JMAP
REGENTS BY STATE STANDARD: TOPIC

NY Geometry Regents Exam Questions
from Spring 2014 to August 2019 Sorted by State Standard: Topic

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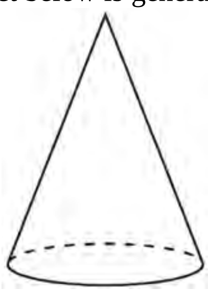
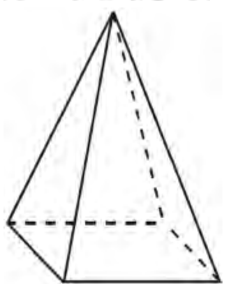
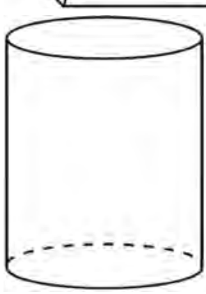
Geometry Regents Exam Questions by State Standard: Topic

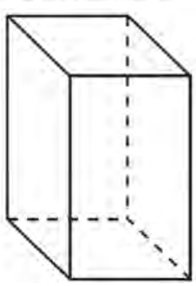
TOOLS OF GEOMETRY
G.GMD.B.4: ROTATIONS OF TWO-DIMENSIONAL OBJECTS

1 A student has a rectangular postcard that he folds in half lengthwise. Next, he rotates it continuously about the folded edge. Which three-dimensional object below is generated by this rotation?

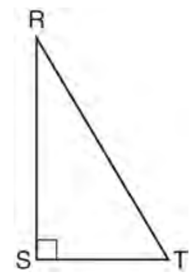
1) 

2) 

3) 

4) 

2 Which object is formed when right triangle RST shown below is rotated around leg $\overline{RS}$?



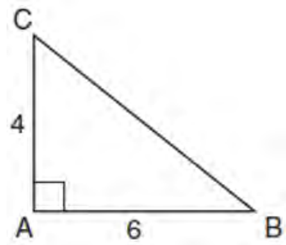
1) a pyramid with a square base
2) an isosceles triangle
3) a right triangle
4) a cone

3 If the rectangle below is continuously rotated about side w, which solid figure is formed?

1) pyramid
2) rectangular prism
3) cone
4) cylinder

4 If an equilateral triangle is continuously rotated around one of its medians, which 3-dimensional object is generated?
1) cone
2) pyramid
3) prism
4) sphere

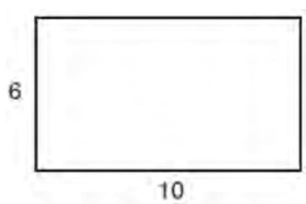
5 In the diagram below, right triangle ABC has legs whose lengths are 4 and 6.



What is the volume of the three-dimensional object formed by continuously rotating the right triangle around $\overline{AB}$?

1) 32π
2) 48π
3) 96π
4) 144π

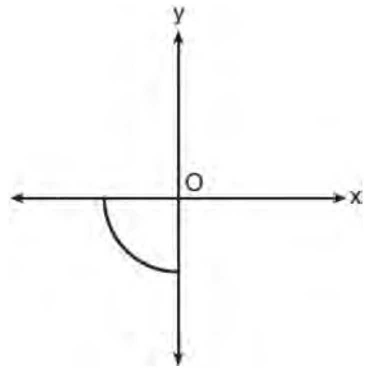
6 A rectangle whose length and width are 10 and 6, respectively, is shown below. The rectangle is continuously rotated around a straight line to form an object whose volume is 150π.



Which line could the rectangle be rotated around?

1) a long side
2) a short side
3) the vertical line of symmetry
4) the horizontal line of symmetry

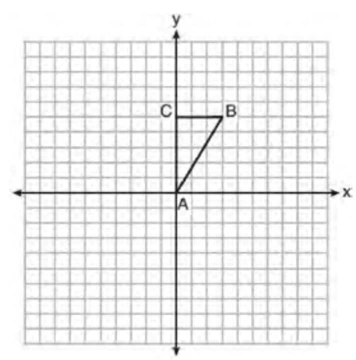
7 Circle O is centered at the origin. In the diagram below, a quarter of circle O is graphed.



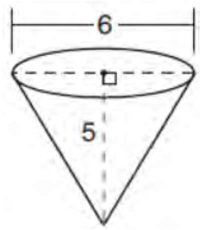
Which three-dimensional figure is generated when the quarter circle is continuously rotated about the y-axis?

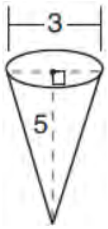
1) cone
2) sphere
3) cylinder
4) hemisphere

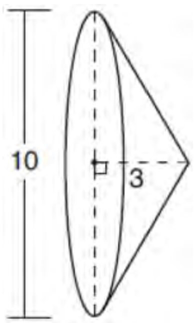
8 Triangle ABC, with vertices at $A(0,0)$, $B(3,5)$, and $C(0,5)$, is graphed on the set of axes shown below.

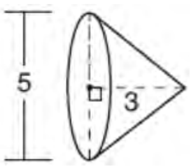


Which figure is formed when $\triangle ABC$ is rotated continuously about $\overline{BC}$?

1) 

2) 

3) 

4) 

9 An isosceles right triangle whose legs measure 6 is continuously rotated about one of its legs to form a three-dimensional object. The three-dimensional object is a
1) cylinder with a diameter of 6
2) cylinder with a diameter of 12
3) cone with a diameter of 6
4) cone with a diameter of 12

10 Which three-dimensional figure will result when a rectangle 6 inches long and 5 inches wide is continuously rotated about the longer side?
1) a rectangular prism with a length of 6 inches, width of 6 inches, and height of 5 inches
2) a rectangular prism with a length of 6 inches, width of 5 inches, and height of 5 inches
3) a cylinder with a radius of 5 inches and a height of 6 inches
4) a cylinder with a radius of 6 inches and a height of 5 inches

11 If a rectangle is continuously rotated around one of its sides, what is the three-dimensional figure formed?
1) rectangular prism
2) cylinder
3) sphere
4) cone

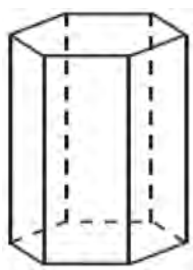
12 Square *MATH* has a side length of 7 inches. Which three-dimensional object will be formed by continuously rotating square *MATH* around side $\overline{AT}$?
1) a right cone with a base diameter of 7 inches
2) a right cylinder with a diameter of 7 inches
3) a right cone with a base radius of 7 inches
4) a right cylinder with a radius of 7 inches

G.GMD.B.4: CROSS-SECTIONS OF THREE-DIMENSIONAL OBJECTS

13 The cross section of a regular pyramid contains the altitude of the pyramid. The shape of this cross section is a
1) circle
2) square
3) triangle
4) rectangle

14 A plane intersects a hexagonal prism. The plane is perpendicular to the base of the prism. Which two-dimensional figure is the cross section of the plane intersecting the prism?
1) triangle
2) trapezoid
3) hexagon
4) rectangle

15 A right hexagonal prism is shown below. A two-dimensional cross section that is perpendicular to the base is taken from the prism.

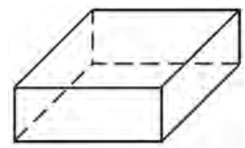


Which figure describes the two-dimensional cross section?
1) triangle
2) rectangle
3) pentagon
4) hexagon

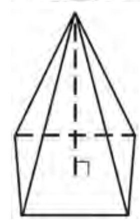
16 A right cylinder is cut perpendicular to its base. The shape of the cross section is a
1) circle
2) cylinder
3) rectangle
4) triangular prism

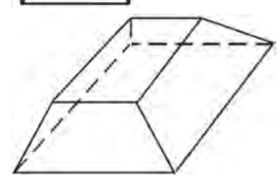
17 A two-dimensional cross section is taken of a three-dimensional object. If this cross section is a triangle, what can *not* be the three-dimensional object?
1) cone
2) cylinder
3) pyramid
4) rectangular prism

18 Which figure can have the same cross section as a sphere?

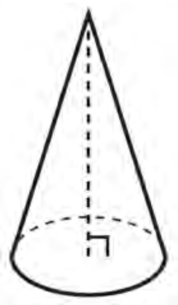
1) 

2) 

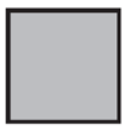
3) 

4) 

19 William is drawing pictures of cross sections of the right circular cone below.



Which drawing can *not* be a cross section of a cone?

1) 

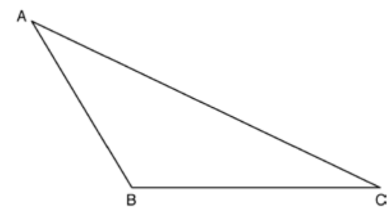
2) 

3) 

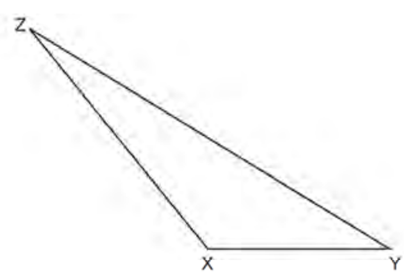
4) 

G.CO.D.12: CONSTRUCTIONS

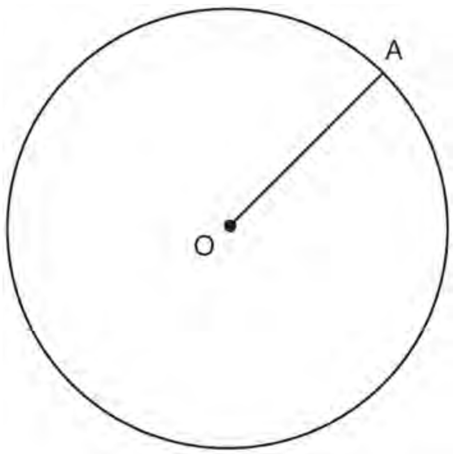
20 Using a compass and straightedge, construct an altitude of triangle ABC below. [Leave all construction marks.]



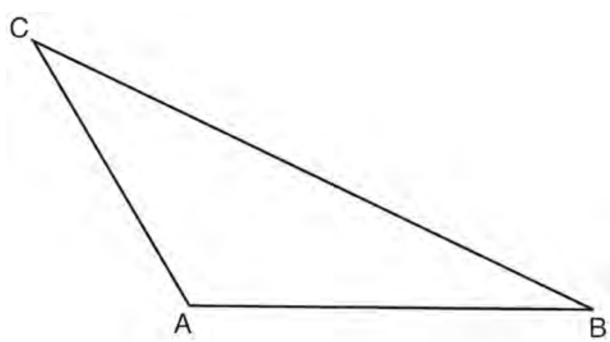
21 Triangle XYZ is shown below. Using a compass and straightedge, on the line below, construct and label $\triangle ABC$, such that $\triangle ABC \cong \triangle XYZ$. [Leave all construction marks.] Based on your construction, state the theorem that justifies why $\triangle ABC$ is congruent to $\triangle XYZ$.



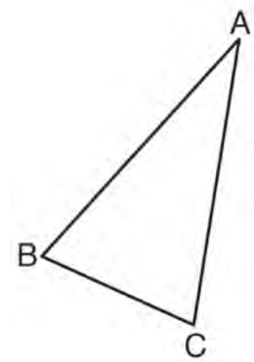
22 In the diagram below, radius $\overline{OA}$ is drawn in circle O. Using a compass and a straightedge, construct a line tangent to circle O at point A. [Leave all construction marks.]



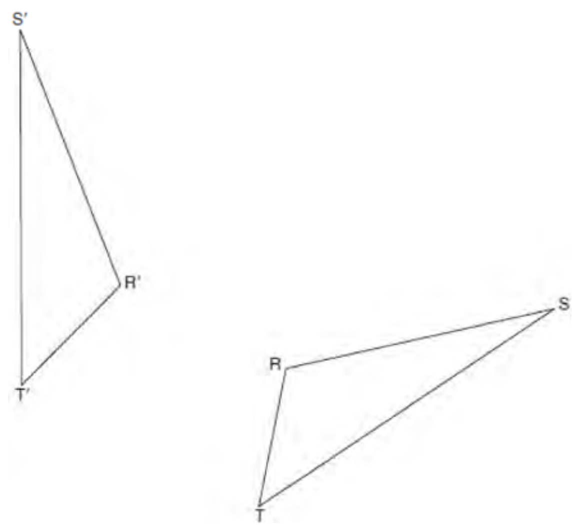
23 In the diagram of $\triangle ABC$ shown below, use a compass and straightedge to construct the median to $\overline{AB}$. [Leave all construction marks.]



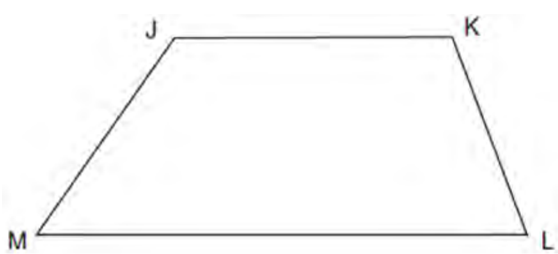
24 Using a compass and straightedge, construct and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation with a scale factor of 2 and centered at B. [Leave all construction marks.] Describe the relationship between the lengths of $\overline{AC}$ and $\overline{A'C'}$.



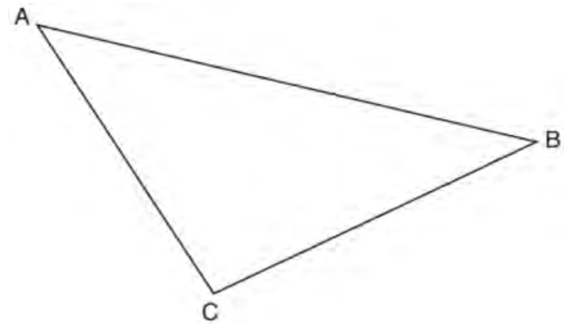
25 Using a compass and straightedge, construct the line of reflection over which triangle *RST* reflects onto triangle *R'S'T'*. [Leave all construction marks.]



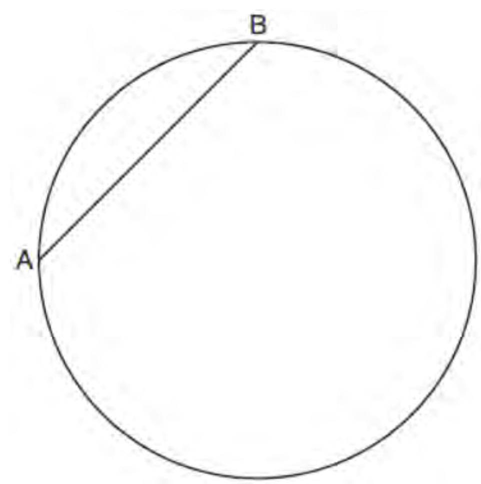
26 Given: Trapezoid *JKLM* with $\overline{JK} \parallel \overline{ML}$
Using a compass and straightedge, construct the altitude from vertex *J* to $\overline{ML}$. [Leave all construction marks.]



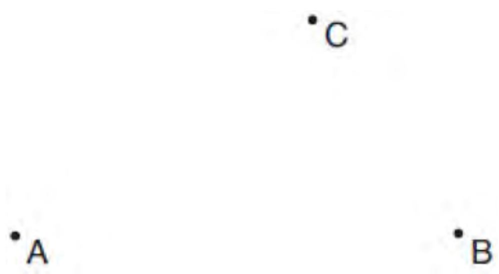
27 Using a compass and straightedge, construct the median to side $\overline{AC}$ in $\triangle ABC$ below. [Leave all construction marks.]



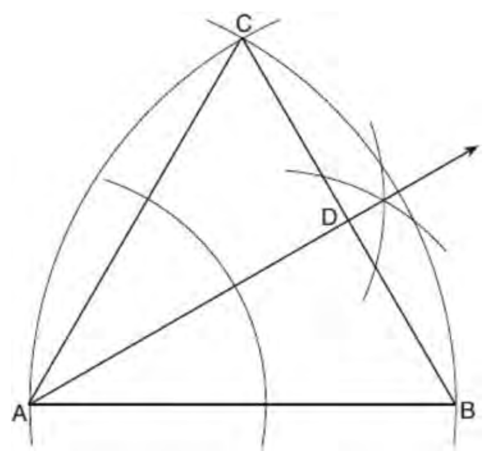
28 In the circle below, $\overline{AB}$ is a chord. Using a compass and straightedge, construct a diameter of the circle. [Leave all construction marks.]



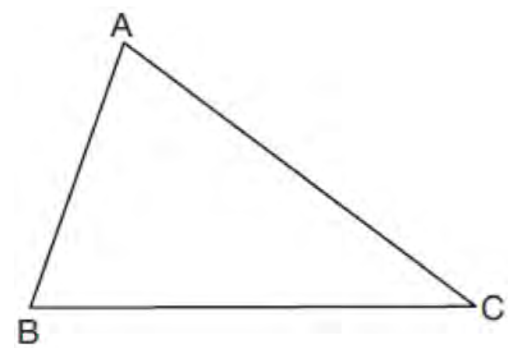
29 Given points *A*, *B*, and *C*, use a compass and straightedge to construct point *D* so that *ABCD* is a parallelogram. [Leave all construction marks.]



30 Using the construction below, state the degree measure of $\angle CAD$. Explain why.



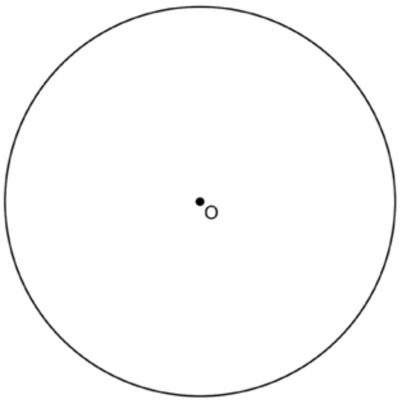
31 Triangle *ABC* is shown below. Using a compass and straightedge, construct the dilation of $\triangle ABC$ centered at *B* with a scale factor of 2. [Leave all construction marks.]



Is the image of $\triangle ABC$ similar to the original triangle? Explain why.

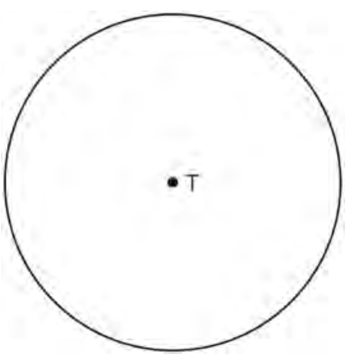
G.CO.D.13: CONSTRUCTIONS

32 Using a straightedge and compass, construct a square inscribed in circle *O* below. [Leave all construction marks.]

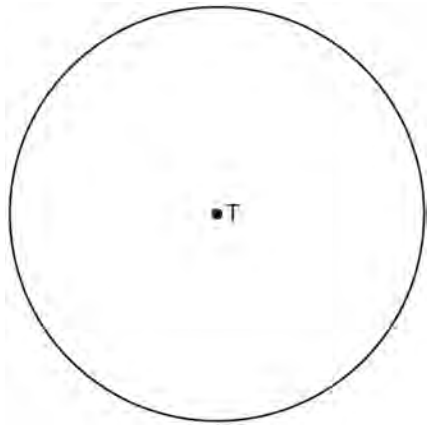


Determine the measure of the arc intercepted by two adjacent sides of the constructed square. Explain your reasoning.

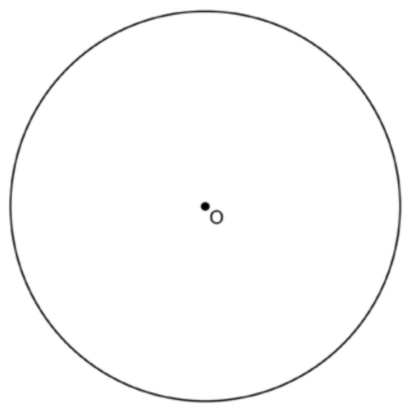
33 Construct an equilateral triangle inscribed in circle *T* shown below. [Leave all construction marks.]



34 Use a compass and straightedge to construct an inscribed square in circle *T* shown below. [Leave all construction marks.]

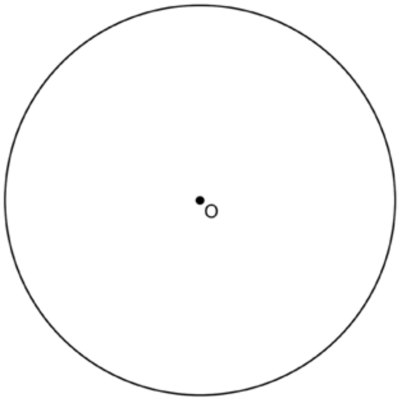


35 Using a compass and straightedge, construct a regular hexagon inscribed in circle *O* below. Label it *ABCDEF*. [Leave all construction marks.]

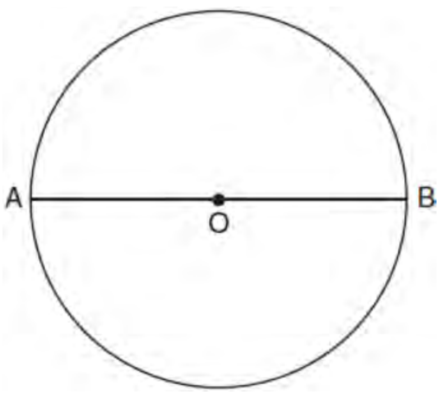


If chords $\overline{FB}$ and $\overline{FC}$ are drawn, which type of triangle, according to its angles, would $\triangle FBC$ be? Explain your answer.

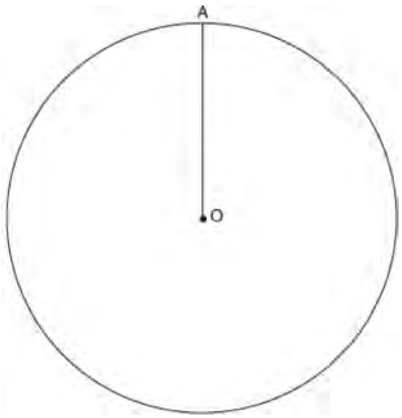
36 Using a compass and straightedge, construct a regular hexagon inscribed in circle *O*. [Leave all construction marks.]



37 The diagram below shows circle *O* with diameter $\overline{AB}$. Using a compass and straightedge, construct a square that is inscribed in circle *O*. [Leave all construction marks.]



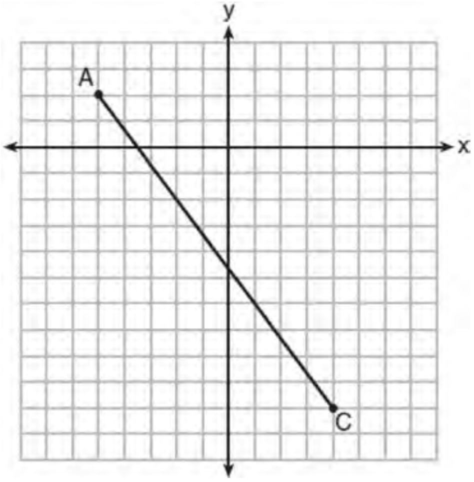
38 Given circle *O* with radius $\overline{OA}$, use a compass and straightedge to construct an equilateral triangle inscribed in circle *O*. [Leave all construction marks.]



LINES AND ANGLES

G.GPE.B.6: DIRECTED LINE SEGMENTS

39 In the diagram below, $\overline{AC}$ has endpoints with coordinates $A(-5,2)$ and $C(4,-10)$.



If B is a point on $\overline{AC}$ and $AB:BC = 1:2$, what are the coordinates of B?
1) $(-2,-2)$
2) $\left(-\frac{1}{2},-4\right)$
3) $\left(0,-\frac{14}{3}\right)$
4) $(1,-6)$

40 What are the coordinates of the point on the directed line segment from $K(-5,-4)$ to $L(5,1)$ that partitions the segment into a ratio of 3 to 2?
1) $(-3,-3)$
2) $(-1,-2)$
3) $\left(0,-\frac{3}{2}\right)$
4) $(1,-1)$

41 Point P is on the directed line segment from point $X(-6,-2)$ to point $Y(6,7)$ and divides the segment in the ratio $1:5$. What are the coordinates of point P?
1) $\left(4,5\frac{1}{2}\right)$
2) $\left(-\frac{1}{2},-4\right)$
3) $\left(-4\frac{1}{2},0\right)$
4) $\left(-4,-\frac{1}{2}\right)$

42 Point Q is on $\overline{MN}$ such that $MQ:QN = 2:3$. If M has coordinates $(3,5)$ and N has coordinates $(8,-5)$, the coordinates of Q are
1) $(5,1)$
2) $(5,0)$
3) $(6,-1)$
4) $(6,0)$

43 Line segment RW has endpoints $R(-4,5)$ and $W(6,20)$. Point P is on $\overline{RW}$ such that $RP:PW$ is 2:3. What are the coordinates of point P?
1) $(2,9)$
2) $(0,11)$
3) $(2,14)$
4) $(10,2)$

44 The coordinates of the endpoints of $\overline{AB}$ are $A(-8,-2)$ and $B(16,6)$. Point P is on $\overline{AB}$. What are the coordinates of point P, such that $AP:PB$ is 3:5?
1) $(1,1)$
2) $(7,3)$
3) $(9.6,3.6)$
4) $(6.4,2.8)$

45 Directed line segment DE has endpoints $D(-4,-2)$ and $E(1,8)$. Point F divides $\overline{DE}$ such that $DF:FE$ is 2:3. What are the coordinates of F?
1) (–3.0)
2) $(-2,2)$
3) $(-1,4)$
4) $(2,4)$

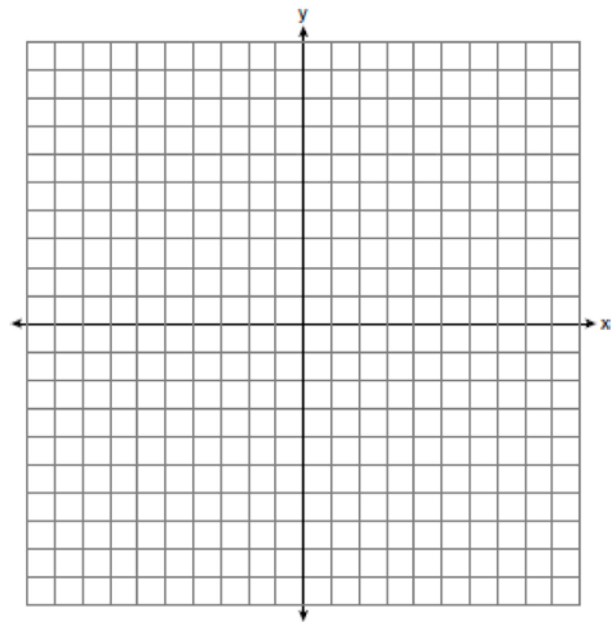
46 The coordinates of the endpoints of directed line segment ABC are $A(-8,7)$ and $C(7,-13)$. If $AB:BC = 3:2$, the coordinates of B are
1) $(1,-5)$
2) $(-2,-1)$
3) $(-3,0)$
4) $(3,-6)$

47 Point M divides $\overline{AB}$ so that $AM:MB = 1:2$. If A has coordinates $(-1,-3)$ and B has coordinates $(8,9)$, the coordinates of M are
1) $(2,1)$
2) $\left(\frac{5}{3},0\right)$
3) $(5,5)$
4) $\left(\frac{23}{3},8\right)$

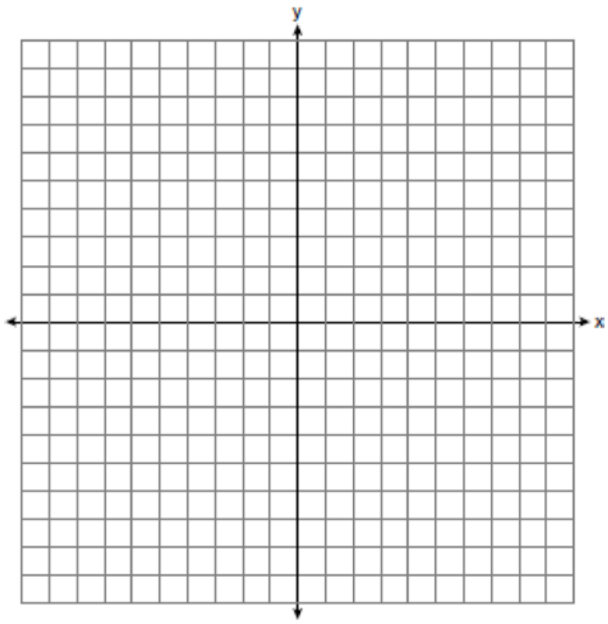
48 What are the coordinates of point C on the directed segment from $A(-8,4)$ to $B(10,-2)$ that partitions the segment such that $AC:CB$ is 2:1?
1) $(1,1)$
2) $(-2,2)$
3) $(2,-2)$
4) $(4,0)$

49 The coordinates of the endpoints of $\overline{QS}$ are $Q(-9,8)$ and $S(9,-4)$. Point R is on $\overline{QS}$ such that $QR:RS$ is in the ratio of 1:2. What are the coordinates of point R?
1) $(0,2)$
2) $(3,0)$
3) $(-3,4)$
4) $(-6,6)$

50 The coordinates of the endpoints of $\overline{AB}$ are $A(-6,-5)$ and $B(4,0)$. Point P is on $\overline{AB}$. Determine and state the coordinates of point P, such that $AP:PB$ is $2:3$. [The use of the set of axes below is optional.]



51 Directed line segment PT has endpoints whose coordinates are $P(-2,1)$ and $T(4,7)$. Determine the coordinates of point J that divides the segment in the ratio 2 to 1. [The use of the set of axes below is optional.]

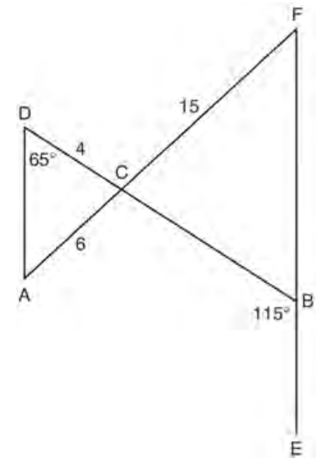


52 The endpoints of $\overline{DEF}$ are $D(1,4)$ and $F(16,14)$. Determine and state the coordinates of point E, if $DE:EF = 2:3$.

53 Point P is on segment AB such that $AP:PB$ is $4:5$. If A has coordinates $(4,2)$, and B has coordinates $(22,2)$, determine and state the coordinates of P.

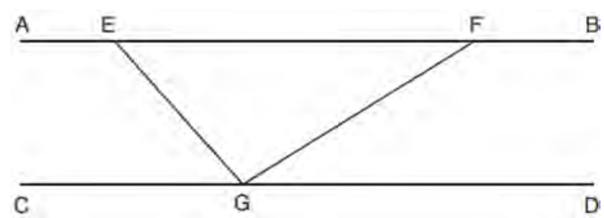
G.CO.C.9: LINES & ANGLES

54 In the diagram below, $\overline{DB}$ and $\overline{AF}$ intersect at point C, and $\overline{AD}$ and $\overline{FBE}$ are drawn.



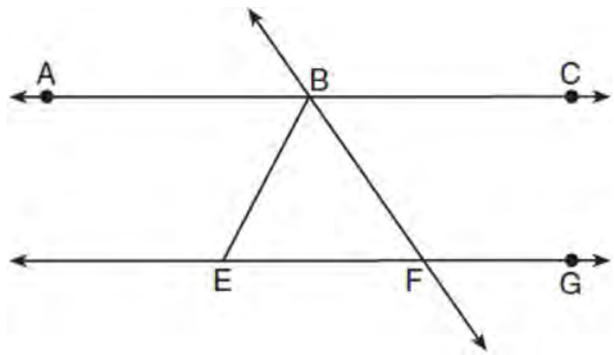
If $AC = 6$, $DC = 4$, $FC = 15$, $m\angle D = 65°$, and $m\angle CBE = 115°$, what is the length of $\overline{CB}$?
1) 10
2) 12
3) 17
4) 22.5

55 In the diagram below, $\overline{AEFB} \parallel \overline{CGD}$, and $\overline{GE}$ and $\overline{GF}$ are drawn.



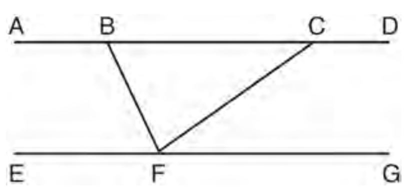
If $m\angle EFG = 32°$ and $m\angle AEG = 137°$, what is $m\angle EGF$?
1) 11º
2) 43º
3) 75º
4) 105º

56 As shown in the diagram below, $\overleftrightarrow{ABC} \parallel \overleftrightarrow{EFG}$ and $\overline{BF} \cong \overline{EF}$.



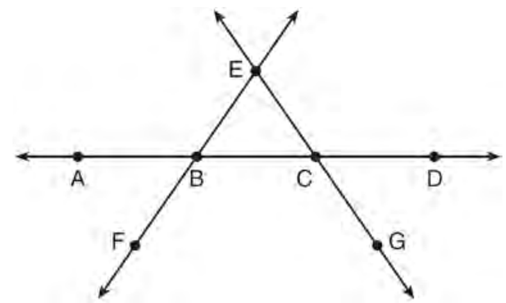
If $m\angle CBF = 42.5°$, then $m\angle EBF$ is
1) 42.5°
2) 68.75°
3) 95°
4) 137.5°

57 Steve drew line segments *ABCD*, *EFG*, *BF*, and *CF* as shown in the diagram below. Scalene $\triangle BFC$ is formed.



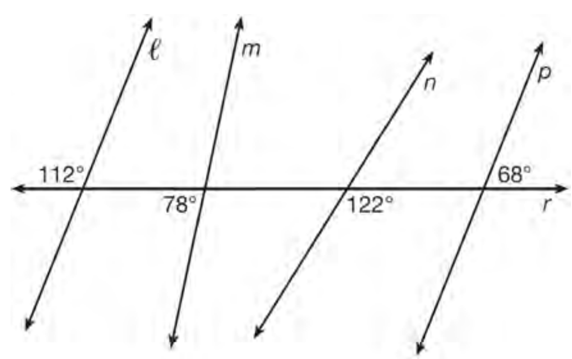
Which statement will allow Steve to prove $\overline{ABCD} \parallel \overline{EFG}$?
1) $\angle CFG \cong \angle FCB$
2) $\angle ABF \cong \angle BFC$
3) $\angle EFB \cong \angle CFB$
4) $\angle CBF \cong \angle GFC$

58 In the diagram below, $\overleftrightarrow{FE}$ bisects $\overline{AC}$ at *B*, and $\overleftrightarrow{GE}$ bisects $\overline{BD}$ at *C*.



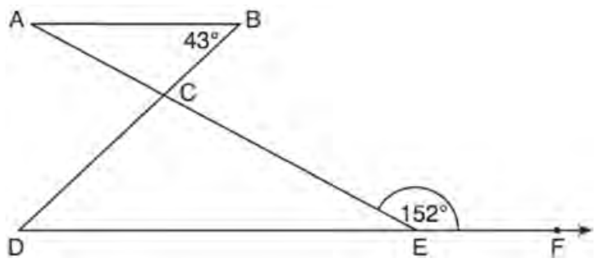
Which statement is always true?
1) $\overline{AB} \cong \overline{DC}$
2) $\overline{FB} \cong \overline{EB}$
3) $\overleftrightarrow{BD}$ bisects $\overline{GE}$ at *C*.
4) $\overleftrightarrow{AC}$ bisects $\overline{FE}$ at *B*.

59 In the diagram below, lines ℓ, *m*, *n*, and *p* intersect line *r*.



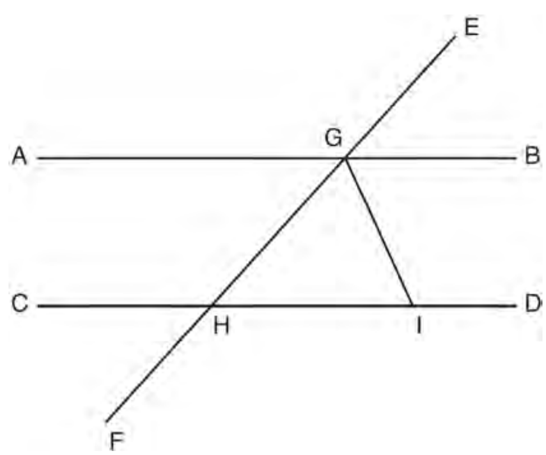
Which statement is true?
1) $\ell \parallel n$
2) $\ell \parallel p$
3) $m \parallel p$
4) $m \parallel n$

60 In the diagram below, $\overline{AB} \parallel \overrightarrow{DEF}$, $\overline{AE}$ and $\overline{BD}$ intersect at C, $m\angle B = 43°$, and $m\angle CEF = 152°$.



Which statement is true?
1) $m\angle D = 28°$
2) $m\angle A = 43°$
3) $m\angle ACD = 71°$
4) $m\angle BCE = 109°$

61 In the diagram below, $\overline{EF}$ intersects $\overline{AB}$ and $\overline{CD}$ at G and H, respectively, and $\overline{GI}$ is drawn such that $\overline{GH} \cong \overline{IH}$.

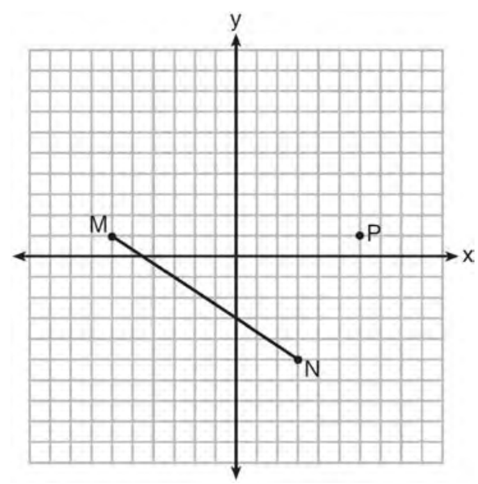


If $m\angle EGB = 50°$ and $m\angle DIG = 115°$, explain why $\overline{AB} \parallel \overline{CD}$.

62 Segment CD is the perpendicular bisector of $\overline{AB}$ at E. Which pair of segments does *not* have to be congruent?
1) $\overline{AD}, \overline{BD}$
2) $\overline{AC}, \overline{BC}$
3) $\overline{AE}, \overline{BE}$
4) $\overline{DE}, \overline{CE}$

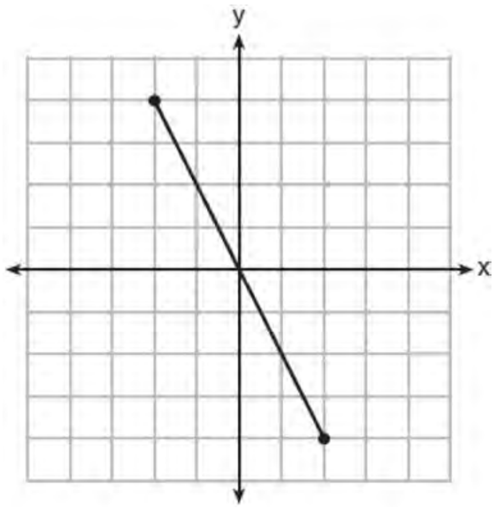
G.GPE.B.5: PARALLEL AND PERPENDICULAR LINES

63 Given $\overline{MN}$ shown below, with $M(-6,1)$ and $N(3,-5)$, what is an equation of the line that passes through point $P(6,1)$ and is parallel to $\overline{MN}$?



1) $y = -\frac{2}{3}x + 5$
2) $y = -\frac{2}{3}x - 3$
3) $y = \frac{3}{2}x + 7$
4) $y = \frac{3}{2}x - 8$

64 What is an equation of the perpendicular bisector of the line segment shown in the diagram below?



1) $y + 2x = 0$
2) $y - 2x = 0$
3) $2y + x = 0$
4) $2y - x = 0$

65 An equation of a line perpendicular to the line represented by the equation $y = -\frac{1}{2}x - 5$ and passing through $(6,-4)$ is

1) $y = -\frac{1}{2}x + 4$
2) $y = -\frac{1}{2}x - 1$
3) $y = 2x + 14$
4) $y = 2x - 16$

66 Line segment NY has endpoints $N(-11,5)$ and $Y(5,-7)$. What is the equation of the perpendicular bisector of $\overline{NY}$?

1) $y + 1 = \frac{4}{3}(x + 3)$
2) $y + 1 = -\frac{3}{4}(x + 3)$
3) $y - 6 = \frac{4}{3}(x - 8)$
4) $y - 6 = -\frac{3}{4}(x - 8)$

67 Which equation represents the line that passes through the point $(-2,2)$ and is parallel to $y = \frac{1}{2}x + 8$?

1) $y = \frac{1}{2}x$
2) $y = -2x - 3$
3) $y = \frac{1}{2}x + 3$
4) $y = -2x + 3$

68 What is an equation of a line that is perpendicular to the line whose equation is $2y = 3x - 10$ and passes through $(-6,1)$?

1) $y = -\frac{2}{3}x - 5$
2) $y = -\frac{2}{3}x - 3$
3) $y = \frac{2}{3}x + 1$
4) $y = \frac{2}{3}x + 10$

69 What is an equation of a line which passes through $(6,9)$ and is perpendicular to the line whose equation is $4x - 6y = 15$?

1) $y - 9 = -\frac{3}{2}(x - 6)$
2) $y - 9 = \frac{2}{3}(x - 6)$
3) $y + 9 = -\frac{3}{2}(x + 6)$
4) $y + 9 = \frac{2}{3}(x + 6)$

70 What is an equation of the line that passes through the point $(6,8)$ and is perpendicular to a line with equation $y = \frac{3}{2}x + 5$?

1) $y - 8 = \frac{3}{2}(x - 6)$
2) $y - 8 = -\frac{2}{3}(x - 6)$
3) $y + 8 = \frac{3}{2}(x + 6)$
4) $y + 8 = -\frac{2}{3}(x + 6)$

71 Which equation represents a line parallel to the line whose equation is $-2x + 3y = -4$ and passes through the point $(1,3)$?

1) $y - 3 = -\frac{3}{2}(x - 1)$
2) $y - 3 = \frac{2}{3}(x - 1)$
3) $y + 3 = -\frac{3}{2}(x + 1)$
4) $y + 3 = \frac{2}{3}(x + 1)$

72 Which equation represents a line that is perpendicular to the line represented by $2x - y = 7$?

1) $y = -\frac{1}{2}x + 6$
2) $y = \frac{1}{2}x + 6$
3) $y = -2x + 6$
4) $y = 2x + 6$

73 Which equation represents a line that is perpendicular to the line represented by $y = \frac{2}{3}x + 1$?

1) $3x + 2y = 12$
2) $3x - 2y = 12$
3) $y = \frac{3}{2}x + 2$
4) $y = -\frac{2}{3}x + 4$

74 What is an equation of a line that is perpendicular to the line whose equation is $2y + 3x = 1$?

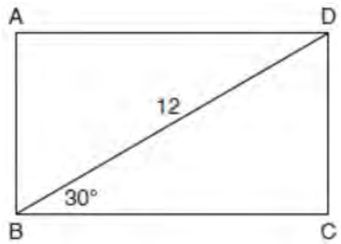
1) $y = \frac{2}{3}x + \frac{5}{2}$
2) $y = \frac{3}{2}x + 2$
3) $y = -\frac{2}{3}x + 1$
4) $y = -\frac{3}{2}x + \frac{1}{2}$

75 Write an equation of the line that is parallel to the line whose equation is $3y + 7 = 2x$ and passes through the point $(2,6)$.

TRIANGLES

G.SRT.C.8: 30-60-90 TRIANGLES

76 The diagram shows rectangle *ABCD*, with diagonal $\overline{BD}$.

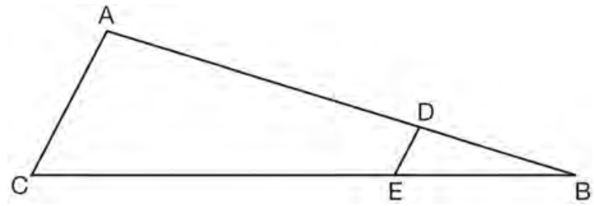


What is the perimeter of rectangle *ABCD*, to the *nearest tenth*?
1) 28.4
2) 32.8
3) 48.0
4) 62.4

77 An equilateral triangle has sides of length 20. To the *nearest tenth*, what is the height of the equilateral triangle?
1) 10.0
2) 11.5
3) 17.3
4) 23.1

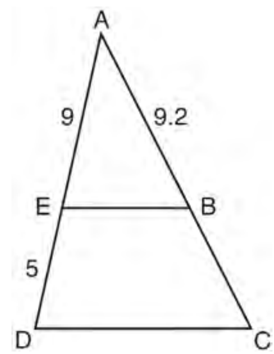
G.SRT.B.5: SIDE SPLITTER THEOREM

78 In the diagram of $\triangle ABC$, points *D* and *E* are on $\overline{AB}$ and $\overline{CB}$, respectively, such that $\overline{AC} \parallel \overline{DE}$.



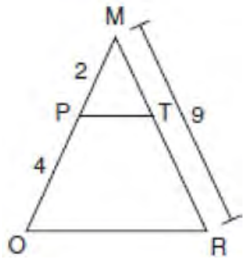
If $AD = 24$, $DB = 12$, and $DE = 4$, what is the length of $\overline{AC}$?
1) 8
2) 12
3) 16
4) 72

79 In the diagram of $\triangle ADC$ below, $\overline{EB} \parallel \overline{DC}$, $AE = 9$, $ED = 5$, and $AB = 9.2$.



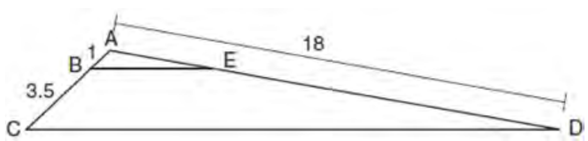
What is the length of $\overline{AC}$, to the *nearest tenth*?
1) 5.1
2) 5.2
3) 14.3
4) 14.4

80 Given $\triangle MRO$ shown below, with trapezoid $PTRO$, $MR = 9$, $MP = 2$, and $PO = 4$.



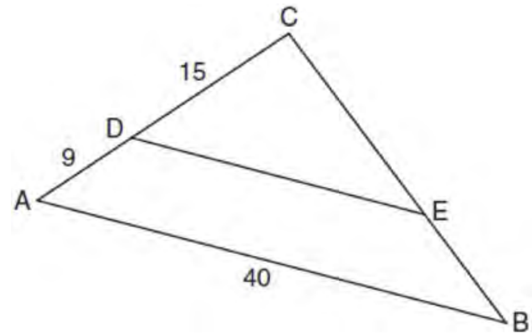
What is the length of $\overline{TR}$?
1) 4.5
2) 5
3) 3
4) 6

81 In the diagram below, triangle ACD has points B and E on sides $\overline{AC}$ and $\overline{AD}$, respectively, such that $\overline{BE} \parallel \overline{CD}$, $AB = 1$, $BC = 3.5$, and $AD = 18$.



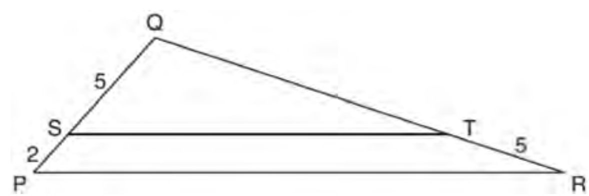
What is the length of $\overline{AE}$, to the *nearest tenth*?
1) 14.0
2) 5.1
3) 3.3
4) 4.0

82 In the diagram of $\triangle ABC$ below, $\overline{DE}$ is parallel to $\overline{AB}$, $CD = 15$, $AD = 9$, and $AB = 40$.



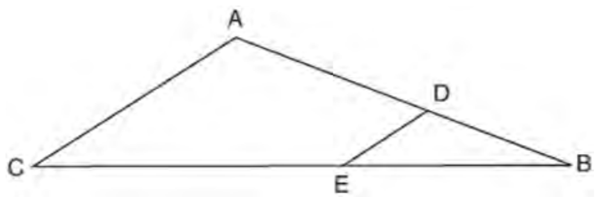
The length of $\overline{DE}$ is
1) 15
2) 24
3) 25
4) 30

83 In the diagram below of $\triangle PQR$, $\overline{ST}$ is drawn parallel to $\overline{PR}$, $PS = 2$, $SQ = 5$, and $TR = 5$.



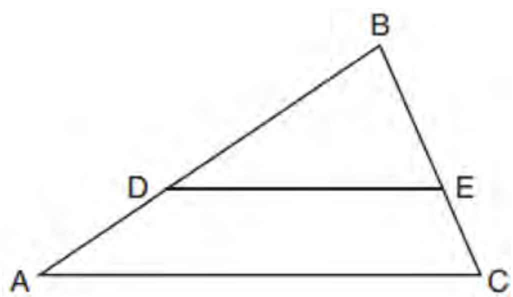
What is the length of $\overline{QR}$?
1) 7
2) 2
3) $12\frac{1}{2}$
4) $17\frac{1}{2}$

84 In the diagram of $\triangle ABC$ below, points D and E are on sides $\overline{AB}$ and $\overline{CB}$ respectively, such that $\overline{DE} \parallel \overline{AC}$.



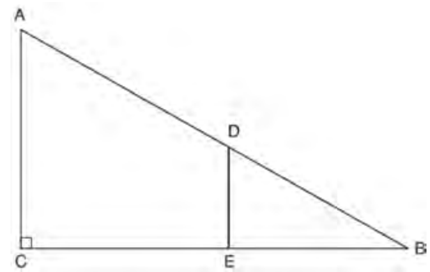
If EB is 3 more than DB, $AB = 14$, and $CB = 21$, what is the length of $\overline{AD}$?
1) 6
2) 8
3) 9
4) 12

85 In triangle ABC, points D and E are on sides $\overline{AB}$ and $\overline{BC}$, respectively, such that $\overline{DE} \parallel \overline{AC}$, and $AD:DB = 3:5$.



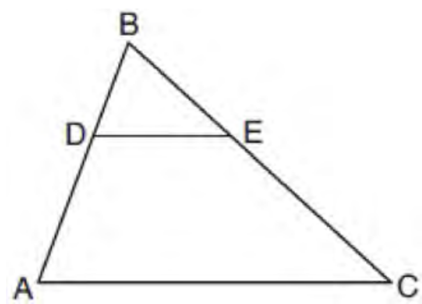
If $DB = 6.3$ and $AC = 9.4$, what is the length of $\overline{DE}$, to the *nearest tenth*?
1) 3.8
2) 5.6
3) 5.9
4) 15.7

86 In right triangle ABC shown below, point D is on $\overline{AB}$ and point E is on $\overline{CB}$ such that $\overline{AC} \parallel \overline{DE}$.



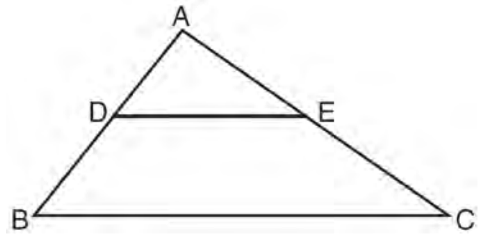
If $AB = 15$, $BC = 12$, and $EC = 7$, what is the length of $\overline{BD}$?
1) 8.75
2) 6.25
3) 5
4) 4

87 In the diagram below of $\triangle ABC$, D is a point on $\overline{BA}$, E is a point on $\overline{BC}$, and $\overline{DE}$ is drawn.



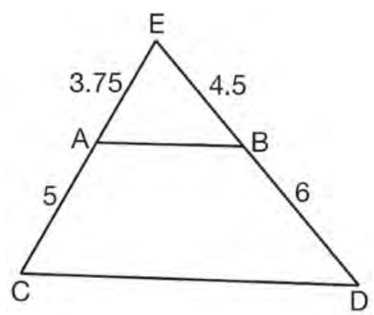
If $BD = 5$, $DA = 12$, and $BE = 7$, what is the length of $\overline{BC}$ so that $\overline{AC} \parallel \overline{DE}$?
1) 23.8
2) 16.8
3) 15.6
4) 8.6

88 In the diagram below, $\triangle ABC \sim \triangle ADE$.



Which measurements are justified by this similarity?
1) $AD = 3$, $AB = 6$, $AE = 4$, and $AC = 12$
2) $AD = 5$, $AB = 8$, $AE = 7$, and $AC = 10$
3) $AD = 3$, $AB = 9$, $AE = 5$, and $AC = 10$
4) $AD = 2$, $AB = 6$, $AE = 5$, and $AC = 15$

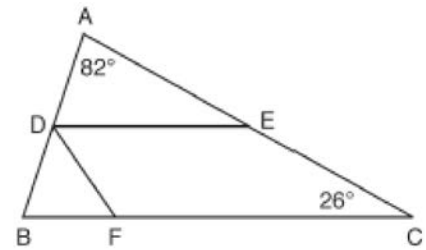
89 In $\triangle CED$ as shown below, points A and B are located on sides $\overline{CE}$ and $\overline{ED}$, respectively. Line segment AB is drawn such that $AE = 3.75$, $AC = 5$, $EB = 4.5$, and $BD = 6$.



Explain why $\overline{AB}$ is parallel to $\overline{CD}$.

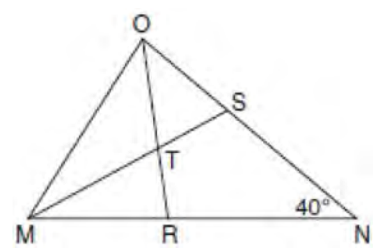
G.CO.C.10: INTERIOR AND EXTERIOR ANGLES OF TRIANGLES

90 In the diagram below, $\overline{DE}$ divides $\overline{AB}$ and $\overline{AC}$ proportionally, $m\angle C = 26°$, $m\angle A = 82°$, and $\overline{DF}$ bisects $\angle BDE$.



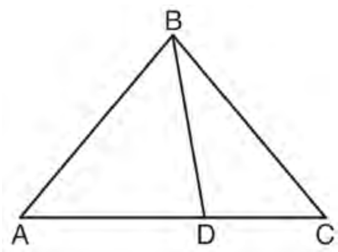
The measure of angle DFB is
1) 36°
2) 54°
3) 72°
4) 82°

91 In the diagram below of triangle MNO, $\angle M$ and $\angle O$ are bisected by $\overline{MS}$ and $\overline{OR}$, respectively. Segments MS and OR intersect at T, and $m\angle N = 40°$.



If $m\angle TMR = 28°$, the measure of angle OTS is
1) 40º
2) 50º
3) 60º
4) 70º

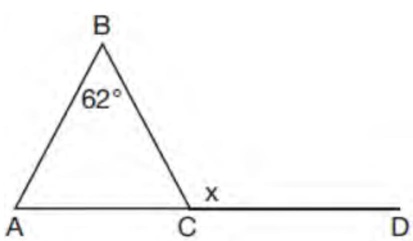
92 In the diagram below, $m\angle BDC = 100°$, $m\angle A = 50°$, and $m\angle DBC = 30°$.



Which statement is true?
1) $\triangle ABD$ is obtuse.
2) $\triangle ABC$ is isosceles.
3) $m\angle ABD = 80°$
4) $\triangle ABD$ is scalene.

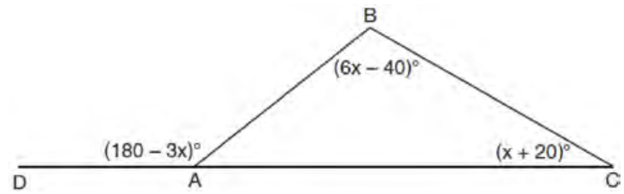
G.CO.C.10: EXTERIOR ANGLE THEOREM

93 Given $\triangle ABC$ with $m\angle B = 62°$ and side $\overline{AC}$ extended to D, as shown below.



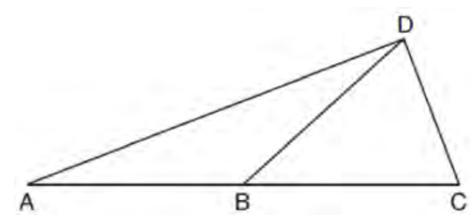
Which value of x makes $\overline{AB} \cong \overline{CB}$?
1) 59º
2) 62º
3) 118º
4) 121º

94 In $\triangle ABC$ shown below, side $\overline{AC}$ is extended to point D with $m\angle DAB = (180 - 3x)°$, $m\angle B = (6x - 40)°$, and $m\angle C = (x + 20)°$.



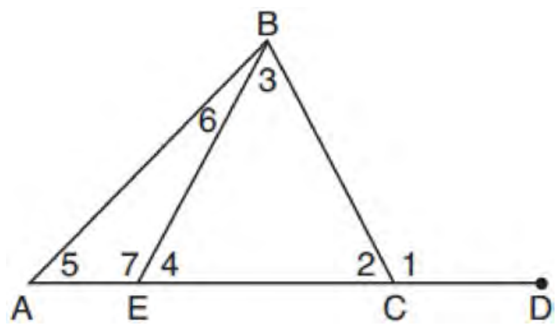
What is $m\angle BAC$?
1) 20º
2) 40º
3) 60º
4) 80º

95 In the diagram below of $\triangle ACD$, $\overline{DB}$ is a median to $\overline{AC}$, and $\overline{AB} \cong \overline{DB}$.



If $m\angle DAB = 32°$, what is $m\angle BDC$?
1) 32º
2) 52º
3) 58º
4) 64º

96 In the diagram below of triangle ABC, $\overline{AC}$ is extended through point C to point D, and $\overline{BE}$ is drawn to $\overline{AC}$.

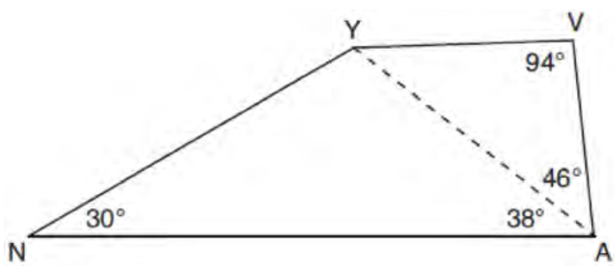


Which equation is always true?

1) $m\angle 1 = m\angle 3 + m\angle 2$
2) $m\angle 5 = m\angle 3 - m\angle 2$
3) $m\angle 6 = m\angle 3 - m\angle 2$
4) $m\angle 7 = m\angle 3 + m\angle 2$

G.CO.C.10: ANGLE SIDE RELATIONSHIP

97 In the diagram of quadrilateral $NAVY$ below, $m\angle YNA = 30°$, $m\angle YAN = 38°$, $m\angle AVY = 94°$, and $m\angle VAY = 46°$.



Which segment has the shortest length?

1) $\overline{AY}$
2) $\overline{NY}$
3) $\overline{VA}$
4) $\overline{VY}$

G.CO.C.10: MEDIANS, ALTITUDES AND BISECTORS

98 In $\triangle ABC$, $\overline{BD}$ is the perpendicular bisector of $\overline{ADC}$. Based upon this information, which statements below can be proven?

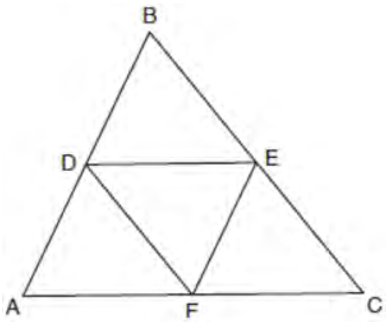
I. $\overline{BD}$ is a median.
II. $\overline{BD}$ bisects $\angle ABC$.
III. $\triangle ABC$ is isosceles.

1) I and II, only
2) I and III, only
3) II and III, only
4) I, II, and III

99 In isosceles $\triangle MNP$, line segment NO bisects vertex $\angle MNP$, as shown below. If $MP = 16$, find the length of $\overline{MO}$ and explain your answer.

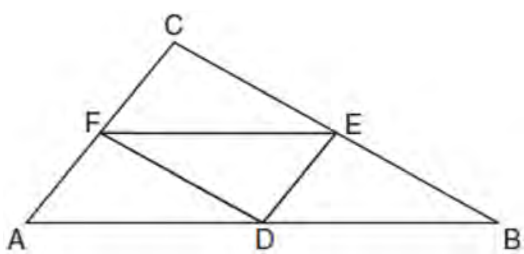
G.CO.C.10: MIDSEGMENTS

100 In the diagram below, $\overline{DE}$, $\overline{DF}$, and $\overline{EF}$ are midsegments of $\triangle ABC$.



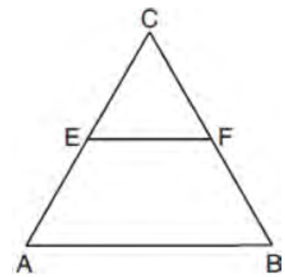
The perimeter of quadrilateral $ADEF$ is equivalent to
1) $AB+BC+AC$
2) $\frac{1}{2}AB+\frac{1}{2}AC$
3) $2AB+2AC$
4) $AB+AC$

101 In the diagram below of $\triangle ABC$, D, E, and F are the midpoints of $\overline{AB}$, $\overline{BC}$, and $\overline{CA}$, respectively.



What is the ratio of the area of $\triangle CFE$ to the area of $\triangle CAB$?
1) 1:1
2) 1:2
3) 1:3
4) 1:4

102 In the diagram of equilateral triangle ABC shown below, E and F are the midpoints of $\overline{AC}$ and $\overline{BC}$, respectively.

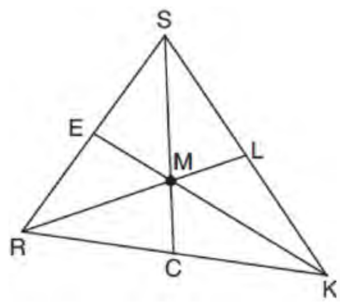


If $EF=2x+8$ and $AB=7x-2$, what is the perimeter of trapezoid $ABFE$?
1) 36
2) 60
3) 100
4) 120

G.CO.C.10: CENTROID, ORTHOCENTER, INCENTER & CIRCUMCENTER

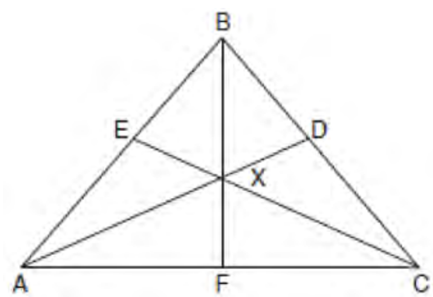
103 If the altitudes of a triangle meet at one of the triangle's vertices, then the triangle is
1) a right triangle
2) an acute triangle
3) an obtuse triangle
4) an equilateral triangle

104 In triangle SRK below, medians $\overline{SC}$, $\overline{KE}$, and $\overline{RL}$ intersect at M.



Which statement must always be true?
1) $3(MC) = SC$
2) $MC = \frac{1}{3}(SM)$
3) $RM = 2MC$
4) $SM = KM$

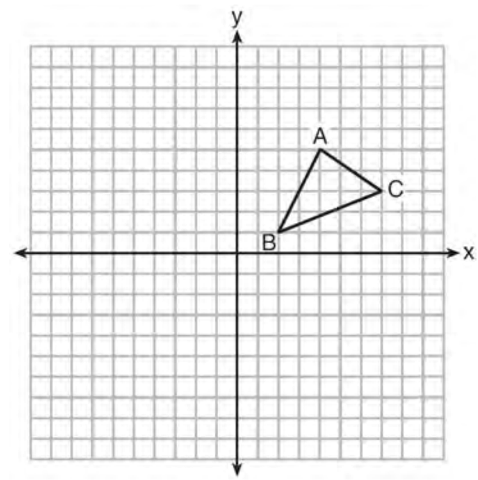
105 In the diagram below of isosceles triangle ABC, $\overline{AB} \cong \overline{CB}$ and angle bisectors $\overline{AD}$, $\overline{BF}$, and $\overline{CE}$ are drawn and intersect at X.



If $m\angle BAC = 50°$, find $m\angle AXC$.

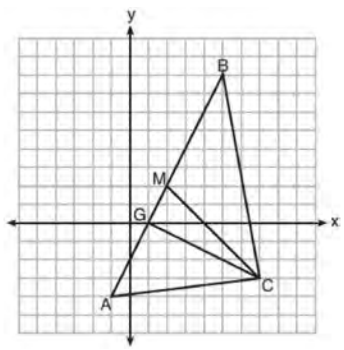
G.GPE.B.4: TRIANGLES IN THE COORDINATE PLANE

106 In the diagram below, $\triangle ABC$ has vertices $A(4,5)$, $B(2,1)$, and $C(7,3)$.



What is the slope of the altitude drawn from A to $\overline{BC}$?
1) $\frac{2}{5}$
2) $\frac{3}{2}$
3) $-\frac{1}{2}$
4) $-\frac{5}{2}$

107 On the set of axes below, $\triangle ABC$, altitude $\overline{CG}$, and median $\overline{CM}$ are drawn.



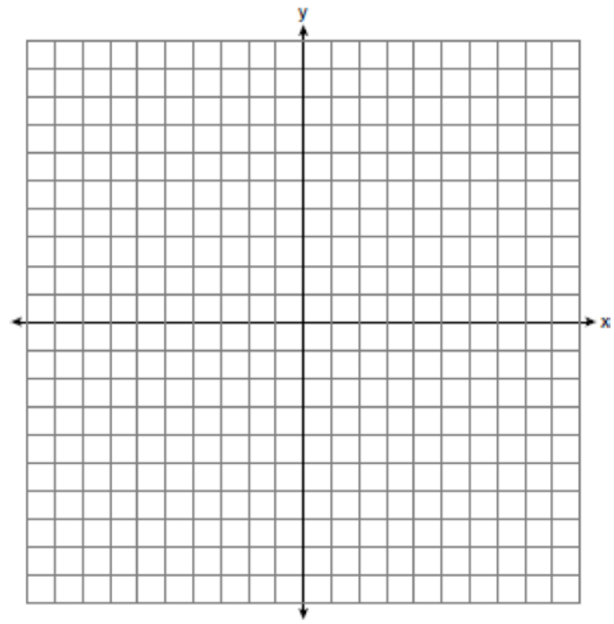
Which expression represents the area of $\triangle ABC$?

1) $\frac{(BC)(AC)}{2}$
2) $\frac{(GC)(BC)}{2}$
3) $\frac{(CM)(AB)}{2}$
4) $\frac{(GC)(AB)}{2}$

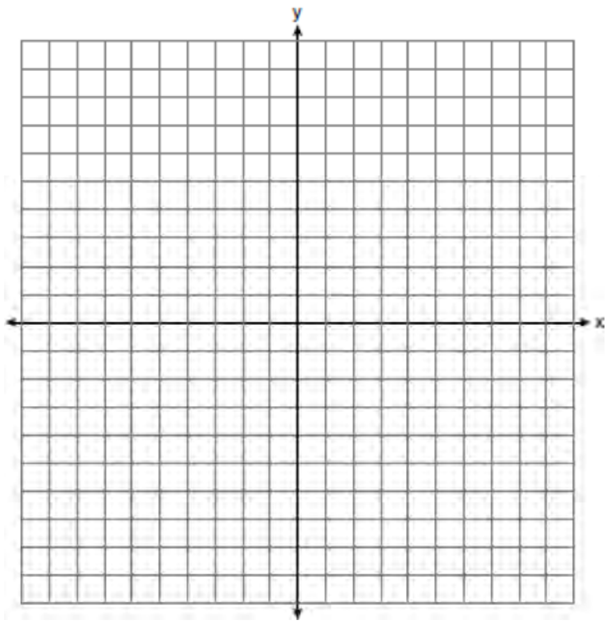
108 The coordinates of the vertices of $\triangle RST$ are $R(-2,-3)$, $S(8,2)$, and $T(4,5)$. Which type of triangle is $\triangle RST$?

1) right
2) acute
3) obtuse
4) equiangular

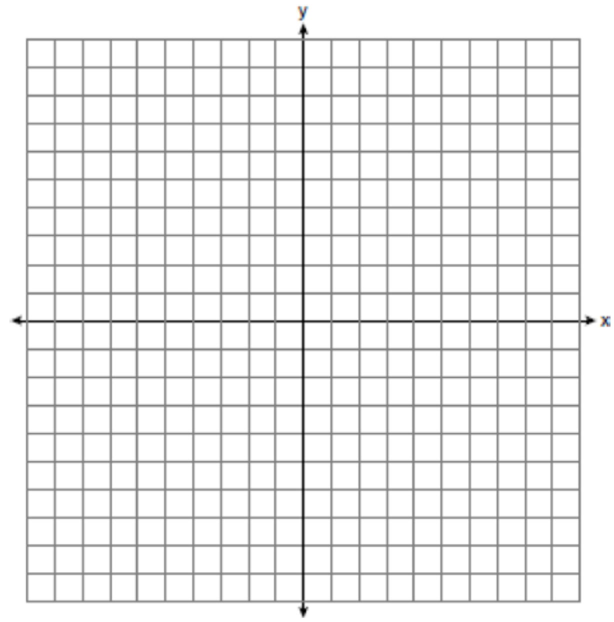
109 Triangle ABC has vertices with $A(x,3)$, $B(-3,-1)$, and $C(-1,-4)$. Determine and state a value of x that would make triangle ABC a right triangle. Justify why $\triangle ABC$ is a right triangle. [The use of the set of axes below is optional.]



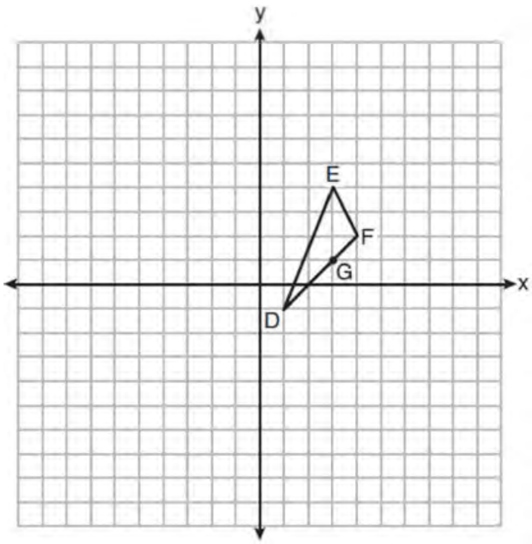
110 Triangle PQR has vertices $P(-3,-1)$, $Q(-1,7)$, and $R(3,3)$, and points A and B are midpoints of $\overline{PQ}$ and $\overline{RQ}$, respectively. Use coordinate geometry to prove that $\overline{AB}$ is parallel to $\overline{PR}$ and is half the length of $\overline{PR}$. [The use of the set of axes below is optional.]



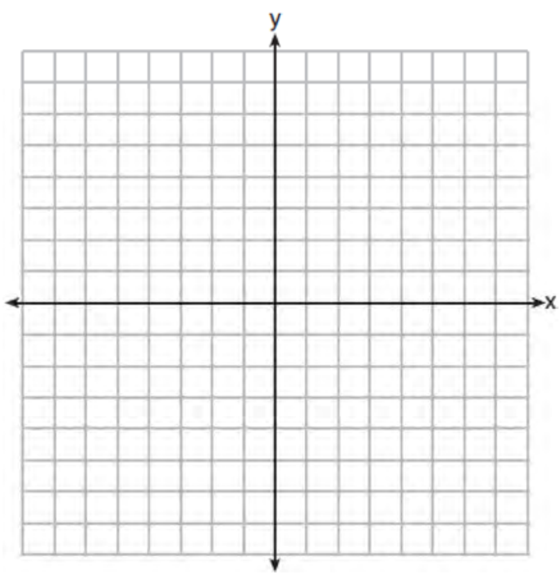
111 Triangle ABC has vertices with coordinates $A(-1,-1)$, $B(4,0)$, and $C(0,4)$. Prove that $\triangle ABC$ is an isosceles triangle but *not* an equilateral triangle. [The use of the set of axes below is optional.]



112 On the set of axes below, $\triangle DEF$ has vertices at the coordinates $D(1,-1)$, $E(3,4)$, and $F(4,2)$, and point G has coordinates $(3,1)$. Owen claims the median from point E must pass through point G. Is Owen correct? Explain why.



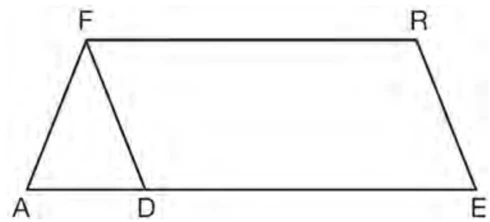
113 A triangle has vertices $A(-2,4)$, $B(6,2)$, and $C(1,-1)$. Prove that $\triangle ABC$ is an isosceles right triangle. [The use of the set of axes below is optional.]



POLYGONS

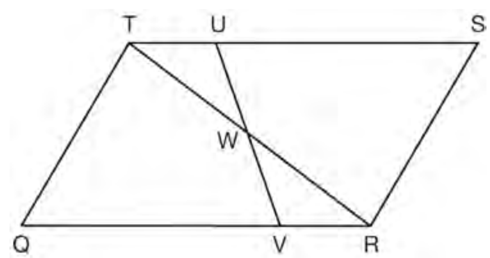
G.CO.C.11: INTERIOR AND EXTERIOR ANGLES OF POLYGONS

114 In the diagram of parallelogram $FRED$ shown below, $\overline{ED}$ is extended to A, and $\overline{AF}$ is drawn such that $\overline{AF} \cong \overline{DF}$.



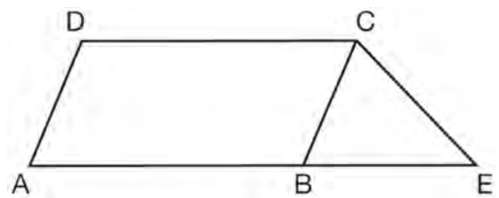
If $m\angle R = 124°$, what is $m\angle AFD$?
1) 124°
2) 112°
3) 68°
4) 56°

115 In parallelogram $QRST$ shown below, diagonal $\overline{TR}$ is drawn, U and V are points on $\overline{TS}$ and $\overline{QR}$, respectively, and $\overline{UV}$ intersects $\overline{TR}$ at W.



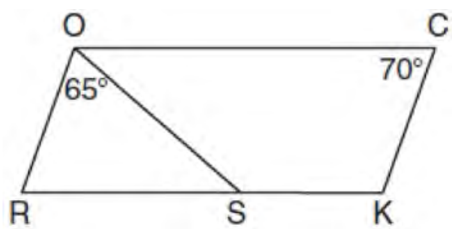
If $m\angle S = 60°$, $m\angle SRT = 83°$, and $m\angle TWU = 35°$, what is $m\angle WVQ$?
1) 37º
2) 60º
3) 72º
4) 83º

116 In the diagram below, $ABCD$ is a parallelogram, $\overline{AB}$ is extended through B to E, and $\overline{CE}$ is drawn.



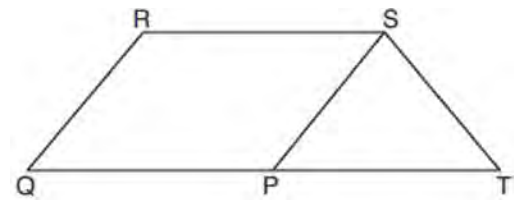
If $\overline{CE} \cong \overline{BE}$ and $m\angle D = 112°$, what is $m\angle E$?
1) 44°
2) 56°
3) 68°
4) 112°

117 In the diagram below of parallelogram $ROCK$, $m\angle C$ is 70° and $m\angle ROS$ is 65°.



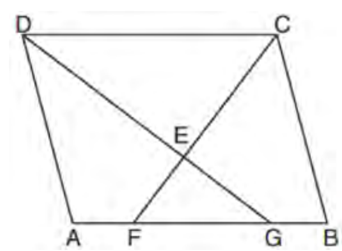
What is $m\angle KSO$?
1) 45º
2) 110º
3) 115º
4) 135º

118 In parallelogram $PQRS$, $\overline{QP}$ is extended to point T and $\overline{ST}$ is drawn.



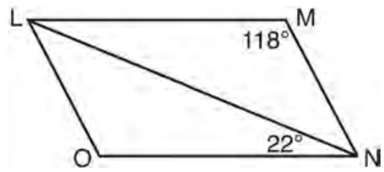
If $\overline{ST} \cong \overline{SP}$ and $m\angle R = 130°$, what is $m\angle PST$?
1) 130°
2) 80°
3) 65°
4) 50°

119 In the diagram below of parallelogram $ABCD$, $\overline{AFGB}$, $\overline{CF}$ bisects $\angle DCB$, $\overline{DG}$ bisects $\angle ADC$, and $\overline{CF}$ and $\overline{DG}$ intersect at E.



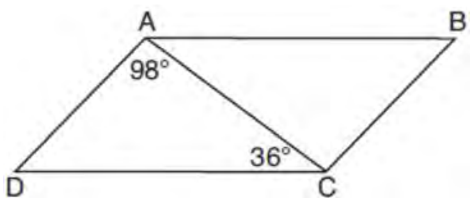
If $m\angle B = 75°$, then the measure of $\angle EFA$ is
1) 142.5°
2) 127.5°
3) 52.5°
4) 37.5°

120 The diagram below shows parallelogram *LMNO* with diagonal $\overline{LN}$, $m\angle M = 118°$, and $m\angle LNO = 22°$.



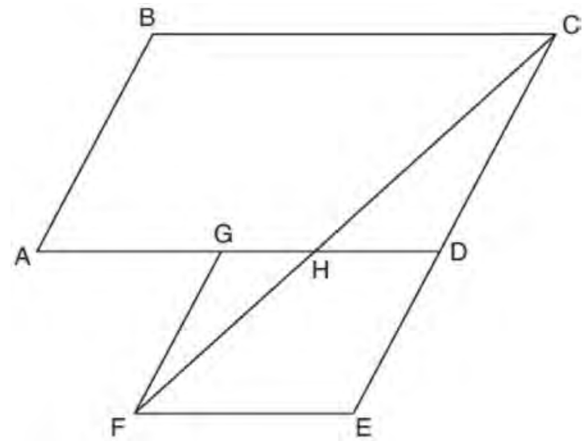
Explain why $m\angle NLO$ is 40 degrees.

121 In parallelogram *ABCD* shown below, $m\angle DAC = 98°$ and $m\angle ACD = 36°$.



What is the measure of angle *B*? Explain why.

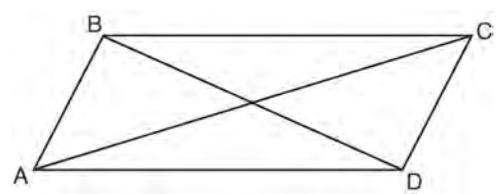
122 Parallelogram *ABCD* is adjacent to rhombus *DEFG*, as shown below, and $\overline{FC}$ intersects $\overline{AGD}$ at *H*.



If $m\angle B = 118°$ and $m\angle AHC = 138°$, determine and state $m\angle GFH$.

G.CO.C.11: PARALLELOGRAMS

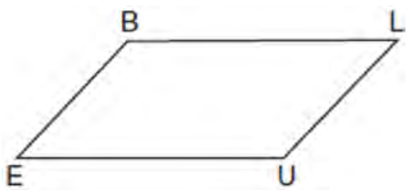
123 Quadrilateral *ABCD* with diagonals $\overline{AC}$ and $\overline{BD}$ is shown in the diagram below.



Which information is *not* enough to prove *ABCD* is a parallelogram?

1) $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{DC}$
2) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$
3) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$
4) $\overline{AB} \parallel \overline{DC}$ and $\overline{BC} \parallel \overline{AD}$

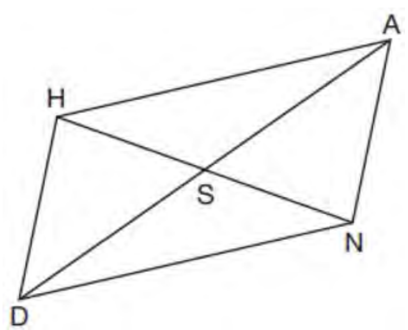
124 In quadrilateral *BLUE* shown below, $\overline{BE} \cong \overline{UL}$.



Which information would be sufficient to prove quadrilateral *BLUE* is a parallelogram?

1) $\overline{BL} \parallel \overline{EU}$
2) $\overline{LU} \parallel \overline{BE}$
3) $\overline{BE} \cong \overline{BL}$
4) $\overline{LU} \cong \overline{EU}$

125 Parallelogram *HAND* is drawn below with diagonals $\overline{HN}$ and $\overline{AD}$ intersecting at *S*.



Which statement is always true?

1) $AN = \frac{1}{2}AD$
2) $AS = \frac{1}{2}AD$
3) $\angle AHS \cong \angle ANS$
4) $\angle HDS \cong \angle NDS$

126 Quadrilateral *ABCD* has diagonals $\overline{AC}$ and $\overline{BD}$. Which information is *not* sufficient to prove *ABCD* is a parallelogram?

1) $\overline{AC}$ and $\overline{BD}$ bisect each other.
2) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{AD}$
3) $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{CD}$
4) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$

127 Quadrilateral *MATH* has both pairs of opposite sides congruent and parallel. Which statement about quadrilateral *MATH* is always true?

1) $\overline{MT} \cong \overline{AH}$
2) $\overline{MT} \perp \overline{AH}$
3) $\angle MHT \cong \angle ATH$
4) $\angle MAT \cong \angle MHT$

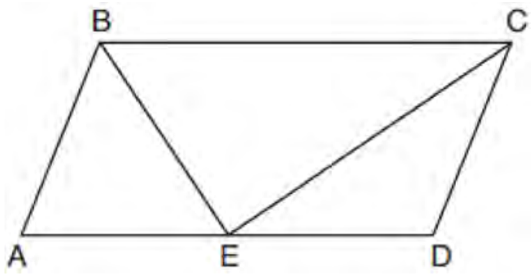
128 Which statement about parallelograms is always true?

1) The diagonals are congruent.
2) The diagonals bisect each other.
3) The diagonals are perpendicular.
4) The diagonals bisect their respective angles.

129 A quadrilateral must be a parallelogram if

1) one pair of sides is parallel and one pair of angles is congruent
2) one pair of sides is congruent and one pair of angles is congruent
3) one pair of sides is both parallel and congruent
4) the diagonals are congruent

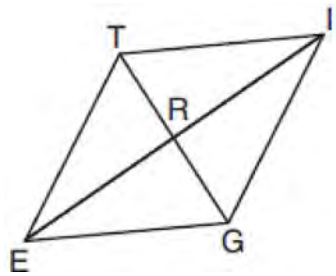
130 In parallelogram *ABCD* shown below, the bisectors of $\angle ABC$ and $\angle DCB$ meet at *E*, a point on $\overline{AD}$.



If $m\angle A = 68°$, determine and state $m\angle BEC$.

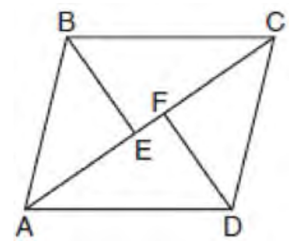
G.CO.C.11: SPECIAL QUADRILATERALS

131 In rhombus *TIGE*, diagonals $\overline{TG}$ and $\overline{IE}$ intersect at *R*. The perimeter of *TIGE* is 68, and *TG* = 16.



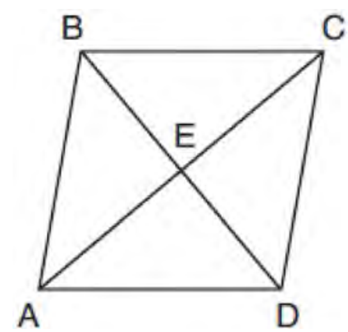
What is the length of diagonal $\overline{IE}$?
1) 15
2) 30
3) 34
4) 52

132 In the diagram below, if $\triangle ABE \cong \triangle CDF$ and $\overline{AEFC}$ is drawn, then it could be proven that quadrilateral *ABCD* is a



1) square
2) rhombus
3) rectangle
4) parallelogram

133 The diagram below shows parallelogram *ABCD* with diagonals $\overline{AC}$ and $\overline{BD}$ intersecting at *E*.



What additional information is sufficient to prove that parallelogram *ABCD* is also a rhombus?
1) $\overline{BD}$ bisects $\overline{AC}$.
2) $\overline{AB}$ is parallel to $\overline{CD}$.
3) $\overline{AC}$ is congruent to $\overline{BD}$.
4) $\overline{AC}$ is perpendicular to $\overline{BD}$.

134 Which set of statements would describe a parallelogram that can always be classified as a rhombus?

I. Diagonals are perpendicular bisectors of each other.

II. Diagonals bisect the angles from which they are drawn.

III. Diagonals form four congruent isosceles right triangles.

1) I and II
2) I and III
3) II and III
4) I, II, and III

135 In rhombus *VENU*, diagonals $\overline{VN}$ and $\overline{EU}$ intersect at *S*. If $VN = 12$ and $EU = 16$, what is the perimeter of the rhombus?

1) 80
2) 40
3) 20
4) 10

136 A parallelogram must be a rectangle when its

1) diagonals are perpendicular
2) diagonals are congruent
3) opposite sides are parallel
4) opposite sides are congruent

137 In parallelogram *ABCD*, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at *E*. Which statement does *not* prove parallelogram *ABCD* is a rhombus?

1) $\overline{AC} \cong \overline{DB}$
2) $\overline{AB} \cong \overline{BC}$
3) $\overline{AC} \perp \overline{DB}$
4) $\overline{AC}$ bisects $\angle DCB$

138 A parallelogram is always a rectangle if

1) the diagonals are congruent
2) the diagonals bisect each other
3) the diagonals intersect at right angles
4) the opposite angles are congruent

139 If *ABCD* is a parallelogram, which statement would prove that *ABCD* is a rhombus?

1) $\angle ABC \cong \angle CDA$
2) $\overline{AC} \cong \overline{BD}$
3) $\overline{AC} \perp \overline{BD}$
4) $\overline{AB} \perp \overline{CD}$

140 A parallelogram must be a rhombus if its diagonals

1) are congruent
2) bisect each other
3) do not bisect its angles
4) are perpendicular to each other

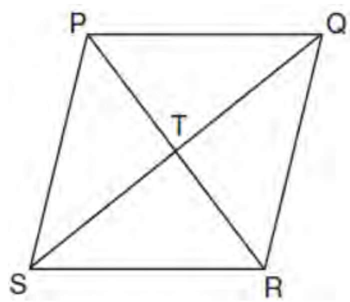
141 Which information is *not* sufficient to prove that a parallelogram is a square?

1) The diagonals are both congruent and perpendicular.
2) The diagonals are congruent and one pair of adjacent sides are congruent.
3) The diagonals are perpendicular and one pair of adjacent sides are congruent.
4) The diagonals are perpendicular and one pair of adjacent sides are perpendicular.

142 In quadrilateral *QRST*, diagonals $\overline{QS}$ and $\overline{RT}$ intersect at *M*. Which statement would always prove quadrilateral *QRST* is a parallelogram?

1) $\angle TQR$ and $\angle QRS$ are supplementary.
2) $\overline{QM} \cong \overline{SM}$ and $\overline{QT} \cong \overline{RS}$
3) $\overline{QR} \cong \overline{TS}$ and $\overline{QT} \cong \overline{RS}$
4) $\overline{QR} \cong \overline{TS}$ and $\overline{QT} \parallel \overline{RS}$

143 In the diagram of rhombus $PQRS$ below, the diagonals $\overline{PR}$ and $\overline{QS}$ intersect at point T, $PR = 16$, and $QS = 30$. Determine and state the perimeter of $PQRS$.



G.GPE.B.4: QUADRILATERALS IN THE COORDINATE PLANE

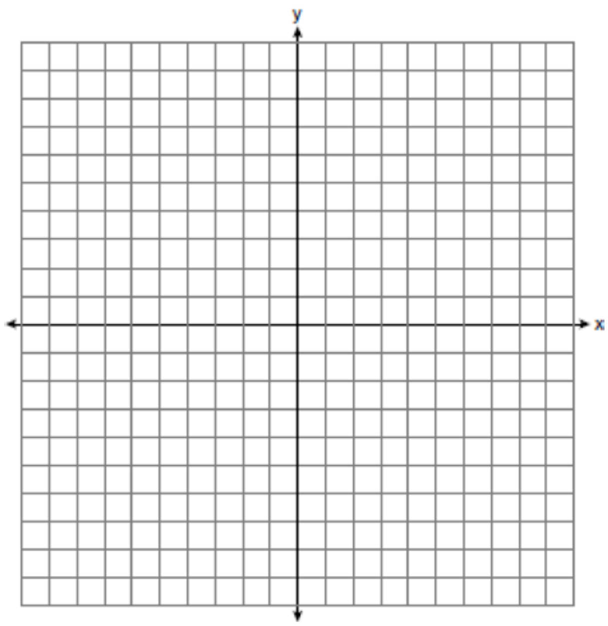
144 A quadrilateral has vertices with coordinates $(-3,1)$, $(0,3)$, $(5,2)$, and $(-1,-2)$. Which type of quadrilateral is this?
1) rhombus
2) rectangle
3) square
4) trapezoid

145 The diagonals of rhombus $TEAM$ intersect at $P(2,1)$. If the equation of the line that contains diagonal $\overline{TA}$ is $y = -x + 3$, what is the equation of a line that contains diagonal EM?
1) $y = x - 1$
2) $y = x - 3$
3) $y = -x - 1$
4) $y = -x - 3$

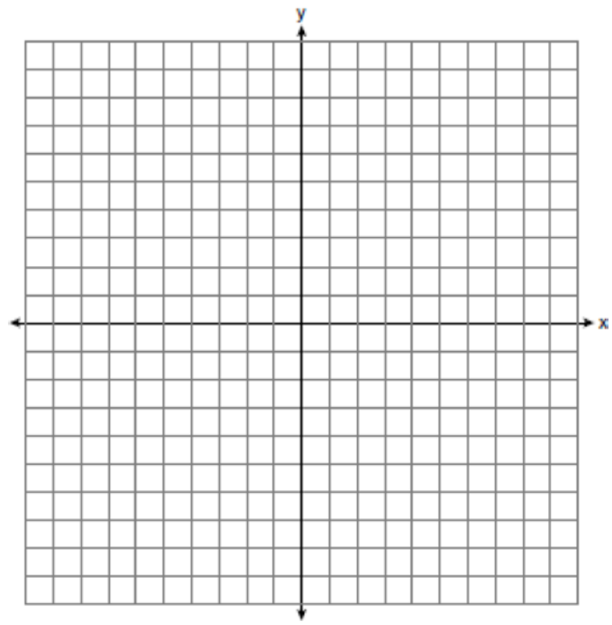
146 The coordinates of the vertices of parallelogram $CDEH$ are $C(-5,5)$, $D(2,5)$, $E(-1,-1)$, and $H(-8,-1)$. What are the coordinates of P, the point of intersection of diagonals $\overline{CE}$ and $\overline{DH}$?
1) $(-2,3)$
2) $(-2,2)$
3) $(-3,2)$
4) $(-3,-2)$

147 Parallelogram $ABCD$ has coordinates $A(0,7)$ and $C(2,1)$. Which statement would prove that $ABCD$ is a rhombus?
1) The midpoint of $\overline{AC}$ is $(1,4)$.
2) The length of $\overline{BD}$ is $\sqrt{40}$.
3) The slope of $\overline{BD}$ is $\frac{1}{3}$.
4) The slope of $\overline{AB}$ is $\frac{1}{3}$.

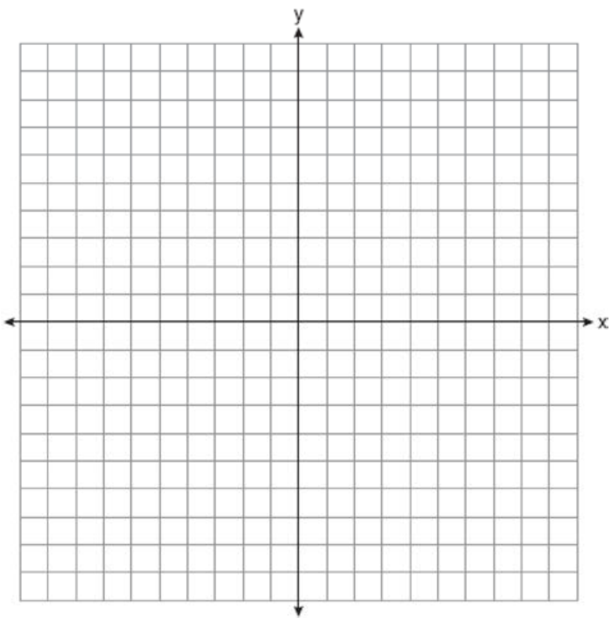
148 In rhombus *MATH*, the coordinates of the endpoints of the diagonal $\overline{MT}$ are $M(0,-1)$ and $T(4,6)$. Write an equation of the line that contains diagonal $\overline{AH}$. [Use of the set of axes below is optional.] Using the given information, explain how you know that your line contains diagonal $\overline{AH}$.



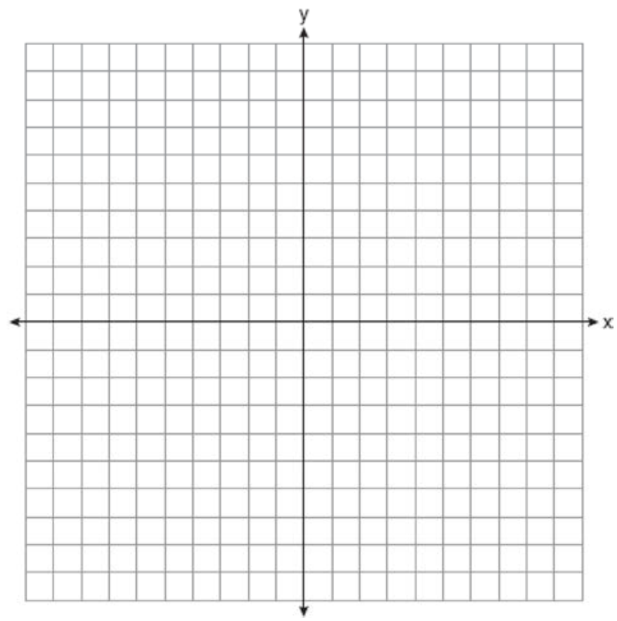
149 In the coordinate plane, the vertices of $\triangle RST$ are $R(6,-1)$, $S(1,-4)$, and $T(-5,6)$. Prove that $\triangle RST$ is a right triangle. State the coordinates of point *P* such that quadrilateral *RSTP* is a rectangle. Prove that your quadrilateral *RSTP* is a rectangle. [The use of the set of axes below is optional.]



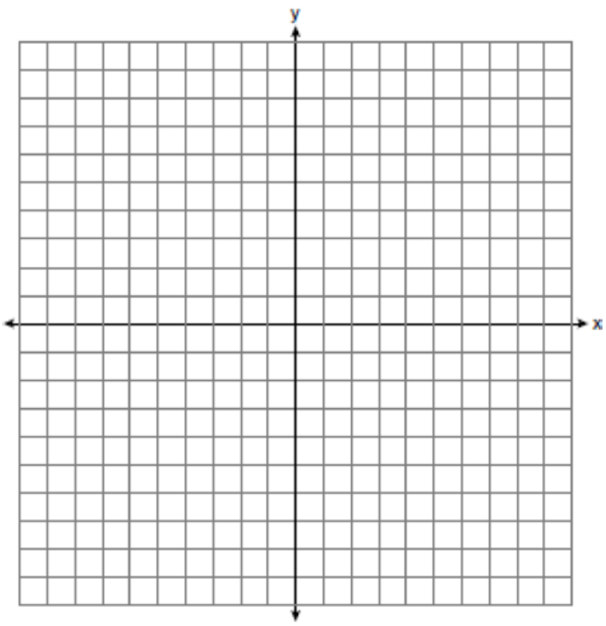
150 In square *GEOM*, the coordinates of *G* are $(2,-2)$ and the coordinates of *O* are $(-4,2)$. Determine and state the coordinates of vertices *E* and *M*. [The use of the set of axes below is optional.]



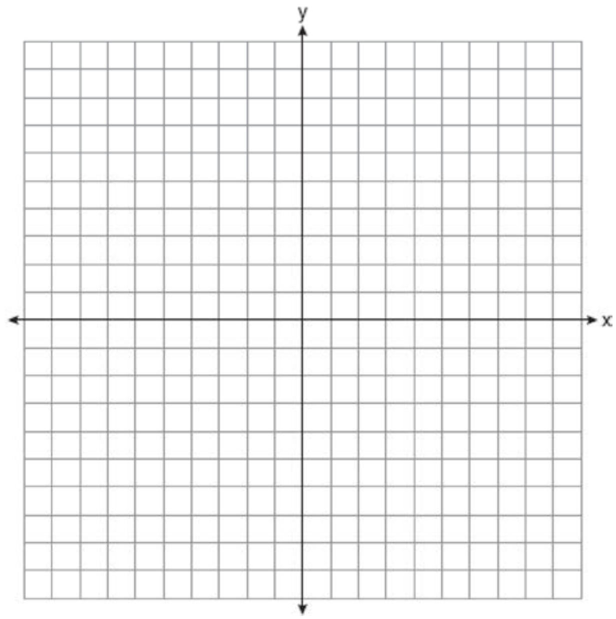
151 Quadrilateral *PQRS* has vertices $P(-2,3)$, $Q(3,8)$, $R(4,1)$, and $S(-1,-4)$. Prove that *PQRS* is a rhombus. Prove that *PQRS* is *not* a square. [The use of the set of axes below is optional.]



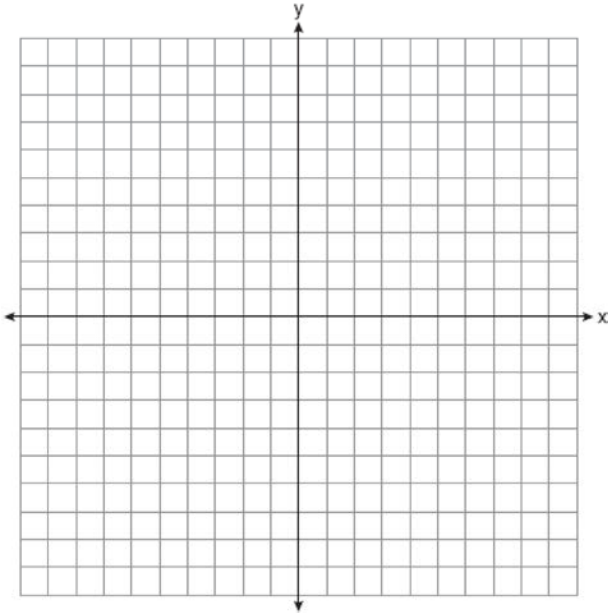
152 In the coordinate plane, the vertices of triangle PAT are $P(-1,-6)$, $A(-4,5)$, and $T(5,-2)$. Prove that $\triangle PAT$ is an isosceles triangle. State the coordinates of R so that quadrilateral $PART$ is a parallelogram. Prove that quadrilateral $PART$ is a parallelogram. [The use of the set of axes below is optional.]



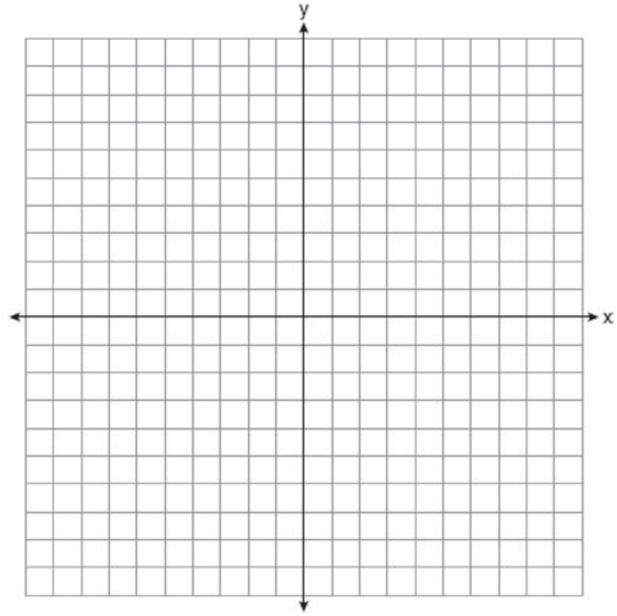
153 The vertices of quadrilateral $MATH$ have coordinates $M(-4,2)$, $A(-1,-3)$, $T(9,3)$, and $H(6,8)$. Prove that quadrilateral $MATH$ is a parallelogram. Prove that quadrilateral $MATH$ is a rectangle. [The use of the set of axes below is optional.]



154 Riley plotted $A(-1,6)$, $B(3,8)$, $C(6,-1)$, and $D(1,0)$ to form a quadrilateral. Prove that Riley's quadrilateral *ABCD* is a trapezoid. [The use of the set of axes on the next page is optional.] Riley defines an isosceles trapezoid as a trapezoid with congruent diagonals. Use Riley's definition to prove that *ABCD* is *not* an isosceles trapezoid.

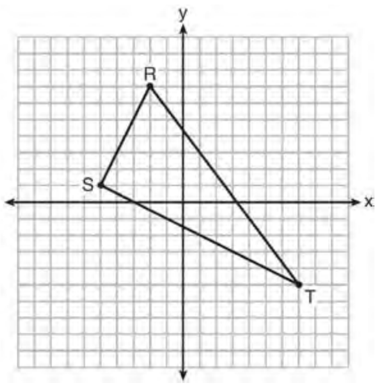


155 The coordinates of the vertices of $\triangle ABC$ are $A(1,2)$, $B(-5,3)$, and $C(-6,-3)$. Prove that $\triangle ABC$ is isosceles. State the coordinates of point *D* such that quadrilateral *ABCD* is a square. Prove that your quadrilateral *ABCD* is a square. [The use of the set of axes below is optional.]



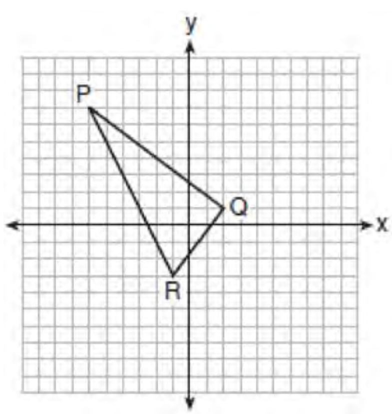
G.GPE.B.7: POLYGONS IN THE COORDINATE PLANE

156 Triangle RST is graphed on the set of axes below.



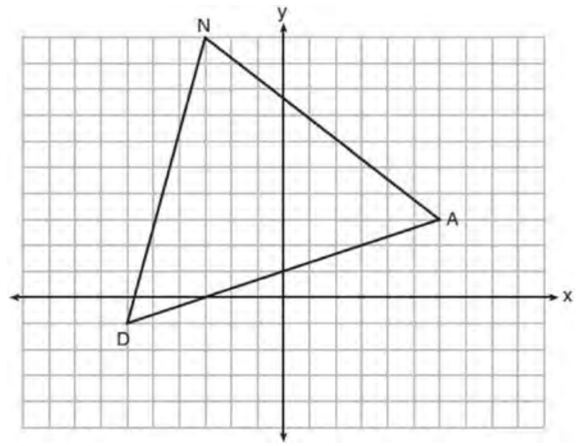
How many square units are in the area of $\triangle RST$?
1) $9\sqrt{3}+15$
2) $9\sqrt{5}+15$
3) 45
4) 90

157 On the set of axes below, the vertices of $\triangle PQR$ have coordinates $P(-6,7)$, $Q(2,1)$, and $R(-1,-3)$.



What is the area of $\triangle PQR$?
1) 10
2) 20
3) 25
4) 50

158 Triangle DAN is graphed on the set of axes below. The vertices of $\triangle DAN$ have coordinates $D(-6,-1)$, $A(6,3)$, and $N(-3,10)$.



What is the area of $\triangle DAN$?
1) 60
2) 120
3) $20\sqrt{13}$
4) $40\sqrt{13}$

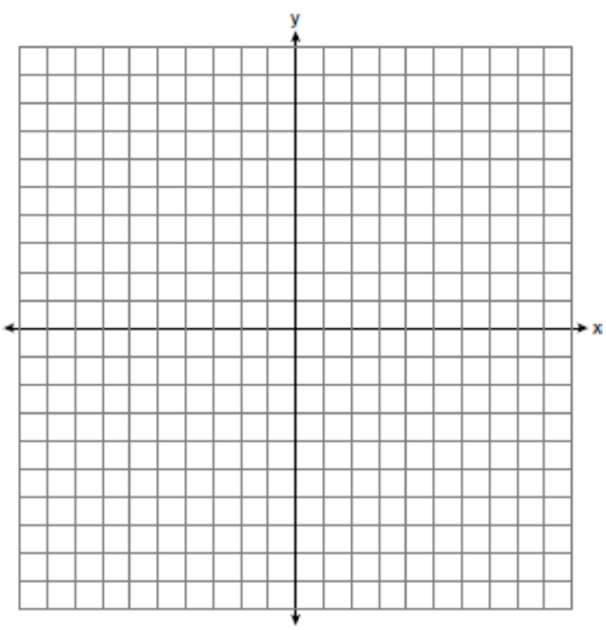
159 The endpoints of one side of a regular pentagon are $(-1,4)$ and $(2,3)$. What is the perimeter of the pentagon?
1) $\sqrt{10}$
2) $5\sqrt{10}$
3) $5\sqrt{2}$
4) $25\sqrt{2}$

160 The vertices of square $RSTV$ have coordinates $R(-1,5)$, $S(-3,1)$, $T(-7,3)$, and $V(-5,7)$. What is the perimeter of $RSTV$?
1) $\sqrt{20}$
2) $\sqrt{40}$
3) $4\sqrt{20}$
4) $4\sqrt{40}$

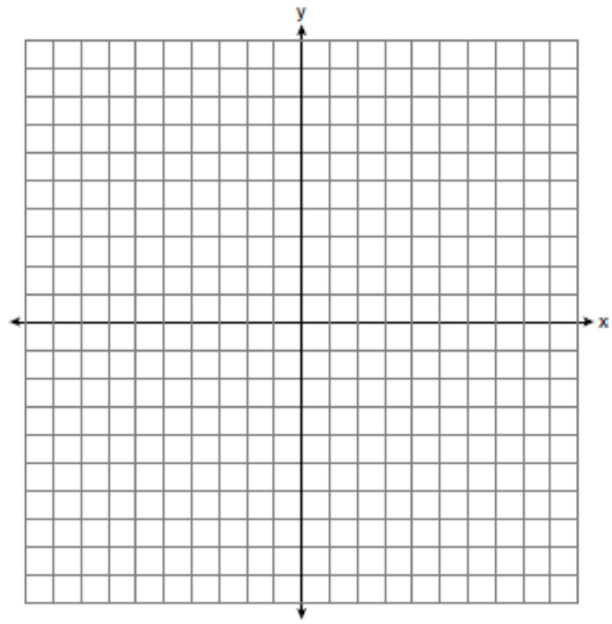
161 Rhombus *STAR* has vertices $S(-1,2)$, $T(2,3)$, $A(3,0)$, and $R(0,-1)$. What is the perimeter of rhombus *STAR*?
1) $\sqrt{34}$
2) $4\sqrt{34}$
3) $\sqrt{10}$
4) $4\sqrt{10}$

162 The coordinates of vertices *A* and *B* of $\triangle ABC$ are $A(3,4)$ and $B(3,12)$. If the area of $\triangle ABC$ is 24 square units, what could be the coordinates of point *C*?
1) $(3,6)$
2) $(8,-3)$
3) $(-3,8)$
4) $(6,3)$

163 Determine and state the area of triangle *PQR*, whose vertices have coordinates $P(-2,-5)$, $Q(3,5)$, and $R(6,1)$. [The use of the set of axes below is optional.]

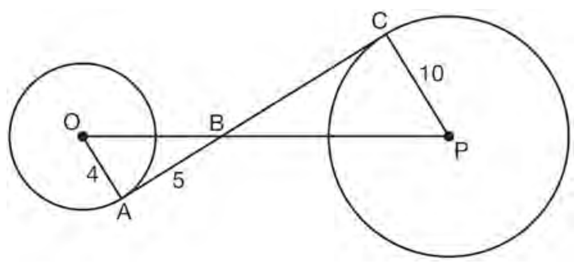


164 The vertices of $\triangle ABC$ have coordinates $A(-2,-1)$, $B(10,-1)$, and $C(4,4)$. Determine and state the area of $\triangle ABC$. [The use of the set of axes below is optional.]



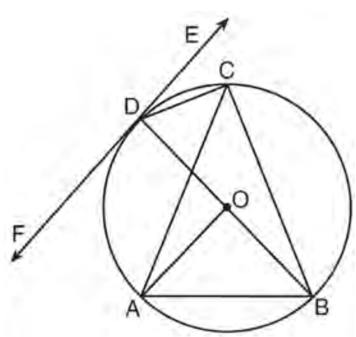
CONICS
G.C.A.2: CHORDS, SECANTS AND TANGENTS

165 In the diagram shown below, $\overline{AC}$ is tangent to circle O at A and to circle P at C, $\overline{OP}$ intersects $\overline{AC}$ at B, $OA = 4$, $AB = 5$, and $PC = 10$.



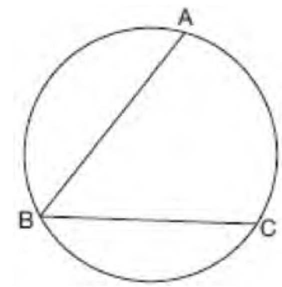
What is the length of $\overline{BC}$?
1) 6.4
2) 8
3) 12.5
4) 16

166 In the diagram below, $\overline{DC}$, $\overline{AC}$, $\overline{DOB}$, $\overline{CB}$, and $\overline{AB}$ are chords of circle O, $\overleftrightarrow{FDE}$ is tangent at point D, and radius $\overline{AO}$ is drawn. Sam decides to apply this theorem to the diagram: "An angle inscribed in a semi-circle is a right angle."



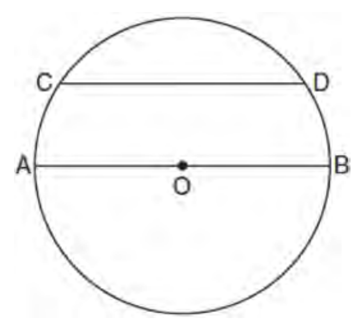
Which angle is Sam referring to?
1) $\angle AOB$
2) $\angle BAC$
3) $\angle DCB$
4) $\angle FDB$

167 In the diagram below, $m\overset{\frown}{ABC} = 268°$.



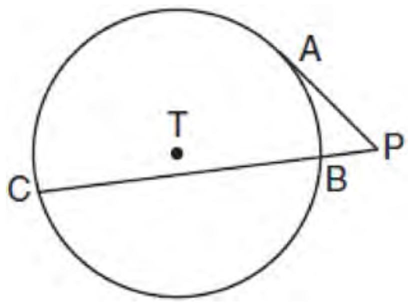
What is the number of degrees in the measure of $\angle ABC$?
1) 134º
2) 92º
3) 68º
4) 46º

168 In the diagram below of circle O, chord $\overline{CD}$ is parallel to diameter $\overline{AOB}$ and $m\overset{\frown}{CD} = 130$.



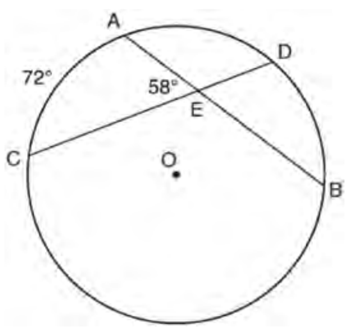
What is $m\overset{\frown}{AC}$?
1) 25
2) 50
3) 65
4) 115

169 In the diagram shown below, $\overline{PA}$ is tangent to circle T at A, and secant $\overline{PBC}$ is drawn where point B is on circle T.



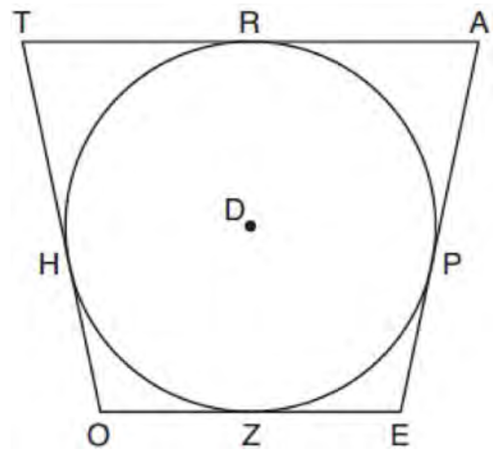
If $PB = 3$ and $BC = 15$, what is the length of $\overline{PA}$?
1) $3\sqrt{5}$
2) $3\sqrt{6}$
3) 3
4) 9

170 In the diagram below of circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E.



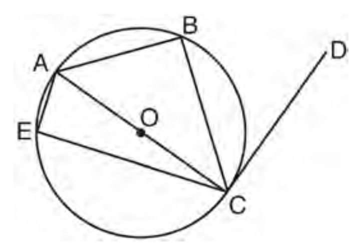
If $m\overset{\frown}{AC} = 72°$ and $m\angle AEC = 58°$, how many degrees are in $m\overset{\frown}{DB}$?
1) 108º
2) 65º
3) 44º
4) 14º

171 In the figure shown below, quadrilateral $TAEO$ is circumscribed around circle D. The midpoint of $\overline{TA}$ is R, and $\overline{HO} \cong \overline{PE}$.



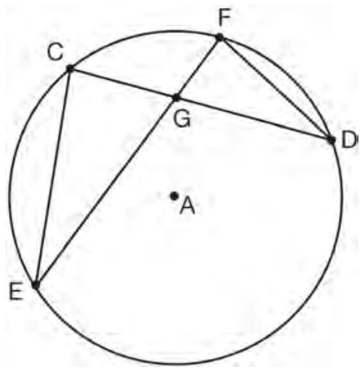
If $AP = 10$ and $EO = 12$, what is the perimeter of quadrilateral $TAEO$?
1) 56
2) 64
3) 72
4) 76

172 In circle O shown below, diameter $\overline{AC}$ is perpendicular to $\overline{CD}$ at point C, and chords $\overline{AB}$, $\overline{BC}$, $\overline{AE}$, and $\overline{CE}$ are drawn.



Which statement is *not* always true?
1) $\angle ACB \cong \angle BCD$
2) $\angle ABC \cong \angle ACD$
3) $\angle BAC \cong \angle DCB$
4) $\angle CBA \cong \angle AEC$

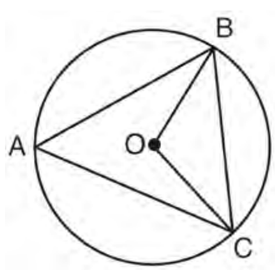
173 In the diagram of circle A shown below, chords $\overline{CD}$ and $\overline{EF}$ intersect at G, and chords $\overline{CE}$ and $\overline{FD}$ are drawn.



Which statement is *not* always true?

1) $\overline{CG} \cong \overline{FG}$
2) $\angle CEG \cong \angle FDG$
3) $\frac{CE}{EG} = \frac{FD}{DG}$
4) $\triangle CEG \sim \triangle FDG$

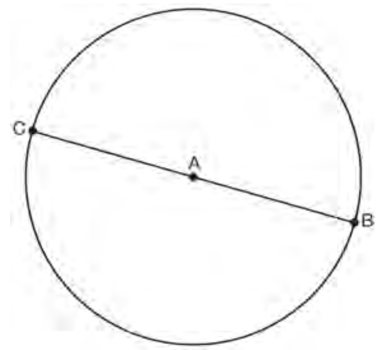
174 In the diagram below of circle O, $\overline{OB}$ and $\overline{OC}$ are radii, and chords $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$ are drawn.



Which statement must always be true?

1) $\angle BAC \cong \angle BOC$
2) $m\angle BAC = \frac{1}{2} m\angle BOC$
3) $\triangle BAC$ and $\triangle BOC$ are isosceles.
4) The area of $\triangle BAC$ is twice the area of $\triangle BOC$.

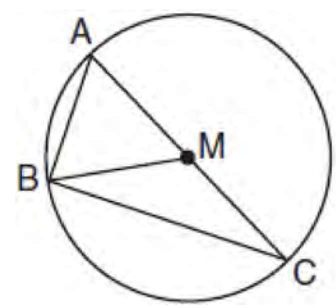
175 In the diagram below, $\overline{BC}$ is the diameter of circle A.



Point D, which is unique from points B and C, is plotted on circle A. Which statement must always be true?

1) $\triangle BCD$ is a right triangle.
2) $\triangle BCD$ is an isosceles triangle.
3) $\triangle BAD$ and $\triangle CBD$ are similar triangles.
4) $\triangle BAD$ and $\triangle CAD$ are congruent triangles.

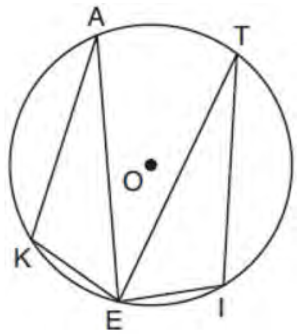
176 In circle M below, diameter $\overline{AC}$, chords $\overline{AB}$ and $\overline{BC}$, and radius $\overline{MB}$ are drawn.



Which statement is *not* true?

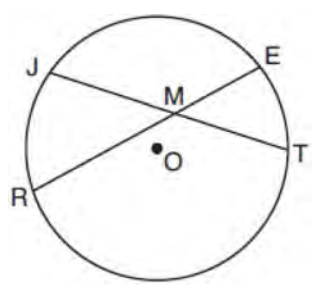
1) $\triangle ABC$ is a right triangle.
2) $\triangle ABM$ is isosceles.
3) $m\overparen{BC} = m\angle BMC$
4) $m\overparen{AB} = \frac{1}{2} m\angle ACB$

177 In the diagram below of circle O, points K, A, T, I, and E are on the circle, $\triangle KAE$ and $\triangle ITE$ are drawn, $\overset{\frown}{KE} \cong \overset{\frown}{EI}$, and $\angle EKA \cong \angle EIT$.



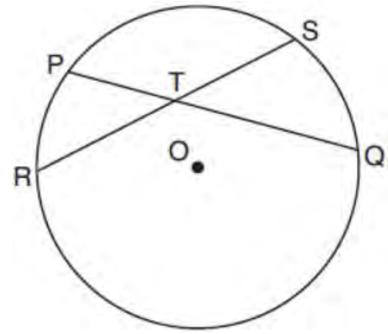
Which statement about $\triangle KAE$ and $\triangle ITE$ is always true?
1) They are neither congruent nor similar.
2) They are similar but not congruent.
3) They are right triangles.
4) They are congruent.

178 In the diagram below of circle O, chords $\overline{JT}$ and $\overline{ER}$ intersect at M.



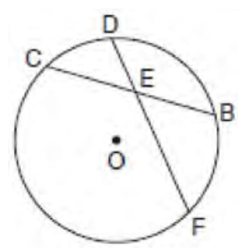
If $EM = 8$ and $RM = 15$, the lengths of $\overline{JM}$ and $\overline{TM}$ could be
1) 12 and 9.5
2) 14 and 8.5
3) 16 and 7.5
4) 18 and 6.5

179 In the diagram below, chords $\overline{PQ}$ and $\overline{RS}$ of circle O intersect at T.



Which relationship must always be true?
1) $RT = TQ$
2) $RT = TS$
3) $RT + TS = PT + TQ$
4) $RT \times TS = PT \times TQ$

180 In the diagram below of circle O, chord $\overline{DF}$ bisects chord $\overline{BC}$ at E.

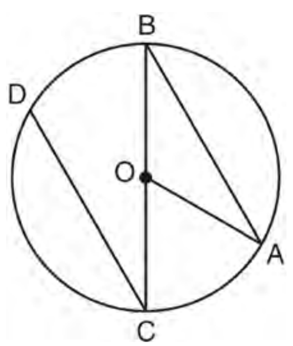


If $BC = 12$ and FE is 5 more than DE, then FE is
1) 13
2) 9
3) 6
4) 4

181 In circle O, secants $\overline{ADB}$ and $\overline{AEC}$ are drawn from external point A such that points D, B, E, and C are on circle O. If $AD = 8$, $AE = 6$, and EC is 12 more than BD, the length of $\overline{BD}$ is
1) 6
2) 22
3) 36
4) 48

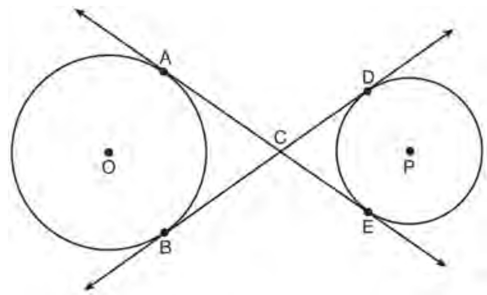
182 In circle O two secants, $\overline{ABP}$ and $\overline{CDP}$, are drawn to external point P. If $m\overset{\frown}{AC} = 72°$, and $m\overset{\frown}{BD} = 34°$, what is the measure of $\angle P$?
1) 19º
2) 38º
3) 53º
4) 106º

183 In the diagram below of circle O with diameter $\overline{BC}$ and radius $\overline{OA}$, chord $\overline{DC}$ is parallel to chord $\overline{BA}$.

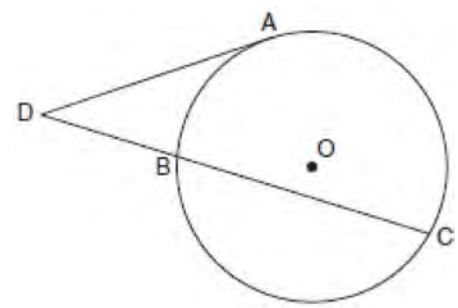


If $m\angle BCD = 30°$, determine and state $m\angle AOB$.

184 Lines AE and BD are tangent to circles O and P at A, E, B, and D, as shown in the diagram below. If $AC:CE = 5:3$, and $BD = 56$, determine and state the length of $\overline{CD}$.

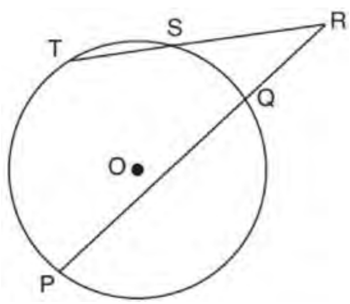


185 In the diagram below, tangent $\overline{DA}$ and secant $\overline{DBC}$ are drawn to circle O from external point D, such that $\overset{\frown}{AC} \cong \overset{\frown}{BC}$.



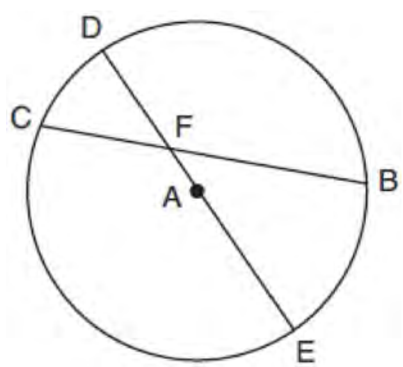
If $m\overset{\frown}{BC} = 152°$, determine and state $m\angle D$.

186 In the diagram below, secants $\overline{RST}$ and $\overline{RQP}$, drawn from point *R*, intersect circle *O* at *S*, *T*, *Q*, and *P*.



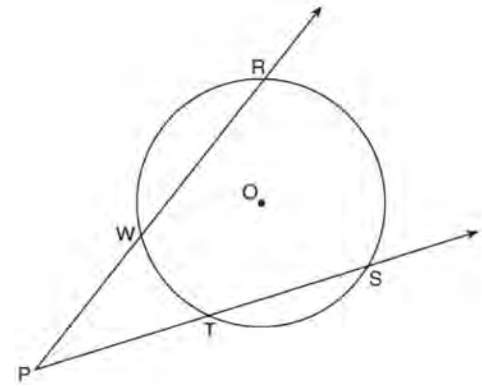
If $RS = 6$, $ST = 4$, and $RP = 15$, what is the length of $\overline{RQ}$?

187 In circle *A* below, chord $\overline{BC}$ and diameter $\overline{DAE}$ intersect at *F*.



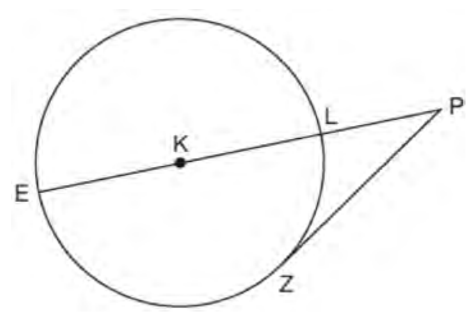
If $m\overset{\frown}{CD} = 46°$ and $m\overset{\frown}{DB} = 102°$, what is $m\angle CFE$?

188 As shown in the diagram below, secants $\overrightarrow{PWR}$ and $\overrightarrow{PTS}$ are drawn to circle *O* from external point *P*.



If $m\angle RPS = 35°$ and $m\overset{\frown}{RS} = 121°$, determine and state $m\overset{\frown}{WT}$.

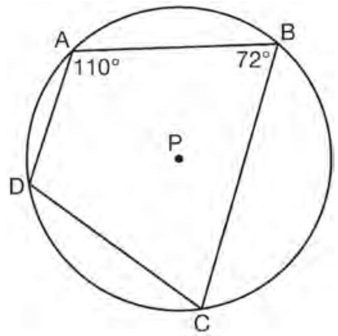
189 In the diagram below of circle *K*, secant $\overline{PLKE}$ and tangent $\overline{PZ}$ are drawn from external point *P*.



If $m\overset{\frown}{LZ} = 56°$, determine and state the degree measure of angle *P*.

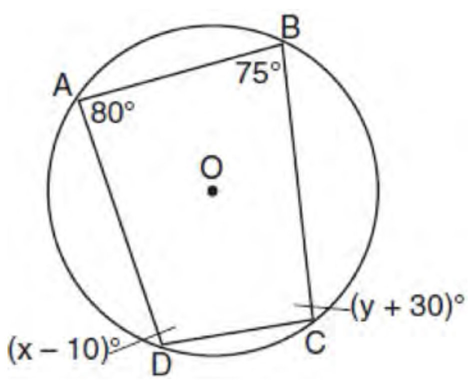
G.C.A.3: INSCRIBED QUADRILATERALS

190 In the diagram below, quadrilateral *ABCD* is inscribed in circle *P*.



What is $m\angle ADC$?
1) 70°
2) 72°
3) 108°
4) 110°

191 Quadrilateral *ABCD* is inscribed in circle *O*, as shown below.

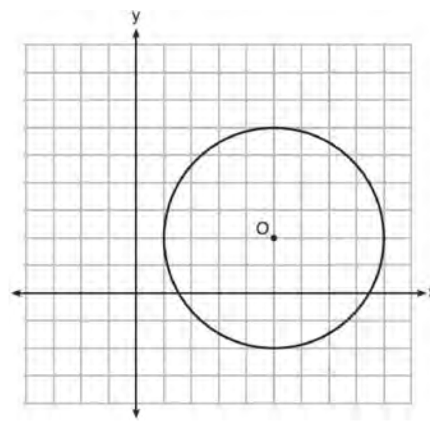


If $m\angle A = 80°$, $m\angle B = 75°$, $m\angle C = (y + 30)°$, and $m\angle D = (x - 10)°$, which statement is true?
1) $x = 85$ and $y = 50$
2) $x = 90$ and $y = 45$
3) $x = 110$ and $y = 75$
4) $x = 115$ and $y = 70$

192 Linda is designing a circular piece of stained glass with a diameter of 7 inches. She is going to sketch a square inside the circular region. To the *nearest tenth of an inch*, the largest possible length of a side of the square is
1) 3.5
2) 4.9
3) 5.0
4) 6.9

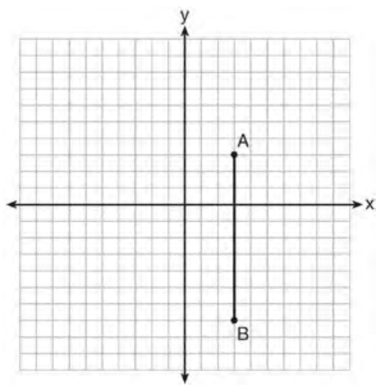
G.GPE.A.1: EQUATIONS OF CIRCLES

193 What is an equation of circle *O* shown in the graph below?



1) $x^2 + 10x + y^2 + 4y = -13$
2) $x^2 - 10x + y^2 - 4y = -13$
3) $x^2 + 10x + y^2 + 4y = -25$
4) $x^2 - 10x + y^2 - 4y = -25$

194 The graph below shows $\overline{AB}$, which is a chord of circle O. The coordinates of the endpoints of $\overline{AB}$ are $A(3,3)$ and $B(3,-7)$. The distance from the midpoint of $\overline{AB}$ to the center of circle O is 2 units.



What could be a correct equation for circle O?
1) $(x-1)^2 + (y+2)^2 = 29$
2) $(x+5)^2 + (y-2)^2 = 29$
3) $(x-1)^2 + (y-2)^2 = 25$
4) $(x-5)^2 + (y+2)^2 = 25$

195 The equation of a circle is $x^2 + y^2 + 6y = 7$. What are the coordinates of the center and the length of the radius of the circle?
1) center $(0,3)$ and radius 4
2) center $(0,-3)$ and radius 4
3) center $(0,3)$ and radius 16
4) center $(0,-3)$ and radius 16

196 If $x^2 + 4x + y^2 - 6y - 12 = 0$ is the equation of a circle, the length of the radius is
1) 25
2) 16
3) 5
4) 4

197 What are the coordinates of the center and length of the radius of the circle whose equation is $x^2 + 6x + y^2 - 4y = 23$?
1) $(3,-2)$ and 36
2) $(3,-2)$ and 6
3) $(-3,2)$ and 36
4) $(-3,2)$ and 6

198 Kevin's work for deriving the equation of a circle is shown below.

$$x^2 + 4x = -(y^2 - 20)$$

STEP 1 $x^2 + 4x = -y^2 + 20$

STEP 2 $x^2 + 4x + 4 = -y^2 + 20 - 4$

STEP 3 $(x+2)^2 = -y^2 + 20 - 4$

STEP 4 $(x+2)^2 + y^2 = 16$

In which step did he make an error in his work?
1) Step 1
2) Step 2
3) Step 3
4) Step 4

199 What are the coordinates of the center and the length of the radius of the circle represented by the equation $x^2 + y^2 - 4x + 8y + 11 = 0$?
1) center $(2,-4)$ and radius 3
2) center $(-2,4)$ and radius 3
3) center $(2,-4)$ and radius 9
4) center $(-2,4)$ and radius 9

200 The equation of a circle is $x^2 + y^2 - 6y + 1 = 0$. What are the coordinates of the center and the length of the radius of this circle?
1) center $(0,3)$ and radius $= 2\sqrt{2}$
2) center $(0,-3)$ and radius $= 2\sqrt{2}$
3) center $(0,6)$ and radius $= \sqrt{35}$
4) center $(0,-6)$ and radius $= \sqrt{35}$

201 The equation of a circle is $x^2 + y^2 - 12y + 20 = 0$. What are the coordinates of the center and the length of the radius of the circle?
1) center $(0,6)$ and radius 4
2) center $(0,-6)$ and radius 4
3) center $(0,6)$ and radius 16
4) center $(0,-6)$ and radius 16

202 The equation of a circle is $x^2 + y^2 - 6x + 2y = 6$. What are the coordinates of the center and the length of the radius of the circle?
1) center $(-3,1)$ and radius 4
2) center $(3,-1)$ and radius 4
3) center $(-3,1)$ and radius 16
4) center $(3,-1)$ and radius 16

203 What is an equation of a circle whose center is $(1,4)$ and diameter is 10?
1) $x^2 - 2x + y^2 - 8y = 8$
2) $x^2 + 2x + y^2 + 8y = 8$
3) $x^2 - 2x + y^2 - 8y = 83$
4) $x^2 + 2x + y^2 + 8y = 83$

204 The equation of a circle is $x^2 + 8x + y^2 - 12y = 144$. What are the coordinates of the center and the length of the radius of the circle?
1) center $(4,-6)$ and radius 12
2) center $(-4,6)$ and radius 12
3) center $(4,-6)$ and radius 14
4) center $(-4,6)$ and radius 14

205 What are the coordinates of the center and the length of the radius of the circle whose equation is $x^2 + y^2 = 8x - 6y + 39$?
1) center $(-4,3)$ and radius 64
2) center $(4,-3)$ and radius 64
3) center $(-4,3)$ and radius 8
4) center $(4,-3)$ and radius 8

206 An equation of circle O is $x^2 + y^2 + 4x - 8y = -16$. The statement that best describes circle O is the
1) center is $(2,-4)$ and is tangent to the x-axis
2) center is $(2,-4)$ and is tangent to the y-axis
3) center is $(-2,4)$ and is tangent to the x-axis
4) center is $(-2,4)$ and is tangent to the y-axis

207 Determine and state the coordinates of the center and the length of the radius of a circle whose equation is $x^2 + y^2 - 6x = 56 - 8y$.

G.GPE.B.4: CIRCLES IN THE COORDINATE PLANE

208 The center of circle Q has coordinates $(3,-2)$. If circle Q passes through $R(7,1)$, what is the length of its diameter?
1) 50
2) 25
3) 10
4) 5

Geometry Regents Exam Questions by State Standard: Topic

209 A circle whose center is the origin passes through the point $(-5,12)$. Which point also lies on this circle?
1) $(10,3)$
2) $(-12,13)$
3) $(11,2\sqrt{12})$
4) $(-8,5\sqrt{21})$

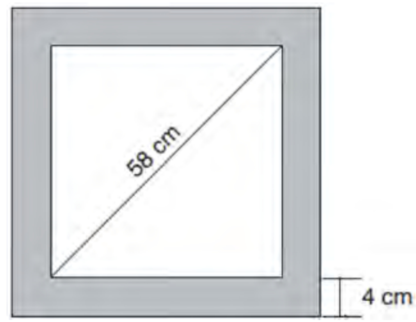
210 A circle has a center at $(1,-2)$ and radius of 4. Does the point $(3.4,1.2)$ lie on the circle? Justify your answer.

MEASURING IN THE PLANE AND SPACE

G.MG.A.3: AREA OF POLYGONS

211 A farmer has 64 feet of fence to enclose a rectangular vegetable garden. Which dimensions would result in the biggest area for this garden?
1) the length and the width are equal
2) the length is 2 more than the width
3) the length is 4 more than the width
4) the length is 6 more than the width

212 Keira has a square poster that she is framing and placing on her wall. The poster has a diagonal 58 cm long and fits exactly inside the frame. The width of the frame around the picture is 4 cm.



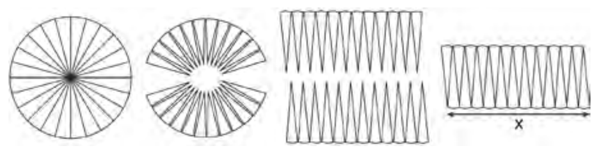
Determine and state the total area of the poster and frame to the *nearest tenth of a square centimeter*.

G.MG.A.3: SURFACE AREA

213 A gallon of paint will cover approximately 450 square feet. An artist wants to paint all the outside surfaces of a cube measuring 12 feet on each edge. What is the *least* number of gallons of paint he must buy to paint the cube?
1) 1
2) 2
3) 3
4) 4

G.GMD.A.1: CIRCUMFERENCE

214 A circle with a radius of 5 was divided into 24 congruent sectors. The sectors were then rearranged, as shown in the diagram below.

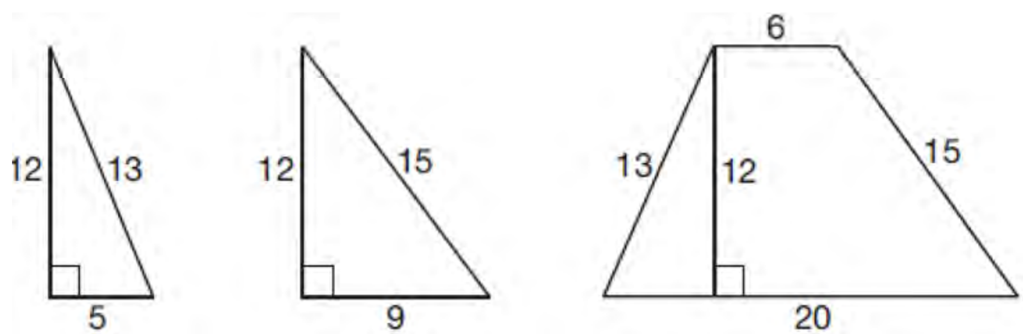


To the *nearest integer*, the value of *x* is
1) 31
2) 16
3) 12
4) 10

215 A designer needs to create perfectly circular necklaces. The necklaces each need to have a radius of 10 cm. What is the largest number of necklaces that can be made from 1000 cm of wire?
1) 15
2) 16
3) 31
4) 32

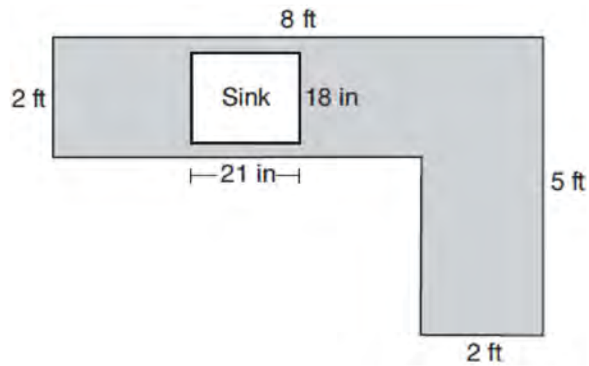
G.MG.A.3: COMPOSITIONS OF POLYGONS AND CIRCLES

216 Francisco needs the three pieces of glass shown below to complete a stained glass window. The shapes, two triangles and a trapezoid, are measured in inches.



Glass can be purchased in rectangular sheets that are 12 inches wide. What is the minimum length of a sheet of glass, in inches, that Francisco must purchase in order to have enough to complete the window?
1) 20
2) 25
3) 29
4) 34

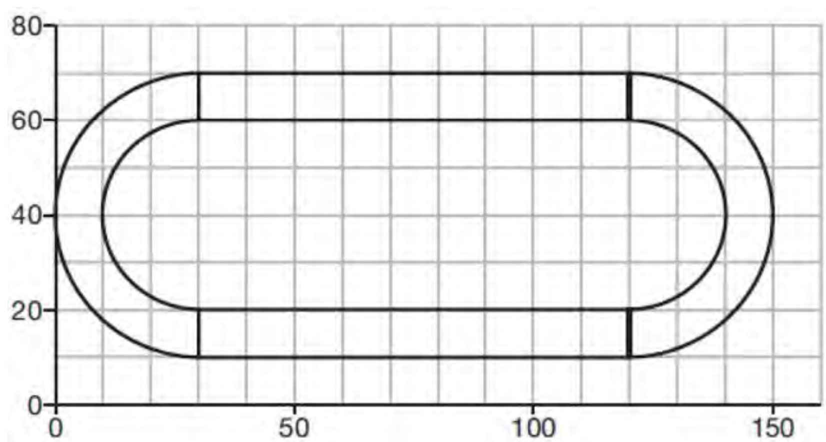
217 A countertop for a kitchen is modeled with the dimensions shown below. An 18-inch by 21-inch rectangle will be removed for the installation of the sink.



What is the area of the top of the installed countertop, to the *nearest square foot*?

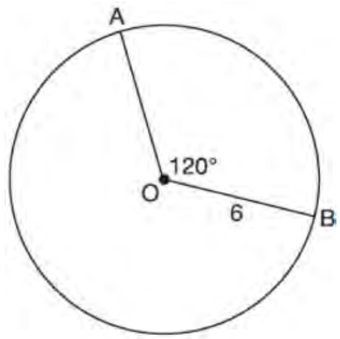
1) 26
2) 23
3) 22
4) 19

218 A walking path at a local park is modeled on the grid below, where the length of each grid square is 10 feet. The town needs to submit paperwork to pave the walking path. Determine and state, to the *nearest square foot*, the area of the walking path.



G.C.B.5: ARC LENGTH

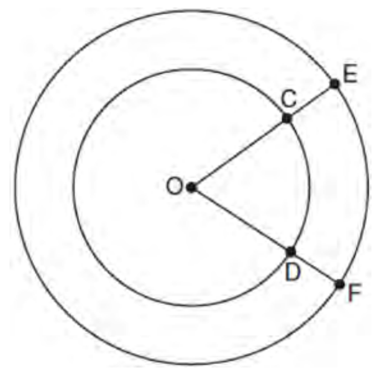
219 The diagram below shows circle O with radii $\overline{OA}$ and $\overline{OB}$. The measure of angle AOB is 120°, and the length of a radius is 6 inches.



Which expression represents the length of arc AB, in inches?

1) $\frac{120}{360}(6\pi)$
2) 120(6)
3) $\frac{1}{3}(36\pi)$
4) $\frac{1}{3}(12\pi)$

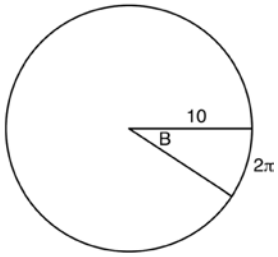
220 In the diagram below, two concentric circles with center O, and radii $\overline{OC}$, $\overline{OD}$, $\overline{OGE}$, and $\overline{ODF}$ are drawn.



If $OC = 4$ and $OE = 6$, which relationship between the length of arc EF and the length of arc CD is always true?

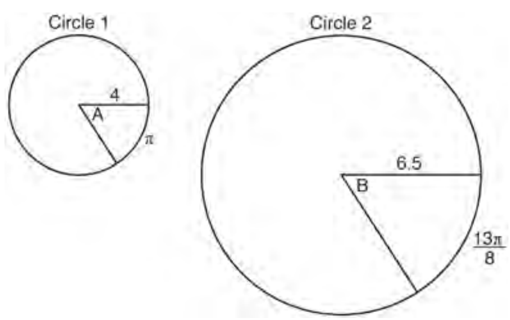
1) The length of arc EF is 2 units longer than the length of arc CD.
2) The length of arc EF is 4 units longer than the length of arc CD.
3) The length of arc EF is 1.5 times the length of arc CD.
4) The length of arc EF is 2.0 times the length of arc CD.

221 In the diagram below, the circle shown has radius 10. Angle B intercepts an arc with a length of 2π.



What is the measure of angle B, in radians?
1) $10+2\pi$
2) 20π
3) $\frac{\pi}{5}$
4) $\frac{5}{\pi}$

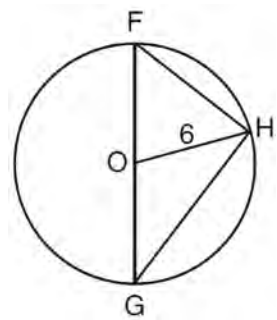
222 In the diagram below, Circle 1 has radius 4, while Circle 2 has radius 6.5. Angle A intercepts an arc of length π, and angle B intercepts an arc of length $\frac{13\pi}{8}$.



Dominic thinks that angles A and B have the same radian measure. State whether Dominic is correct or not. Explain why.

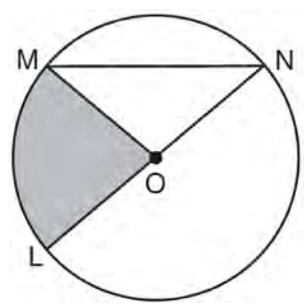
G.C.B.5: SECTORS

223 Triangle FGH is inscribed in circle O, the length of radius $\overline{OH}$ is 6, and $\overline{FH} \cong \overline{OG}$.



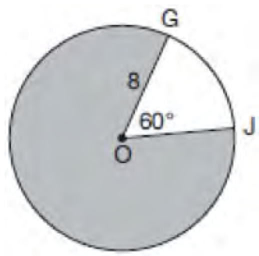
What is the area of the sector formed by angle FOH?
1) 2π
2) $\frac{3}{2}\pi$
3) 6π
4) 24π

224 In the diagram below of circle O, the area of the shaded sector LOM is 2π cm^2.



If the length of $\overline{NL}$ is 6 cm, what is m$\angle N$?
1) 10º
2) 20º
3) 40º
4) 80º

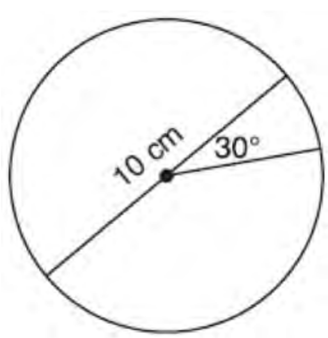
225 In the diagram below of circle O, $GO = 8$ and $m\angle GOJ = 60°$.



What is the area, in terms of π, of the shaded region?

1) $\frac{4\pi}{3}$
2) $\frac{20\pi}{3}$
3) $\frac{32\pi}{3}$
4) $\frac{160\pi}{3}$

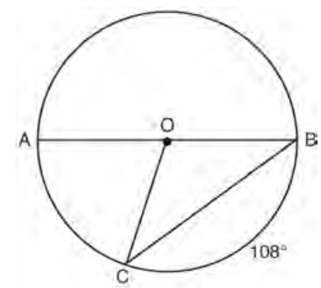
226 A circle with a diameter of 10 cm and a central angle of 30° is drawn below.



What is the area, to the *nearest tenth of a square centimeter*, of the sector formed by the 30° angle?

1) 5.2
2) 6.5
3) 13.1
4) 26.2

227 In circle O, diameter $\overline{AB}$, chord $\overline{BC}$, and radius $\overline{OC}$ are drawn, and the measure of arc BC is 108°.



Some students wrote these formulas to find the area of sector COB:

Amy $\frac{3}{10} \cdot \pi \cdot (BC)^2$

Beth $\frac{108}{360} \cdot \pi \cdot (OC)^2$

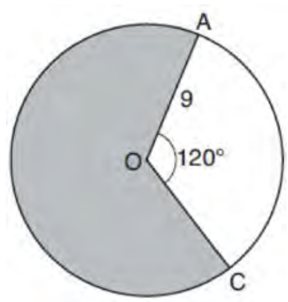
Carl $\frac{3}{10} \cdot \pi \cdot (\frac{1}{2}AB)^2$

Dex $\frac{108}{360} \cdot \pi \cdot \frac{1}{2}(AB)^2$

Which students wrote correct formulas?

1) Amy and Dex
2) Beth and Carl
3) Carl and Amy
4) Dex and Beth

228 Circle O with a radius of 9 is drawn below. The measure of central angle AOC is 120°.



What is the area of the shaded sector of circle O?

1) 6π
2) 12π
3) 27π
4) 54π

229 What is the area of a sector of a circle with a radius of 8 inches and formed by a central angle that measures 60°?

1) $\frac{8\pi}{3}$
2) $\frac{16\pi}{3}$
3) $\frac{32\pi}{3}$
4) $\frac{64\pi}{3}$

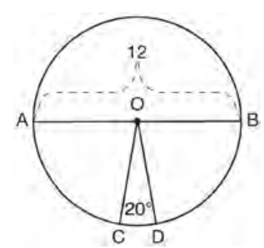
230 In a circle with a diameter of 32, the area of a sector is $\frac{512\pi}{3}$. The measure of the angle of the sector, in radians, is

1) $\frac{\pi}{3}$
2) $\frac{4\pi}{3}$
3) $\frac{16\pi}{3}$
4) $\frac{64\pi}{3}$

231 The area of a sector of a circle with a radius measuring 15 cm is 75π cm^2. What is the measure of the central angle that forms the sector?

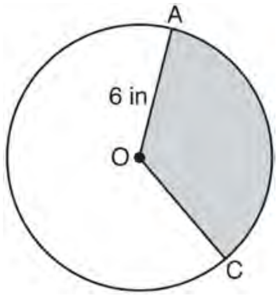
1) 72°
2) 120°
3) 144°
4) 180°

232 In the diagram below of circle O, diameter $\overline{AB}$ and radii $\overline{OC}$ and $\overline{OD}$ are drawn. The length of $\overline{AB}$ is 12 and the measure of $\angle COD$ is 20 degrees.

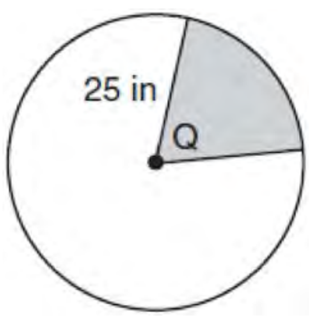


If $\overset{\frown}{AC} \cong \overset{\frown}{BD}$, find the area of sector BOD in terms of π.

233 In the diagram below of circle O, the area of the shaded sector AOC is 12π in^2 and the length of $\overline{OA}$ is 6 inches. Determine and state $m\angle AOC$.

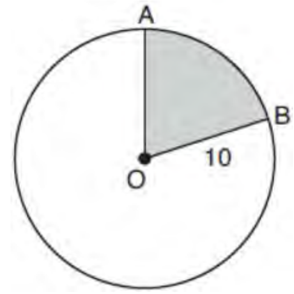


234 In the diagram below, the circle has a radius of 25 inches. The area of the *unshaded* sector is 500π in^2.



Determine and state the degree measure of angle Q, the central angle of the shaded sector.

235 In the diagram below, circle O has a radius of 10.

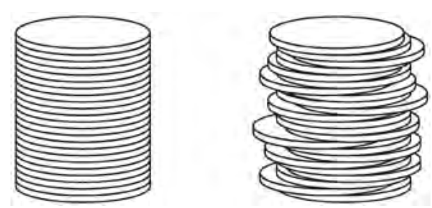


If $m\overset{\frown}{AB} = 72°$, find the area of shaded sector AOB, in terms of π.

236 Determine and state, in terms of π, the area of a sector that intercepts a 40° arc of a circle with a radius of 4.5.

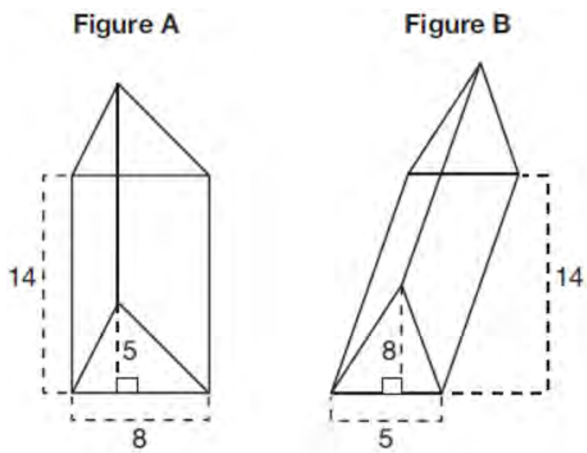
G.GMD.A.1: VOLUME

237 Two stacks of 23 quarters each are shown below. One stack forms a cylinder but the other stack does not form a cylinder.



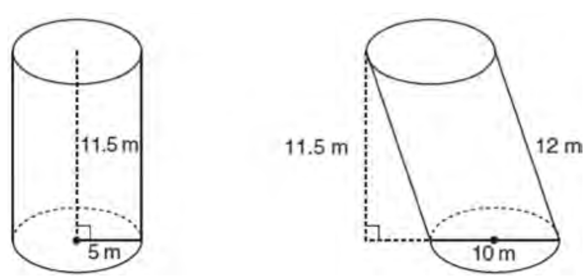
Use Cavelieri's principle to explain why the volumes of these two stacks of quarters are equal.

238 The diagram below shows two figures. Figure *A* is a right triangular prism and figure *B* is an oblique triangular prism. The base of figure *A* has a height of 5 and a length of 8 and the height of prism *A* is 14. The base of figure *B* has a height of 8 and a length of 5 and the height of prism *B* is 14.



Use Cavalieri's Principle to explain why the volumes of these two triangular prisms are equal.

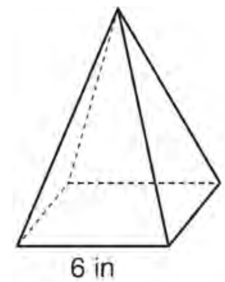
239 Sue believes that the two cylinders shown in the diagram below have equal volumes.



Is Sue correct? Explain why.

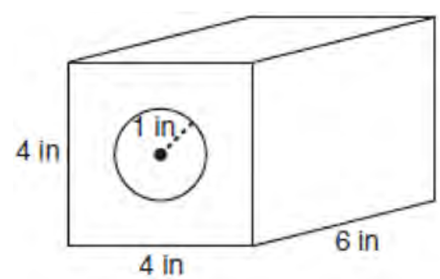
G.GMD.A.3: VOLUME

240 As shown in the diagram below, a regular pyramid has a square base whose side measures 6 inches.



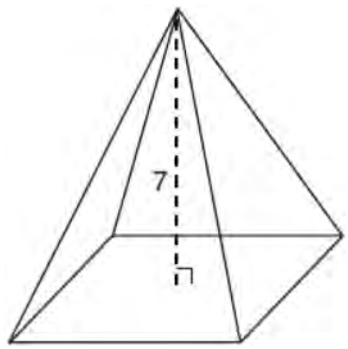
If the altitude of the pyramid measures 12 inches, its volume, in cubic inches, is
1) 72
2) 144
3) 288
4) 432

241 A solid metal prism has a rectangular base with sides of 4 inches and 6 inches, and a height of 4 inches. A hole in the shape of a cylinder, with a radius of 1 inch, is drilled through the entire length of the rectangular prism.



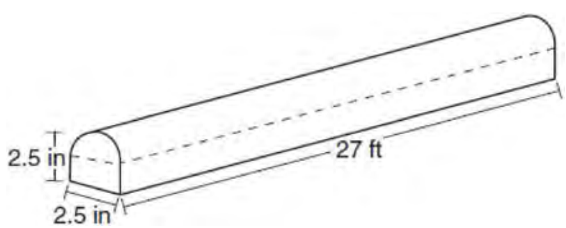
What is the approximate volume of the remaining solid, in cubic inches?
1) 19
2) 77
3) 93
4) 96

242 The pyramid shown below has a square base, a height of 7, and a volume of 84.



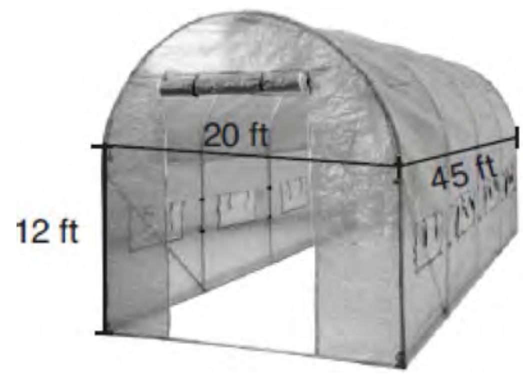
What is the length of the side of the base?
1) 6
2) 12
3) 18
4) 36

243 A fabricator is hired to make a 27-foot-long solid metal railing for the stairs at the local library. The railing is modeled by the diagram below. The railing is 2.5 inches high and 2.5 inches wide and is comprised of a rectangular prism and a half-cylinder.



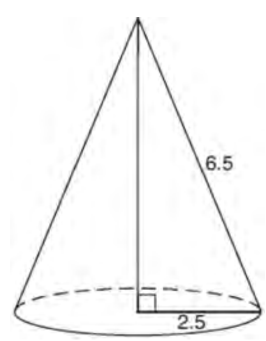
How much metal, to the *nearest cubic inch*, will the railing contain?
1) 151
2) 795
3) 1808
4) 2025

244 The greenhouse pictured below can be modeled as a rectangular prism with a half-cylinder on top. The rectangular prism is 20 feet wide, 12 feet high, and 45 feet long. The half-cylinder has a diameter of 20 feet.



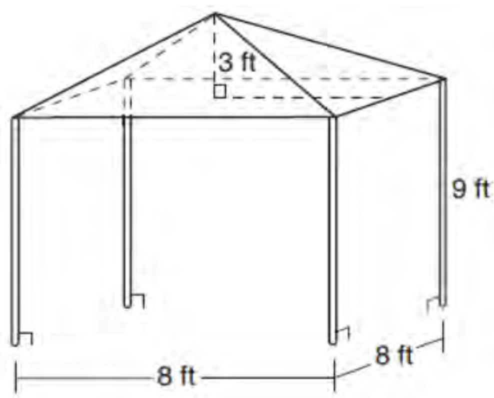
To the *nearest cubic foot*, what is the volume of the greenhouse?
1) 17,869
2) 24,937
3) 39,074
4) 67,349

245 As shown in the diagram below, the radius of a cone is 2.5 cm and its slant height is 6.5 cm.



How many cubic centimeters are in the volume of the cone?
1) 12.5π
2) 13.5π
3) 30.0π
4) 37.5π

246 A vendor is using an 8-ft by 8-ft tent for a craft fair. The legs of the tent are 9 ft tall and the top forms a square pyramid with a height of 3 ft.



What is the volume, in cubic feet, of space the tent occupies?
1) 256
2) 640
3) 672
4) 768

247 The Great Pyramid of Giza was constructed as a regular pyramid with a square base. It was built with an approximate volume of 2,592,276 cubic meters and a height of 146.5 meters. What was the length of one side of its base, to the *nearest meter*?
1) 73
2) 77
3) 133
4) 230

248 A fish tank in the shape of a rectangular prism has dimensions of 14 inches, 16 inches, and 10 inches. The tank contains 1680 cubic inches of water. What percent of the fish tank is empty?
1) 10
2) 25
3) 50
4) 75

249 The diameter of a basketball is approximately 9.5 inches and the diameter of a tennis ball is approximately 2.5 inches. The volume of the basketball is about how many times greater than the volume of the tennis ball?
1) 3591
2) 65
3) 55
4) 4

250 A company is creating an object from a wooden cube with an edge length of 8.5 cm. A right circular cone with a diameter of 8 cm and an altitude of 8 cm will be cut out of the cube. Which expression represents the volume of the remaining wood?
1) $(8.5)^3 - \pi(8)^2(8)$
2) $(8.5)^3 - \pi(4)^2(8)$
3) $(8.5)^3 - \frac{1}{3}\pi(8)^2(8)$
4) $(8.5)^3 - \frac{1}{3}\pi(4)^2(8)$

251 Tennis balls are sold in cylindrical cans with the balls stacked one on top of the other. A tennis ball has a diameter of 6.7 cm. To the *nearest cubic centimeter*, what is the minimum volume of the can that holds a stack of 4 tennis balls?
1) 236
2) 282
3) 564
4) 945

252 A water cup in the shape of a cone has a height of 4 inches and a maximum diameter of 3 inches. What is the volume of the water in the cup, to the *nearest tenth of a cubic inch*, when the cup is filled to half its height?
1) 1.2
2) 3.5
3) 4.7
4) 14.1

253 An ice cream waffle cone can be modeled by a right circular cone with a base diameter of 6.6 centimeters and a volume of 54.45π cubic centimeters. What is the number of centimeters in the height of the waffle cone?
1) $3\frac{3}{4}$
2) 5
3) 15
4) $24\frac{3}{4}$

254 A regular pyramid has a square base. The perimeter of the base is 36 inches and the height of the pyramid is 15 inches. What is the volume of the pyramid in cubic inches?
1) 180
2) 405
3) 540
4) 1215

255 The base of a pyramid is a rectangle with a width of 4.6 cm and a length of 9 cm. What is the height, in centimeters, of the pyramid if its volume is 82.8 cm^3?
1) 6
2) 2
3) 9
4) 18

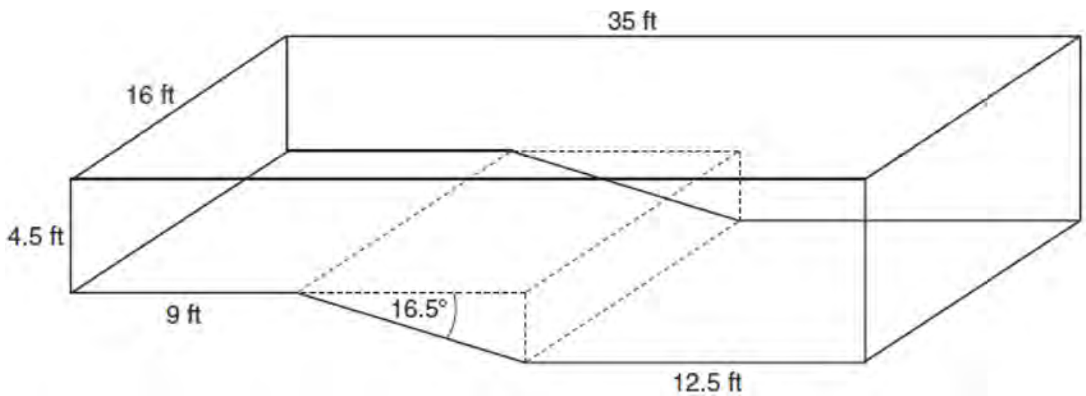
256 A child's tent can be modeled as a pyramid with a square base whose sides measure 60 inches and whose height measures 84 inches. What is the volume of the tent, to the *nearest cubic foot*?
1) 35
2) 58
3) 82
4) 175

257 A tent is in the shape of a right pyramid with a square floor. The square floor has side lengths of 8 feet. If the height of the tent at its center is 6 feet, what is the volume of the tent, in cubic feet?
1) 48
2) 128
3) 192
4) 384

258 What is the volume of a hemisphere that has a diameter of 12.6 cm, to the *nearest tenth of a cubic centimeter*?
1) 523.7
2) 1047.4
3) 4189.6
4) 8379.2

259 What is the volume, in cubic centimeters, of a right square pyramid with base edges that are 64 cm long and a slant height of 40 cm?
1) 8192.0
2) $13,653.\overline{3}$
3) 32,768.0
4) $54,613.\overline{3}$

260 A rectangular in-ground pool is modeled by the prism below. The inside of the pool is 16 feet wide and 35 feet long. The pool has a shallow end and a deep end, with a sloped floor connecting the two ends. Without water, the shallow end is 9 feet long and 4.5 feet deep, and the deep end of the pool is 12.5 feet long.

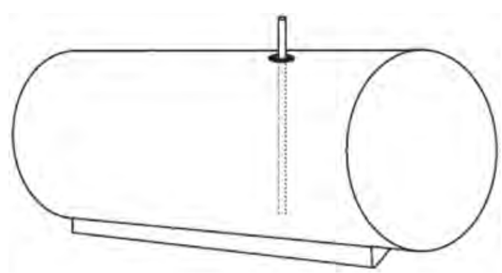


If the sloped floor has an angle of depression of 16.5 degrees, what is the depth of the pool at the deep end, to the *nearest tenth of a foot*? Find the volume of the inside of the pool to the *nearest cubic foot*. A garden hose is used to fill the pool. Water comes out of the hose at a rate of 10 .5 gallons per minute. How much time, to the *nearest hour*, will it take to fill the pool 6 inches from the top? [1 ft^3=7.48 gallons]

261 A candle maker uses a mold to make candles like the one shown below.

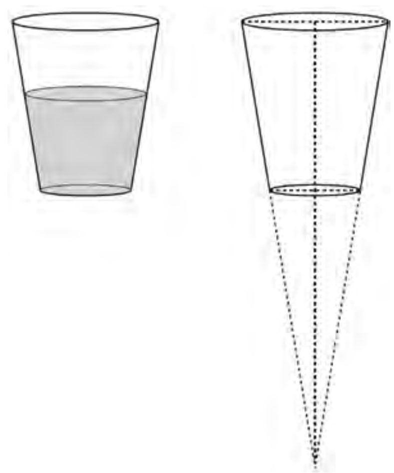
The height of the candle is 13 cm and the circumference of the candle at its widest measure is 31.416 cm. Use modeling to approximate how much wax, to the *nearest cubic centimeter*, is needed to make this candle. Justify your answer.

262 A gas station has a cylindrical fueling tank that holds the gasoline for its pumps, as modeled below. The tank holds a maximum of 20,000 gallons of gasoline and has a length of 34.5 feet.



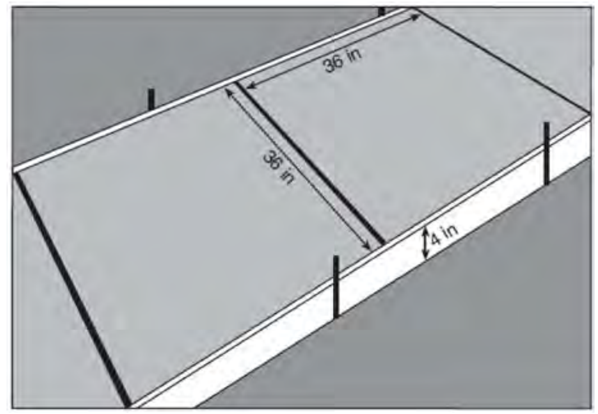
A metal pole is used to measure how much gas is in the tank. To the *nearest tenth of a foot*, how long does the pole need to be in order to reach the bottom of the tank and still extend one foot outside the tank? Justify your answer. [1 ft^3=7.48 gallons]

263 A water glass can be modeled by a truncated right cone (a cone which is cut parallel to its base) as shown below.



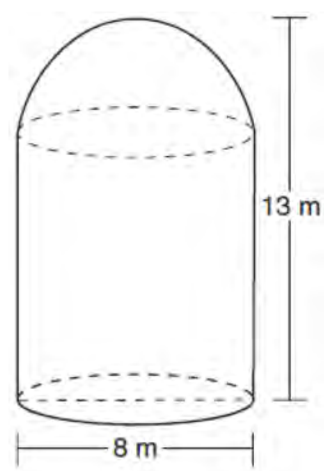
The diameter of the top of the glass is 3 inches, the diameter at the bottom of the glass is 2 inches, and the height of the glass is 5 inches. The base with a diameter of 2 inches must be parallel to the base with a diameter of 3 inches in order to find the height of the cone. Explain why. Determine and state, in inches, the height of the larger cone. Determine and state, to the *nearest tenth of a cubic inch*, the volume of the water glass.

264 Ian needs to replace two concrete sections in his sidewalk, as modeled below. Each section is 36 inches by 36 inches and 4 inches deep. He can mix his own concrete for $3.25 per cubic foot.



How much money will it cost Ian to replace the two concrete sections?

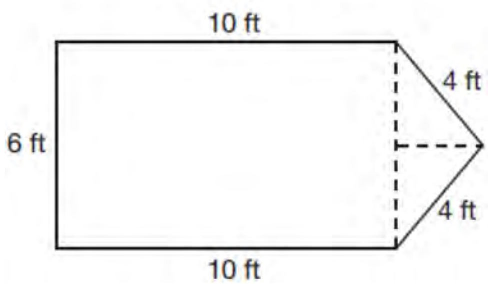
265 A storage tank is in the shape of a cylinder with a hemisphere on the top. The highest point on the inside of the storage tank is 13 meters above the floor of the storage tank, and the diameter inside the cylinder is 8 meters. Determine and state, to the *nearest cubic meter*, the total volume inside the storage tank.



266 A cargo trailer, pictured below, can be modeled by a rectangular prism and a triangular prism. Inside the trailer, the rectangular prism measures 6 feet wide and 10 feet long. The walls that form the triangular prism each measure 4 feet wide inside the trailer. The diagram below is of the floor, showing the inside measurements of the trailer.

Cargo Trailer

Cargo Trailer Floor



If the inside height of the trailer is 6.5 feet, what is the total volume of the inside of the trailer, to the *nearest cubic foot*?

267 Theresa has a rectangular pool 30 ft long, 15 ft wide, and 4 ft deep. Theresa fills her pool using city water at a rate of $3.95 per 100 gallons of water. Nancy has a circular pool with a diameter of 24 ft and a depth of 4 ft. Nancy fills her pool with a water delivery service at a rate of $200 per 6000 gallons. If Theresa and Nancy both fill their pools 6 inches from the top of the pool, determine and state who paid more to fill her pool.
[1ft^3 water = 7.48 gallons]

268 A child-sized swimming pool can be modeled by a cylinder. The pool has a diameter of $6\frac{1}{2}$ feet and a height of 12 inches. The pool is filled with water to $\frac{2}{3}$ of its height. Determine and state the volume of the water in the pool, to the *nearest cubic foot*. One cubic foot equals 7.48 gallons of water. Determine and state, to the *nearest gallon*, the number of gallons of water in the pool.

269 When volleyballs are purchased, they are not fully inflated. A partially inflated volleyball can be modeled by a sphere whose volume is approximately 180 in^3. After being fully inflated, its volume is approximately 294 in^3. To the *nearest tenth of an inch*, how much does the radius increase when the volleyball is fully inflated?

270 A barrel of fuel oil is a right circular cylinder where the inside measurements of the barrel are a diameter of 22.5 inches and a height of 33.5 inches. There are 231 cubic inches in a liquid gallon. Determine and state, to the *nearest tenth*, the gallons of fuel that are in a barrel of fuel oil.

271 A large water basin is in the shape of a right cylinder. The inside of the basin has a diameter of $8\frac{1}{4}$ feet and a height of 3 feet. Determine and state, to the *nearest cubic foot*, the number of cubic feet of water that it will take to fill the basin to a level of $\frac{1}{2}$ foot from the top.

272 Randy's basketball is in the shape of a sphere with a maximum circumference of 29.5 inches. Determine and state the volume of the basketball, to the *nearest cubic inch*.

G.MG.A.2: DENSITY

273 The 2010 U.S. Census populations and population densities are shown in the table below.

State	Population Density $\left(\frac{\text{people}}{\text{mi}^2}\right)$	Population in 2010
Florida	350.6	18,801,310
Illinois	231.1	12,830,632
New York	411.2	19,378,102
Pennsylvania	283.9	12,702,379

Based on the table above, which list has the states' areas, in square miles, in order from largest to smallest?

1) Illinois, Florida, New York, Pennsylvania
2) New York, Florida, Illinois, Pennsylvania
3) New York, Florida, Pennsylvania, Illinois
4) Pennsylvania, New York, Florida, Illinois

274 The table below shows the population and land area, in square miles, of four counties in New York State at the turn of the century.

County	2000 Census Population	2000 Land Area $\left(\text{mi}^2\right)$
Broome	200,536	706.82
Dutchess	280,150	801.59
Niagara	219,846	522.95
Saratoga	200,635	811.84

Which county had the greatest population density?

1) Broome
2) Dutchess
3) Niagara
4) Saratoga

275 A shipping container is in the shape of a right rectangular prism with a length of 12 feet, a width of 8.5 feet, and a height of 4 feet. The container is completely filled with contents that weigh, on average, 0.25 pound per cubic foot. What is the weight, in pounds, of the contents in the container?
1) 1,632
2) 408
3) 102
4) 92

276 A hemispherical tank is filled with water and has a diameter of 10 feet. If water weighs 62.4 pounds per cubic foot, what is the total weight of the water in a full tank, to the *nearest pound*?
1) 16,336
2) 32,673
3) 130,690
4) 261,381

277 Molly wishes to make a lawn ornament in the form of a solid sphere. The clay being used to make the sphere weighs .075 pound per cubic inch. If the sphere's radius is 4 inches, what is the weight of the sphere, to the *nearest pound*?
1) 34
2) 20
3) 15
4) 4

278 Seawater contains approximately 1.2 ounces of salt per liter on average. How many gallons of seawater, to the *nearest tenth of a gallon*, would contain 1 pound of salt?
1) 3.3
2) 3.5
3) 4.7
4) 13.3

279 A hemispherical water tank has an inside diameter of 10 feet. If water has a density of 62.4 pounds per cubic foot, what is the weight of the water in a full tank, to the *nearest pound*?
1) 16,336
2) 32,673
3) 130,690
4) 261,381

280 The density of the American white oak tree is 752 kilograms per cubic meter. If the trunk of an American white oak tree has a circumference of 4.5 meters and the height of the trunk is 8 meters, what is the approximate number of kilograms of the trunk?
1) 13
2) 9694
3) 13,536
4) 30,456

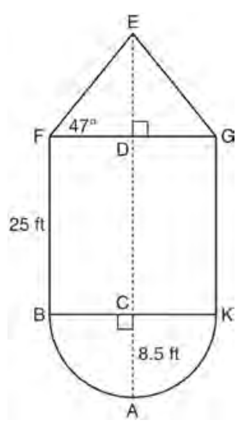
281 A standard-size golf ball has a diameter of 1.680 inches. The material used to make the golf ball weighs 0.6523 ounce per cubic inch. What is the weight, to the *nearest hundredth of an ounce*, of one golf ball?
1) 1.10
2) 1.62
3) 2.48
4) 3.81

282 A wooden cube has an edge length of 6 centimeters and a mass of 137.8 grams. Determine the density of the cube, to the *nearest thousandth*. State which type of wood the cube is made of, using the density table below.

Type of Wood	**Density** (g/cm^3)
Pine	0.373
Hemlock	0.431
Elm	0.554
Birch	0.601
Ash	0.638
Maple	0.676
Oak	0.711

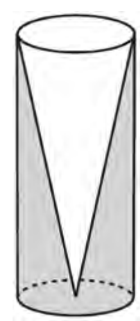
283 The water tower in the picture below is modeled by the two-dimensional figure beside it. The water tower is composed of a hemisphere, a cylinder, and a cone. Let C be the center of the hemisphere and let D be the center of the base of the cone.

Source: http://en.wikipedia.org



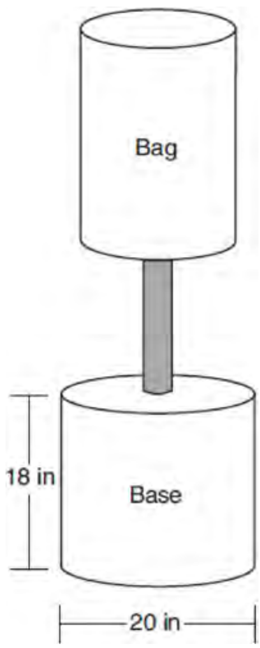
If $AC = 8.5$ feet, $BF = 25$ feet, and $m\angle EFD = 47°$, determine and state, to the *nearest cubic foot*, the volume of the water tower. The water tower was constructed to hold a maximum of 400,000 pounds of water. If water weighs 62.4 pounds per cubic foot, can the water tower be filled to 85% of its volume and *not* exceed the weight limit? Justify your answer.

284 Walter wants to make 100 candles in the shape of a cone for his new candle business. The mold shown below will be used to make the candles. Each mold will have a height of 8 inches and a diameter of 3 inches. To the *nearest cubic inch*, what will be the total volume of 100 candles?



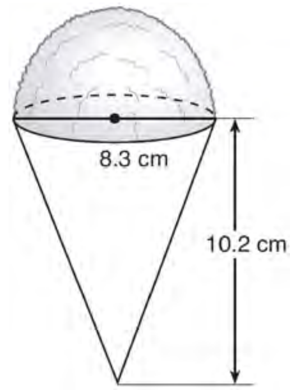
Walter goes to a hobby store to buy the wax for his candles. The wax costs \$0.10 per ounce. If the weight of the wax is 0.52 ounce per cubic inch, how much will it cost Walter to buy the wax for 100 candles? If Walter spent a total of \$37.83 for the molds and charges \$1.95 for each candle, what is Walter's profit after selling 100 candles?

285 Shae has recently begun kickboxing and purchased training equipment as modeled in the diagram below. The total weight of the bag, pole, and unfilled base is 270 pounds. The cylindrical base is 18 inches tall with a diameter of 20 inches. The dry sand used to fill the base weighs 95.46 lbs per cubic foot.



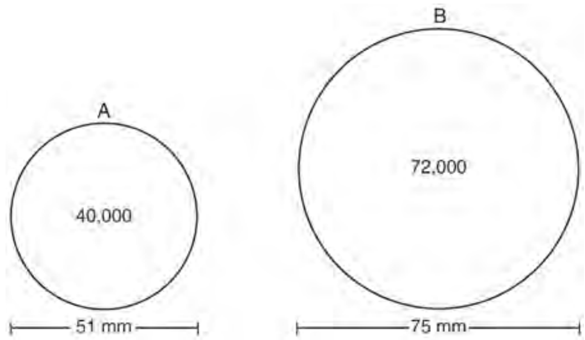
To the *nearest pound*, determine and state the total weight of the training equipment if the base is filled to 85% of its capacity.

286 A snow cone consists of a paper cone completely filled with shaved ice and topped with a hemisphere of shaved ice, as shown in the diagram below. The inside diameter of both the cone and the hemisphere is 8.3 centimeters. The height of the cone is 10.2 centimeters.



The desired density of the shaved ice is $0.697\ \text{g/cm}^3$, and the cost, per kilogram, of ice is \$3.83. Determine and state the cost of the ice needed to make 50 snow cones.

287 During an experiment, the same type of bacteria is grown in two petri dishes. Petri dish *A* has a diameter of 51 mm and has approximately 40,000 bacteria after 1 hour. Petri dish *B* has a diameter of 75 mm and has approximately 72,000 bacteria after 1 hour.



Determine and state which petri dish has the greater population density of bacteria at the end of the first hour.

288 Trees that are cut down and stripped of their branches for timber are approximately cylindrical. A timber company specializes in a certain type of tree that has a typical diameter of 50 cm and a typical height of about 10 meters. The density of the wood is 380 kilograms per cubic meter, and the wood can be sold by mass at a rate of $4.75 per kilogram. Determine and state the minimum number of whole trees that must be sold to raise at least $50,000.

289 A contractor needs to purchase 500 bricks. The dimensions of each brick are 5.1 cm by 10.2 cm by 20.3 cm, and the density of each brick is $1920\ \text{kg}/\text{m}^3$. The maximum capacity of the contractor's trailer is 900 kg. Can the trailer hold the weight of 500 bricks? Justify your answer.

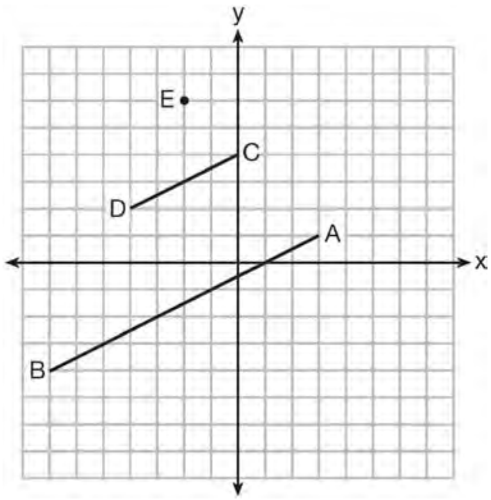
290 New streetlights will be installed along a section of the highway. The posts for the streetlights will be 7.5 m tall and made of aluminum. The city can choose to buy the posts shaped like cylinders or the posts shaped like rectangular prisms. The cylindrical posts have a hollow core, with aluminum 2.5 cm thick, and an outer diameter of 53.4 cm. The rectangular-prism posts have a hollow core, with aluminum 2.5 cm thick, and a square base that measures 40 cm on each side. The density of aluminum is 2.7 g/cm3, and the cost of aluminum is $0.38 per kilogram. If all posts must be the same shape, which post design will cost the town less? How much money will be saved per streetlight post with the less expensive design?

291 A machinist creates a solid steel part for a wind turbine engine. The part has a volume of 1015 cubic centimeters. Steel can be purchased for $0.29 per kilogram, and has a density of 7.95 g/cm^3. If the machinist makes 500 of these parts, what is the cost of the steel, to the *nearest dollar*?

292 A bakery sells hollow chocolate spheres. The larger diameter of each sphere is 4 cm. The thickness of the chocolate of each sphere is 0.5 cm. Determine and state, to the *nearest tenth of a cubic centimeter*, the amount of chocolate in each hollow sphere. The bakery packages 8 of them into a box. If the density of the chocolate is 1.308 g/cm^3, determine and state, to the *nearest gram*, the total mass of the chocolate in the box.

TRANSFORMATIONS
G.SRT.A.1: LINE DILATIONS

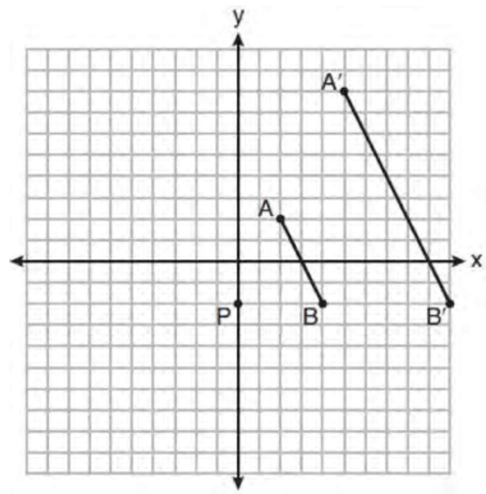
293 In the diagram below, $\overline{CD}$ is the image of $\overline{AB}$ after a dilation of scale factor k with center E.



Which ratio is equal to the scale factor k of the dilation?

1) $\frac{EC}{EA}$
2) $\frac{BA}{EA}$
3) $\frac{EA}{BA}$
4) $\frac{EA}{EC}$

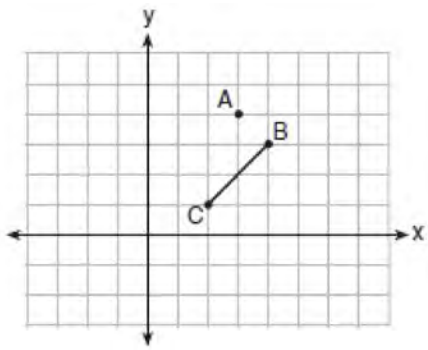
294 On the set of axes below, $\overline{AB}$ is dilated by a scale factor of $\frac{5}{2}$ centered at point P.



Which statement is always true?

1) $\overline{PA} \cong \overline{AA'}$
2) $\overline{AB} \parallel \overline{A'B'}$
3) $AB = A'B'$
4) $\frac{5}{2}(A'B') = AB$

295 On the graph below, point $A(3,4)$ and $\overline{BC}$ with coordinates $B(4,3)$ and $C(2,1)$ are graphed.



What are the coordinates of *B'* and *C'* after $\overline{BC}$ undergoes a dilation centered at point *A* with a scale factor of 2?
1) $B'(5,2)$ and $C'(1,-2)$
2) $B'(6,1)$ and $C'(0,-1)$
3) $B'(5,0)$ and $C'(1,-2)$
4) $B'(5,2)$ and $C'(3,0)$

296 The equation of line *h* is $2x + y = 1$. Line *m* is the image of line *h* after a dilation of scale factor 4 with respect to the origin. What is the equation of the line *m*?
1) $y = -2x + 1$
2) $y = -2x + 4$
3) $y = 2x + 4$
4) $y = 2x + 1$

297 The line $y = 2x - 4$ is dilated by a scale factor of $\frac{3}{2}$ and centered at the origin. Which equation represents the image of the line after the dilation?
1) $y = 2x - 4$
2) $y = 2x - 6$
3) $y = 3x - 4$
4) $y = 3x - 6$

298 Line $y = 3x - 1$ is transformed by a dilation with a scale factor of 2 and centered at $(3,8)$. The line's image is
1) $y = 3x - 8$
2) $y = 3x - 4$
3) $y = 3x - 2$
4) $y = 3x - 1$

299 A three-inch line segment is dilated by a scale factor of 6 and centered at its midpoint. What is the length of its image?
1) 9 inches
2) 2 inches
3) 15 inches
4) 18 inches

300 Line segment $A'B'$, whose endpoints are $(4,-2)$ and $(16,14)$, is the image of $\overline{AB}$ after a dilation of $\frac{1}{2}$ centered at the origin. What is the length of $\overline{AB}$?
1) 5
2) 10
3) 20
4) 40

301 Line *MN* is dilated by a scale factor of 2 centered at the point $(0,6)$. If $\overleftrightarrow{MN}$ is represented by $y = -3x + 6$, which equation can represent $\overleftrightarrow{M'N'}$, the image of $\overleftrightarrow{MN}$?
1) $y = -3x + 12$
2) $y = -3x + 6$
3) $y = -6x + 12$
4) $y = -6x + 6$

302 After a dilation with center (0,0), the image of $\overline{DB}$ is $\overline{D'B'}$. If $DB = 4.5$ and $D'B' = 18$, the scale factor of this dilation is

1) $\frac{1}{5}$
2) 5
3) $\frac{1}{4}$
4) 4

303 What is an equation of the image of the line $y = \frac{3}{2}x - 4$ after a dilation of a scale factor of $\frac{3}{4}$ centered at the origin?

1) $y = \frac{9}{8}x - 4$
2) $y = \frac{9}{8}x - 3$
3) $y = \frac{3}{2}x - 4$
4) $y = \frac{3}{2}x - 3$

304 After a dilation centered at the origin, the image of $\overline{CD}$ is $\overline{C'D'}$. If the coordinates of the endpoints of these segments are $C(6,-4)$, $D(2,-8)$, $C'(9,-6)$, and $D'(3,-12)$, the scale factor of the dilation is

1) $\frac{3}{2}$
2) $\frac{2}{3}$
3) 3
4) $\frac{1}{3}$

305 The line $3y = -2x + 8$ is transformed by a dilation centered at the origin. Which linear equation could be its image?

1) $2x + 3y = 5$
2) $2x - 3y = 5$
3) $3x + 2y = 5$
4) $3x - 2y = 5$

306 A line that passes through the points whose coordinates are (1,1) and (5,7) is dilated by a scale factor of 3 and centered at the origin. The image of the line

1) is perpendicular to the original line
2) is parallel to the original line
3) passes through the origin
4) is the original line

307 A line segment is dilated by a scale factor of 2 centered at a point not on the line segment. Which statement regarding the relationship between the given line segment and its image is true?

1) The line segments are perpendicular, and the image is one-half of the length of the given line segment.
2) The line segments are perpendicular, and the image is twice the length of the given line segment.
3) The line segments are parallel, and the image is twice the length of the given line segment.
4) The line segments are parallel, and the image is one-half of the length of the given line segment.

308 The line represented by the equation $4y = 3x + 7$ is transformed by a dilation centered at the origin. Which linear equation could represent its image?

1) $3x - 4y = 9$
2) $3x + 4y = 9$
3) $4x - 3y = 9$
4) $4x + 3y = 9$

309 The line whose equation is $3x - 5y = 4$ is dilated by a scale factor of $\frac{5}{3}$ centered at the origin. Which statement is correct?

1) The image of the line has the same slope as the pre-image but a different *y*-intercept.
2) The image of the line has the same *y*-intercept as the pre-image but a different slope.
3) The image of the line has the same slope and the same *y*-intercept as the pre-image.
4) The image of the line has a different slope and a different *y*-intercept from the pre-image.

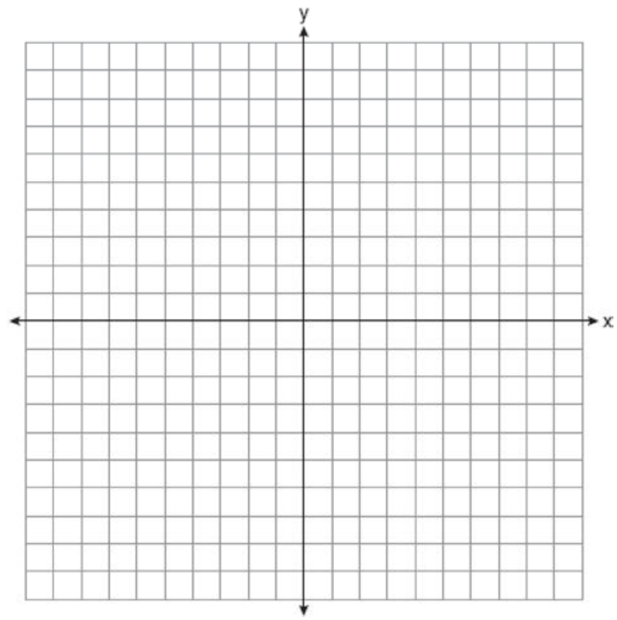
310 The line $-3x + 4y = 8$ is transformed by a dilation centered at the origin. Which linear equation could represent its image?

1) $y = \frac{4}{3}x + 8$
2) $y = \frac{3}{4}x + 8$
3) $y = -\frac{3}{4}x - 8$
4) $y = -\frac{4}{3}x - 8$

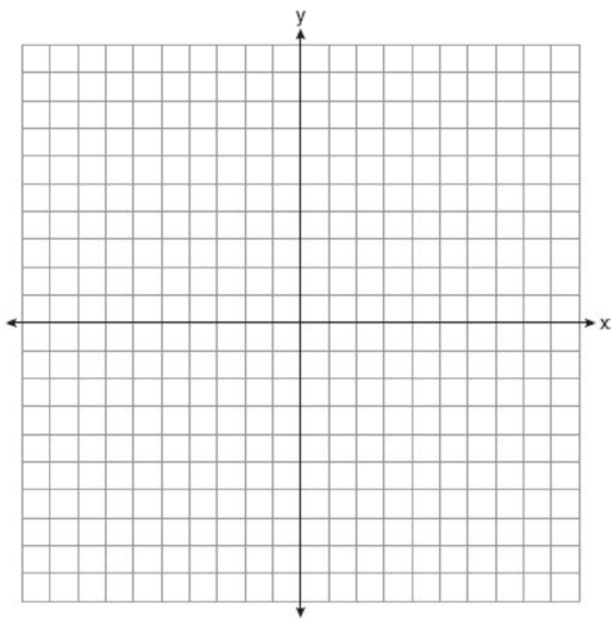
311 If the line represented by $y = -\frac{1}{4}x - 2$ is dilated by a scale factor of 4 centered at the origin, which statement about the image is true?

1) The slope is $-\frac{1}{4}$ and the *y*-intercept is -8.
2) The slope is $-\frac{1}{4}$ and the *y*-intercept is -2.
3) The slope is -1 and the *y*-intercept is -8.
4) The slope is -1 and the *y*-intercept is -2.

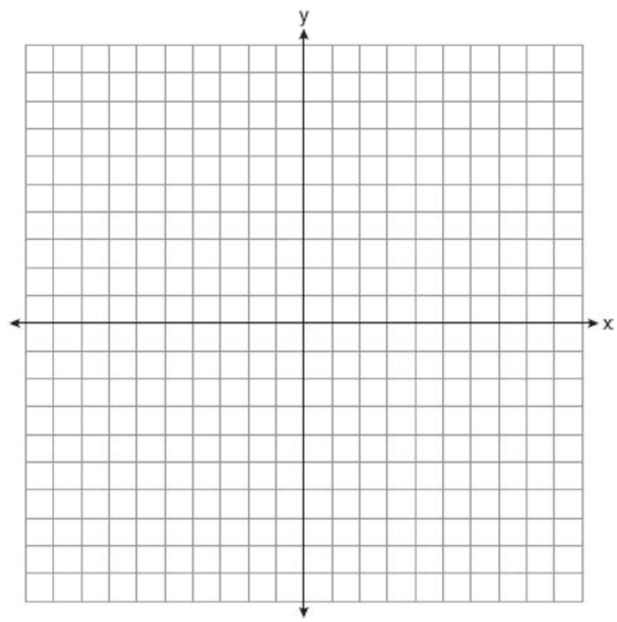
312 Line *n* is represented by the equation $3x + 4y = 20$. Determine and state the equation of line *p*, the image of line *n*, after a dilation of scale factor $\frac{1}{3}$ centered at the point $(4, 2)$. [The use of the set of axes below is optional.] Explain your answer.



313 The coordinates of the endpoints of $\overline{AB}$ are $A(2,3)$ and $B(5,-1)$. Determine the length of $\overline{A'B'}$, the image of $\overline{AB}$, after a dilation of $\frac{1}{2}$ centered at the origin. [The use of the set of axes below is optional.]



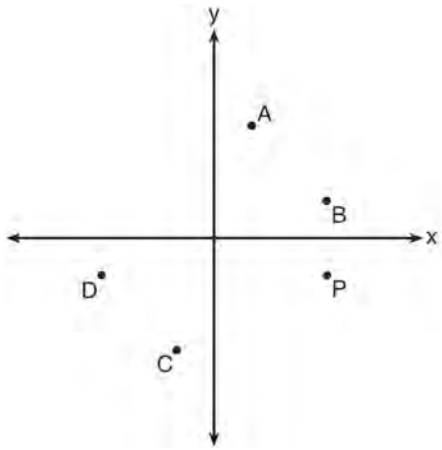
314 Aliyah says that when the line $4x + 3y = 24$ is dilated by a scale factor of 2 centered at the point $(3,4)$, the equation of the dilated line is $y = -\frac{4}{3}x + 16$. Is Aliyah correct? Explain why. [The use of the set of axes below is optional.]



315 Line ℓ is mapped onto line m by a dilation centered at the origin with a scale factor of 2. The equation of line ℓ is $3x - y = 4$. Determine and state an equation for line m.

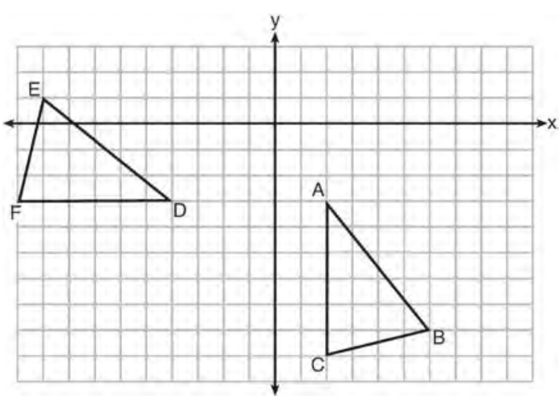
G.CO.A.5: ROTATIONS

316 Which point shown in the graph below is the image of point *P* after a counterclockwise rotation of 90° about the origin?



1) *A*
2) *B*
3) *C*
4) *D*

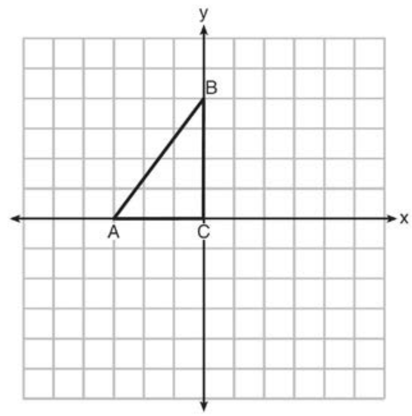
317 The grid below shows $\triangle ABC$ and $\triangle DEF$.



Let $\triangle A'B'C'$ be the image of $\triangle ABC$ after a rotation about point *A*. Determine and state the location of *B'* if the location of point *C'* is $(8,-3)$. Explain your answer. Is $\triangle DEF$ congruent to $\triangle A'B'C'$? Explain your answer.

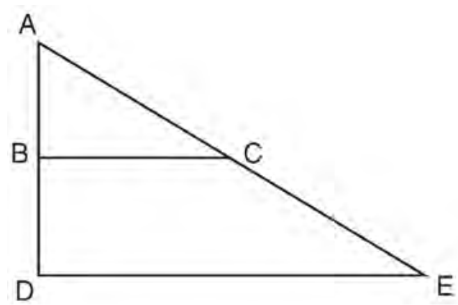
G.CO.A.5: REFLECTIONS

318 Triangle *ABC* is graphed on the set of axes below. Graph and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a reflection over the line $x = 1$.



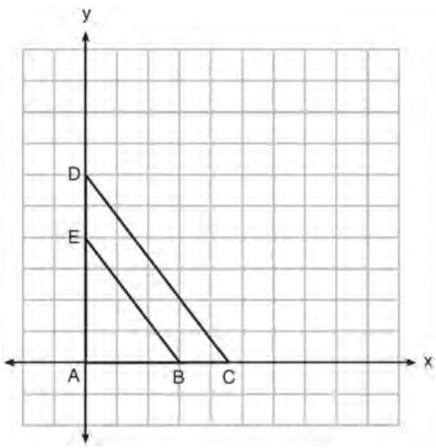
G.SRT.A.2: DILATIONS

319 The image of $\triangle ABC$ after a dilation of scale factor *k* centered at point *A* is $\triangle ADE$, as shown in the diagram below.



Which statement is always true?
1) $2AB = AD$
2) $\overline{AD} \perp \overline{DE}$
3) $\overline{AC} = \overline{CE}$
4) $\overline{BC} \parallel \overline{DE}$

320 In the diagram below, $\triangle ABE$ is the image of $\triangle ACD$ after a dilation centered at the origin. The coordinates of the vertices are $A(0,0)$, $B(3,0)$, $C(4.5,0)$, $D(0,6)$, and $E(0,4)$.



The ratio of the lengths of $\overline{BE}$ to $\overline{CD}$ is
1) $\frac{2}{3}$
2) $\frac{3}{2}$
3) $\frac{3}{4}$
4) $\frac{4}{3}$

321 Given square *RSTV*, where $RS = 9$ cm. If square *RSTV* is dilated by a scale factor of 3 about a given center, what is the perimeter, in centimeters, of the image of *RSTV* after the dilation?
1) 12
2) 27
3) 36
4) 108

322 Triangle *RJM* has an area of 6 and a perimeter of 12. If the triangle is dilated by a scale factor of 3 centered at the origin, what are the area and perimeter of its image, triangle *R'J'M'*?
1) area of 9 and perimeter of 15
2) area of 18 and perimeter of 36
3) area of 54 and perimeter of 36
4) area of 54 and perimeter of 108

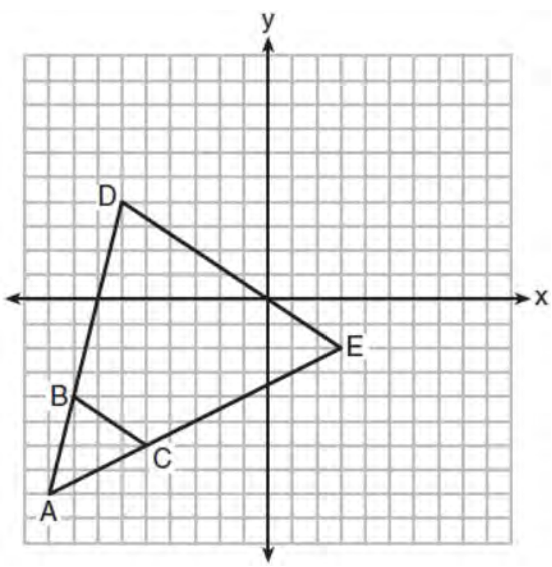
323 If $\triangle ABC$ is dilated by a scale factor of 3, which statement is true of the image $\triangle A'B'C'$?
1) $3A'B' = AB$
2) $B'C' = 3BC$
3) $m\angle A' = 3(m\angle A)$
4) $3(m\angle C') = m\angle C$

324 A triangle is dilated by a scale factor of 3 with the center of dilation at the origin. Which statement is true?
1) The area of the image is nine times the area of the original triangle.
2) The perimeter of the image is nine times the perimeter of the original triangle.
3) The slope of any side of the image is three times the slope of the corresponding side of the original triangle.
4) The measure of each angle in the image is three times the measure of the corresponding angle of the original triangle.

325 Rectangle $A'B'C'D'$ is the image of rectangle $ABCD$ after a dilation centered at point A by a scale factor of $\frac{2}{3}$. Which statement is correct?

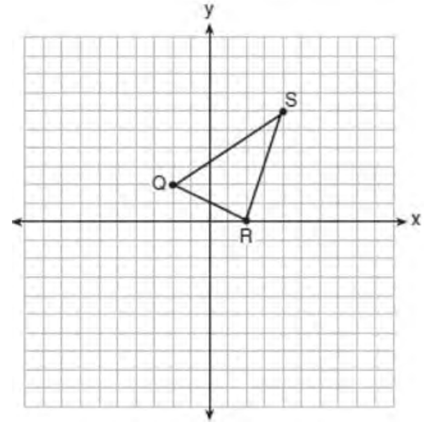
1) Rectangle $A'B'C'D'$ has a perimeter that is $\frac{2}{3}$ the perimeter of rectangle $ABCD$.
2) Rectangle $A'B'C'D'$ has a perimeter that is $\frac{3}{2}$ the perimeter of rectangle $ABCD$.
3) Rectangle $A'B'C'D'$ has an area that is $\frac{2}{3}$ the area of rectangle $ABCD$.
4) Rectangle $A'B'C'D'$ has an area that is $\frac{3}{2}$ the area of rectangle $ABCD$.

326 Triangle ABC and triangle ADE are graphed on the set of axes below.



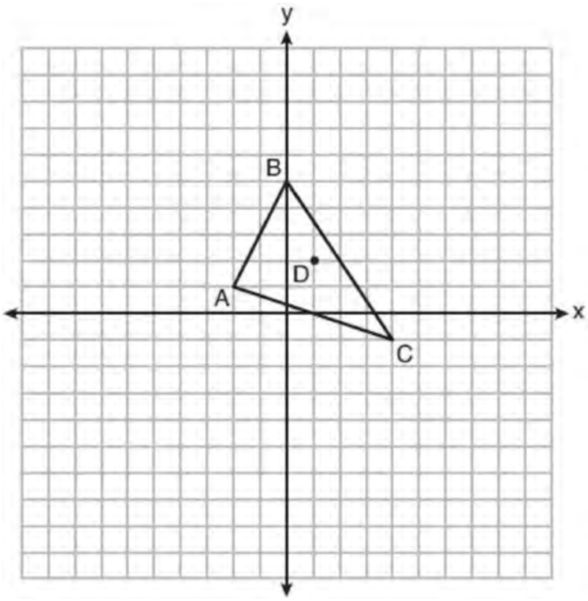
Describe a transformation that maps triangle ABC onto triangle ADE. Explain why this transformation makes triangle ADE similar to triangle ABC.

327 Triangle QRS is graphed on the set of axes below.



On the same set of axes, graph and label $\triangle Q'R'S'$, the image of $\triangle QRS$ after a dilation with a scale factor of $\frac{3}{2}$ centered at the origin. Use slopes to explain why $Q'R' \parallel QR$.

328 Triangle ABC and point $D(1,2)$ are graphed on the set of axes below.

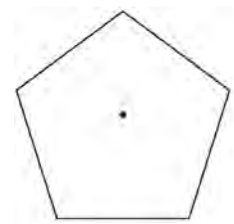


Graph and label $\triangle A'B'C'$, the image of $\triangle ABC$, after a dilation of scale factor 2 centered at point D.

329 Triangle $A'B'C'$ is the image of triangle ABC after a dilation with a scale factor of $\frac{1}{2}$ and centered at point A. Is triangle ABC congruent to triangle $A'B'C'$? Explain your answer.

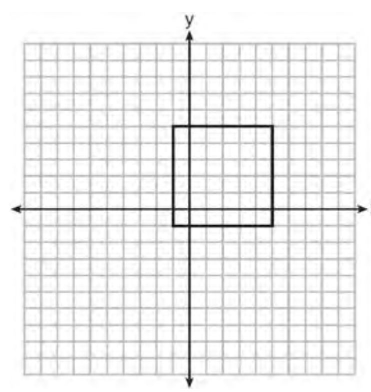
G.CO.A.3: MAPPING A POLYGON ONTO ITSELF

330 A regular pentagon is shown in the diagram below.



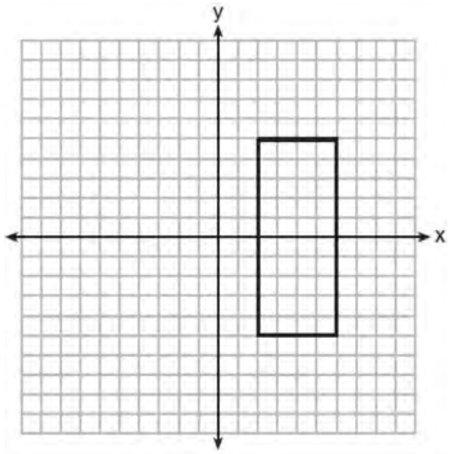
If the pentagon is rotated clockwise around its center, the minimum number of degrees it must be rotated to carry the pentagon onto itself is
1) 54º
2) 72º
3) 108º
4) 360º

331 In the diagram below, a square is graphed in the coordinate plane.



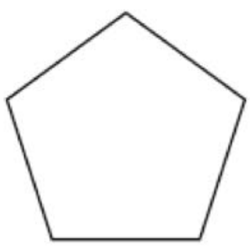
A reflection over which line does *not* carry the square onto itself?
1) $x = 5$
2) $y = 2$
3) $y = x$
4) $x + y = 4$

332 As shown in the graph below, the quadrilateral is a rectangle.



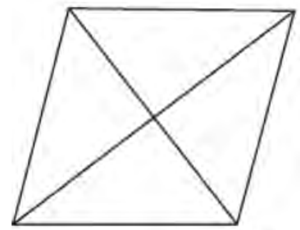
Which transformation would *not* map the rectangle onto itself?
1) a reflection over the x-axis
2) a reflection over the line $x = 4$
3) a rotation of 180° about the origin
4) a rotation of 180° about the point $(4,0)$

333 The regular polygon below is rotated about its center.



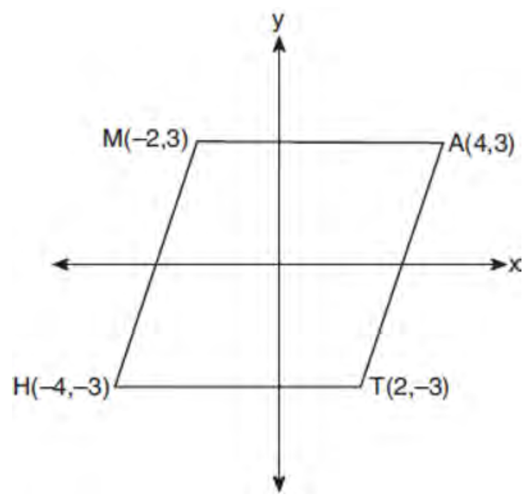
Which angle of rotation will carry the figure onto itself?
1) 60°
2) 108°
3) 216°
4) 540°

334 The figure below shows a rhombus with noncongruent diagonals.



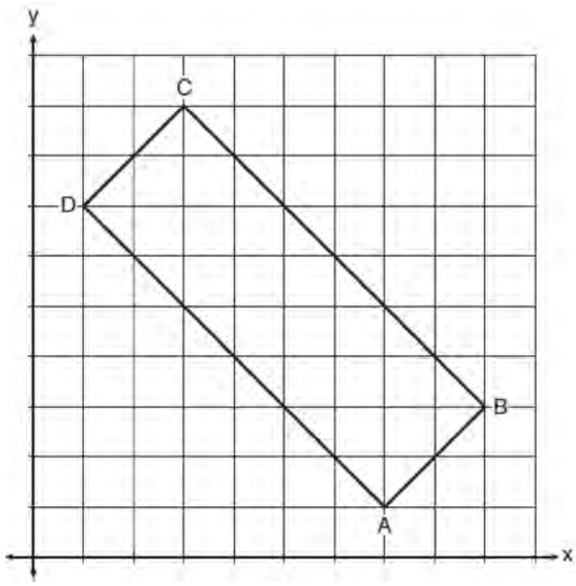
Which transformation would *not* carry this rhombus onto itself?
1) a reflection over the shorter diagonal
2) a reflection over the longer diagonal
3) a clockwise rotation of 90° about the intersection of the diagonals
4) a counterclockwise rotation of 180° about the intersection of the diagonals

335 Which transformation carries the parallelogram below onto itself?



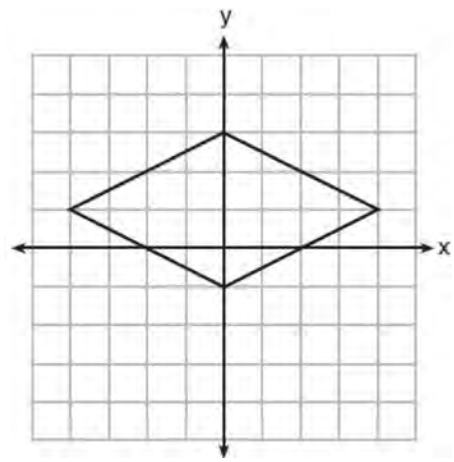
1) a reflection over $y = x$
2) a reflection over $y = -x$
3) a rotation of 90° counterclockwise about the origin
4) a rotation of 180° counterclockwise about the origin

336 In the diagram below, rectangle $ABCD$ has vertices whose coordinates are $A(7,1)$, $B(9,3)$, $C(3,9)$, and $D(1,7)$.



Which transformation will *not* carry the rectangle onto itself?
1) a reflection over the line $y = x$
2) a reflection over the line $y = -x + 10$
3) a rotation of 180° about the point $(6,6)$
4) a rotation of 180° about the point $(5,5)$

337 A rhombus is graphed on the set of axes below.



Which transformation would carry the rhombus onto itself?
1) 180° rotation counterclockwise about the origin
2) reflection over the line $y = \frac{1}{2}x + 1$
3) reflection over the line $y = 0$
4) reflection over the line $x = 0$

338 Which regular polygon has a minimum rotation of 45° to carry the polygon onto itself?
1) octagon
2) decagon
3) hexagon
4) pentagon

339 Which rotation about its center will carry a regular decagon onto itself?
1) 54°
2) 162°
3) 198°
4) 252°

340 Which figure always has exactly four lines of reflection that map the figure onto itself?
1) square
2) rectangle
3) regular octagon
4) equilateral triangle

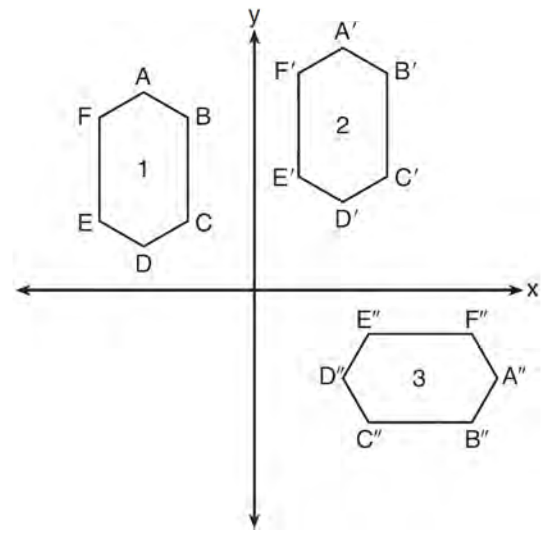
341 A regular decagon is rotated *n* degrees about its center, carrying the decagon onto itself. The value of *n* could be
1) 10°
2) 150°
3) 225°
4) 252°

342 Which transformation would *not* carry a square onto itself?
1) a reflection over one of its diagonals
2) a 90° rotation clockwise about its center
3) a 180° rotation about one of its vertices
4) a reflection over the perpendicular bisector of one side

343 A regular hexagon is rotated in a counterclockwise direction about its center. Determine and state the minimum number of degrees in the rotation such that the hexagon will coincide with itself.

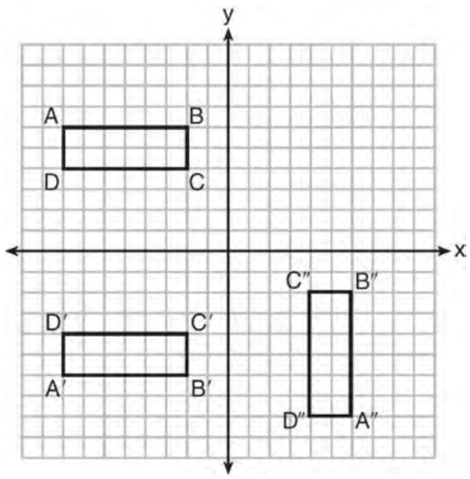
G.CO.A.5: COMPOSITIONS OF TRANSFORMATIONS

344 In the diagram below, congruent figures 1, 2, and 3 are drawn.



Which sequence of transformations maps figure 1 onto figure 2 and then figure 2 onto figure 3?
1) a reflection followed by a translation
2) a rotation followed by a translation
3) a translation followed by a reflection
4) a translation followed by a rotation

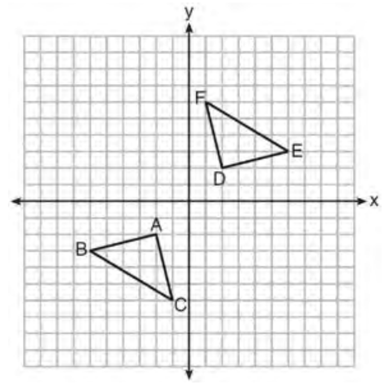
345 A sequence of transformations maps rectangle *ABCD* onto rectangle *A"B"C"D"*, as shown in the diagram below.



Which sequence of transformations maps *ABCD* onto *A'B'C'D'* and then maps *A'B'C'D'* onto *A"B"C"D"*?

1) a reflection followed by a rotation
2) a reflection followed by a translation
3) a translation followed by a rotation
4) a translation followed by a reflection

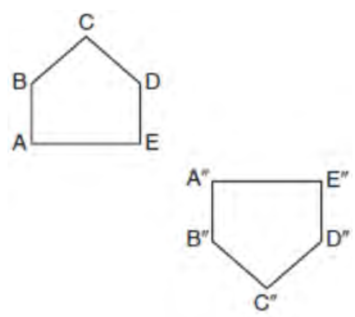
346 Triangle *ABC* and triangle *DEF* are graphed on the set of axes below.



Which sequence of transformations maps triangle *ABC* onto triangle *DEF*?

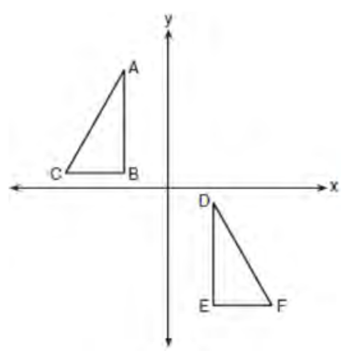
1) a reflection over the *x*-axis followed by a reflection over the *y*-axis
2) a 180° rotation about the origin followed by a reflection over the line $y = x$
3) a 90° clockwise rotation about the origin followed by a reflection over the *y*-axis
4) a translation 8 units to the right and 1 unit up followed by a 90° counterclockwise rotation about the origin

347 Identify which sequence of transformations could map pentagon *ABCDE* onto pentagon *A"B"C"D"E"*, as shown below.



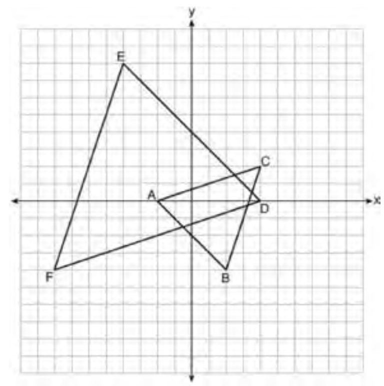
1) dilation followed by a rotation
2) translation followed by a rotation
3) line reflection followed by a translation
4) line reflection followed by a line reflection

348 In the diagram below, $\triangle ABC \cong \triangle DEF$.



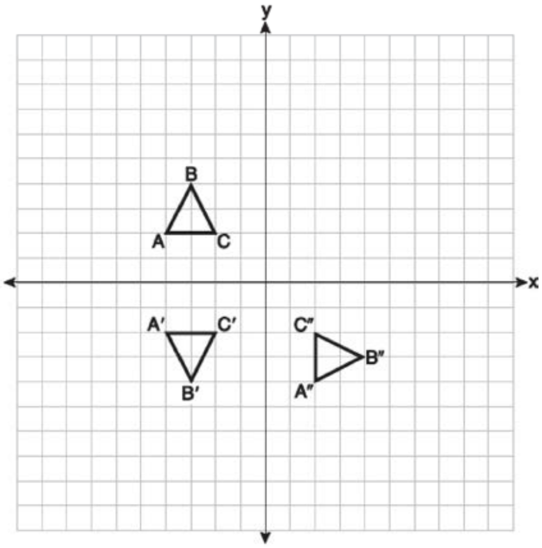
Which sequence of transformations maps $\triangle ABC$ onto $\triangle DEF$?
1) a reflection over the *x*-axis followed by a translation
2) a reflection over the *y*-axis followed by a translation
3) a rotation of 180° about the origin followed by a translation
4) a counterclockwise rotation of 90° about the origin followed by a translation

349 On the set of axes below, $\triangle ABC$ has vertices at $A(-2,0)$, $B(2,-4)$, $C(4,2)$, and $\triangle DEF$ has vertices at $D(4,0)$, $E(-4,8)$, $F(-8,-4)$.



Which sequence of transformations will map $\triangle ABC$ onto $\triangle DEF$?
1) a dilation of $\triangle ABC$ by a scale factor of 2 centered at point *A*
2) a dilation of $\triangle ABC$ by a scale factor of $\frac{1}{2}$ centered at point *A*
3) a dilation of $\triangle ABC$ by a scale factor of 2 centered at the origin, followed by a rotation of 180° about the origin
4) a dilation of $\triangle ABC$ by a scale factor of $\frac{1}{2}$ centered at the origin, followed by a rotation of 180° about the origin

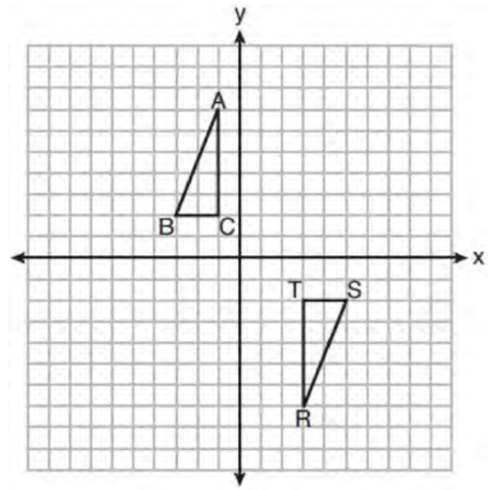
350 On the set of axes below, triangle ABC is graphed. Triangles $A'B'C'$ and $A''B''C''$, the images of triangle ABC, are graphed after a sequence of rigid motions.



Identify which sequence of rigid motions maps $\triangle ABC$ onto $\triangle A'B'C'$ and then maps $\triangle A'B'C'$ onto $\triangle A''B''C''$.

1) a rotation followed by another rotation
2) a translation followed by a reflection
3) a reflection followed by a translation
4) a reflection followed by a rotation

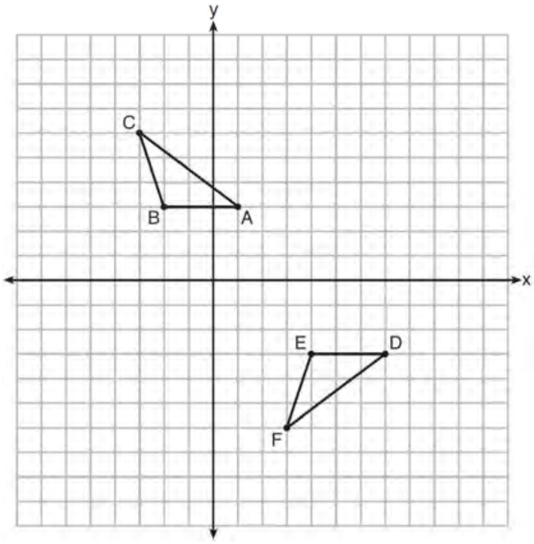
351 Triangles ABC and RST are graphed on the set of axes below.



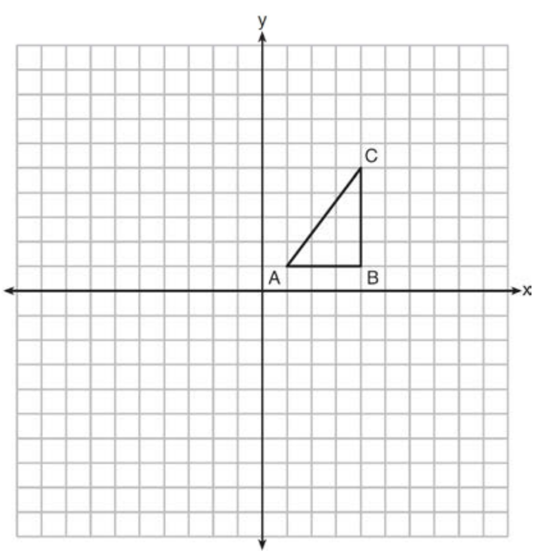
Which sequence of rigid motions will prove $\triangle ABC \cong \triangle RST$?

1) a line reflection over $y = x$
2) a rotation of 180° centered at $(1,0)$
3) a line reflection over the x-axis followed by a translation of 6 units right
4) a line reflection over the x-axis followed by a line reflection over $y = 1$

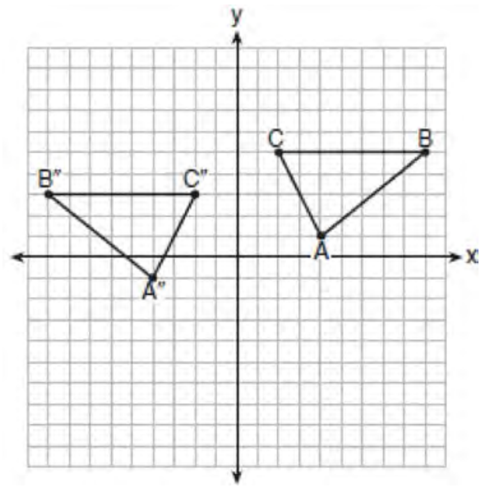
352 Describe a sequence of transformations that will map $\triangle ABC$ onto $\triangle DEF$ as shown below.



353 In the diagram below, $\triangle ABC$ has coordinates $A(1,1)$, $B(4,1)$, and $C(4,5)$. Graph and label $\triangle A''B''C''$, the image of $\triangle ABC$ after the translation five units to the right and two units up followed by the reflection over the line $y = 0$.

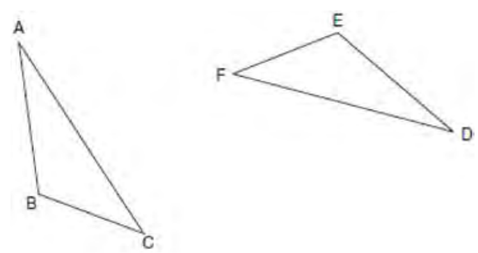


354 The graph below shows $\triangle ABC$ and its image, $\triangle A''B''C''$.



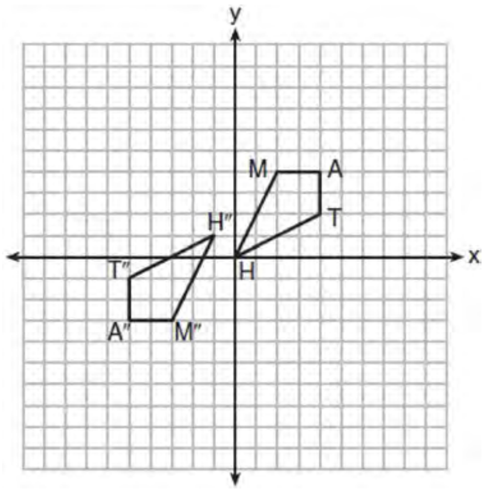
Describe a sequence of rigid motions which would map $\triangle ABC$ onto $\triangle A''B''C''$.

355 Triangle ABC and triangle DEF are drawn below.



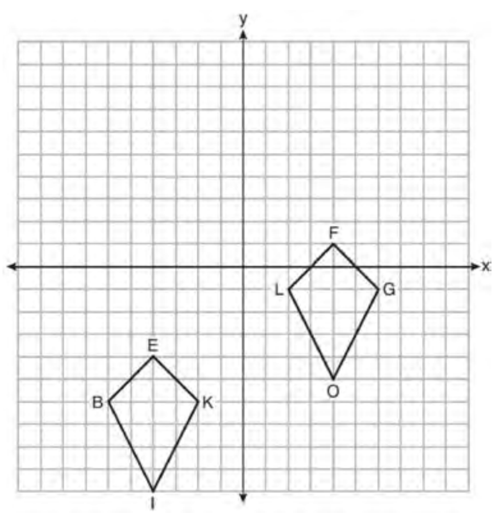
If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $\angle A \cong \angle D$, write a sequence of transformations that maps triangle ABC onto triangle DEF.

356 Quadrilateral *MATH* and its image *M"A"T"H"* are graphed on the set of axes below.



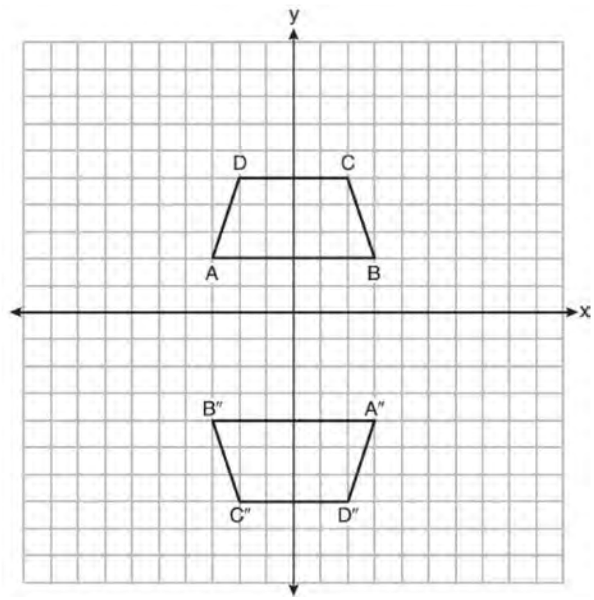
Describe a sequence of transformations that maps quadrilateral *MATH* onto quadrilateral *M"A"T"H"*.

357 Quadrilaterals *BIKE* and *GOLF* are graphed on the set of axes below.



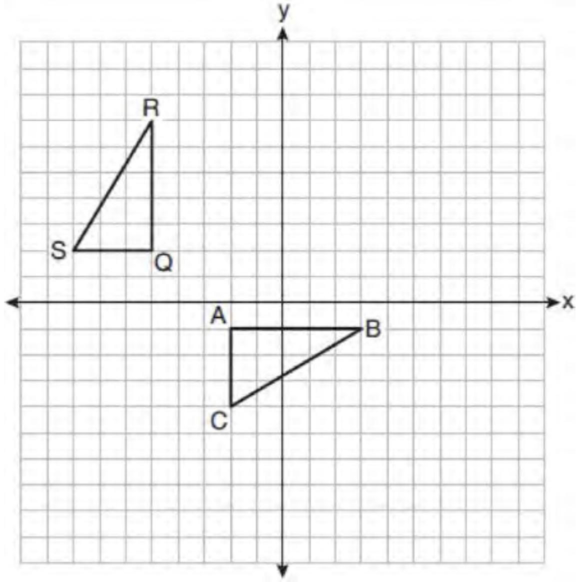
Describe a sequence of transformations that maps quadrilateral *BIKE* onto quadrilateral *GOLF*.

358 Trapezoids *ABCD* and *A"B"C"D"* are graphed on the set of axes below.



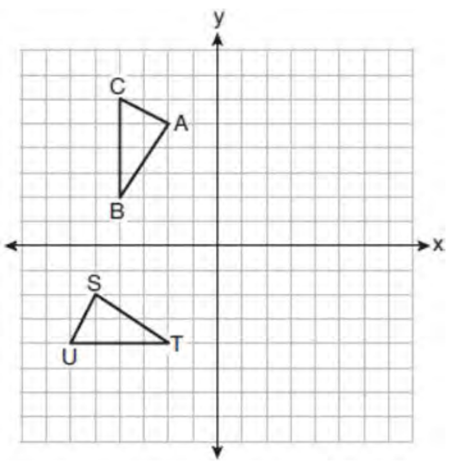
Describe a sequence of transformations that maps trapezoid *ABCD* onto trapezoid *A"B"C"D"*.

359 On the set of axes below, $\triangle ABC$ is graphed with coordinates $A(-2,-1)$, $B(3,-1)$, and $C(-2,-4)$. Triangle QRS, the image of $\triangle ABC$, is graphed with coordinates $Q(-5,2)$, $R(-5,7)$, and $S(-8,2)$.



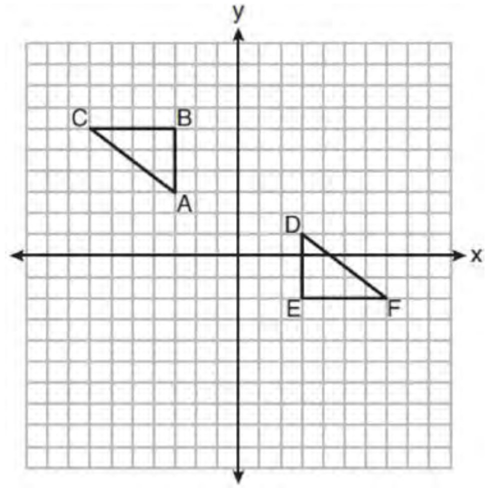
Describe a sequence of transformations that would map $\triangle ABC$ onto $\triangle QRS$.

360 On the set of axes below, $\triangle ABC \cong \triangle STU$.



Describe a sequence of rigid motions that maps $\triangle ABC$ onto $\triangle STU$.

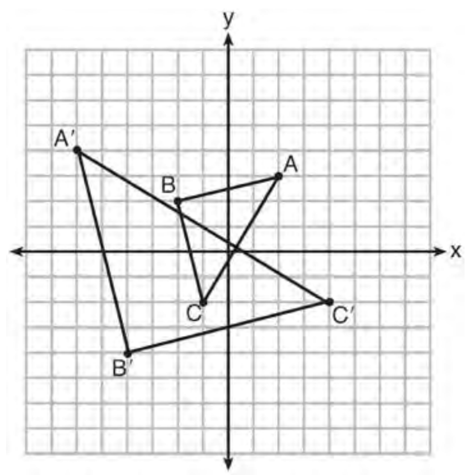
361 On the set of axes below, $\triangle ABC \cong \triangle DEF$.



Describe a sequence of rigid motions that maps $\triangle ABC$ onto $\triangle DEF$.

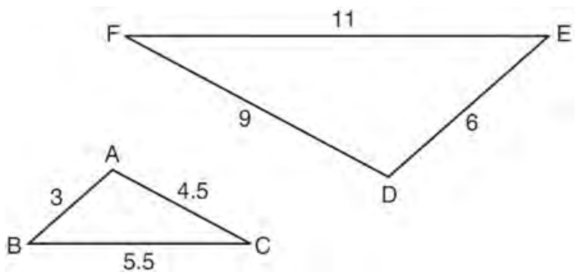
G.SRT.A.2: COMPOSITIONS OF TRANSFORMATIONS

362 Which sequence of transformations will map $\triangle ABC$ onto $\triangle A'B'C'$?



1) reflection and translation
2) rotation and reflection
3) translation and dilation
4) dilation and rotation

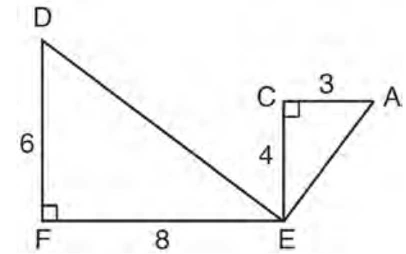
363 In the diagram below, $\triangle DEF$ is the image of $\triangle ABC$ after a clockwise rotation of 180° and a dilation where $AB = 3$, $BC = 5.5$, $AC = 4.5$, $DE = 6$, $FD = 9$, and $EF = 11$.



Which relationship must always be true?

1) $\dfrac{m\angle A}{m\angle D} = \dfrac{1}{2}$
2) $\dfrac{m\angle C}{m\angle F} = \dfrac{2}{1}$
3) $\dfrac{m\angle A}{m\angle C} = \dfrac{m\angle F}{m\angle D}$
4) $\dfrac{m\angle B}{m\angle E} = \dfrac{m\angle C}{m\angle F}$

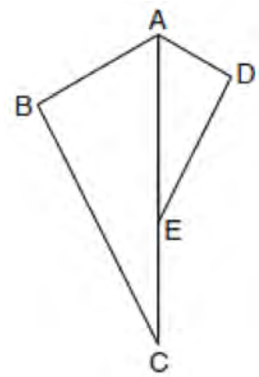
364 Given: $\triangle AEC$, $\triangle DEF$, and $\overline{FE} \perp \overline{CE}$



What is a correct sequence of similarity transformations that shows $\triangle AEC \sim \triangle DEF$?

1) a rotation of 180 degrees about point E followed by a horizontal translation
2) a counterclockwise rotation of 90 degrees about point E followed by a horizontal translation
3) a rotation of 180 degrees about point E followed by a dilation with a scale factor of 2 centered at point E
4) a counterclockwise rotation of 90 degrees about point E followed by a dilation with a scale factor of 2 centered at point E

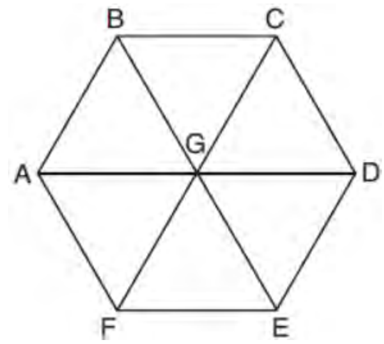
365 In the diagram below, $\triangle ADE$ is the image of $\triangle ABC$ after a reflection over the line AC followed by a dilation of scale factor $\frac{AE}{AC}$ centered at point A.



Which statement must be true?
1) $m\angle BAC \cong m\angle AED$
2) $m\angle ABC \cong m\angle ADE$
3) $m\angle DAE \cong \frac{1}{2} m\angle BAC$
4) $m\angle ACB \cong \frac{1}{2} m\angle DAB$

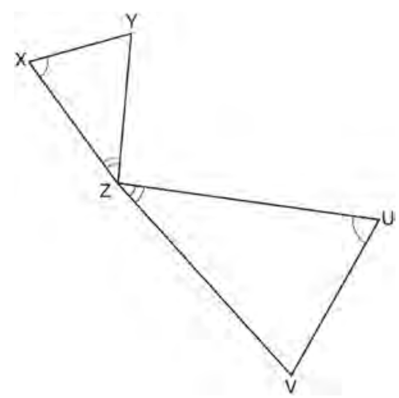
366 Triangle $A'B'C'$ is the image of $\triangle ABC$ after a dilation followed by a translation. Which statement(s) would always be true with respect to this sequence of transformations?
I. $\triangle ABC \cong \triangle A'B'C'$
II. $\triangle ABC \sim \triangle A'B'C'$
III. $\overline{AB} \parallel \overline{A'B'}$
IV. $AA' = BB'$
1) II, only
2) I and II
3) II and III
4) II, III, and IV

367 In regular hexagon $ABCDEF$ shown below, $\overline{AD}$, $\overline{BE}$, and $\overline{CF}$ all intersect at G.



When $\triangle ABG$ is reflected over $\overline{BG}$ and then rotated 180° about point G, $\triangle ABG$ is mapped onto
1) $\triangle FEG$
2) $\triangle AFG$
3) $\triangle CBG$
4) $\triangle DEG$

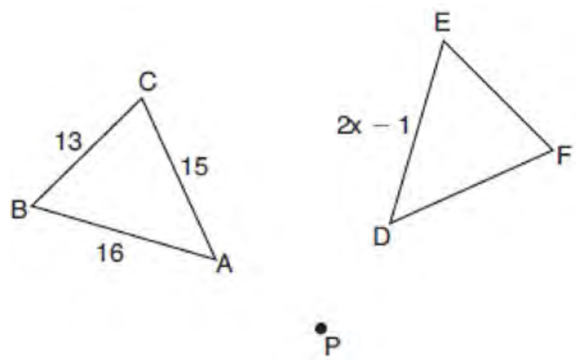
368 In the diagram below, triangles XYZ and UVZ are drawn such that $\angle X \cong \angle U$ and $\angle XZY \cong \angle UZV$.



Describe a sequence of similarity transformations that shows $\triangle XYZ$ is similar to $\triangle UVZ$.

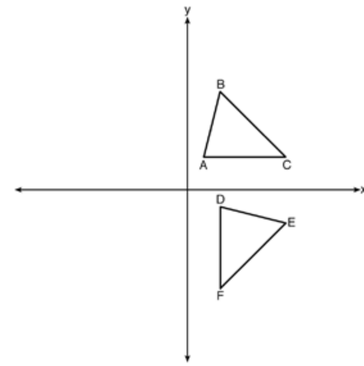
G.CO.B.6: PROPERTIES OF TRANSFORMATIONS

369 In the diagram below, $\triangle ABC$ with sides 13, 15, and 16, is mapped onto $\triangle DEF$ after a clockwise rotation of 90° about point P.



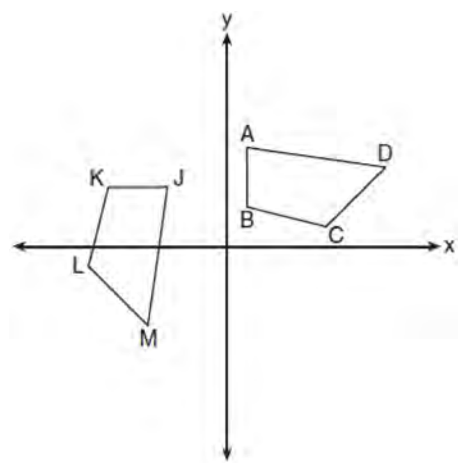
If $DE = 2x - 1$, what is the value of x?
1) 7
2) 7.5
3) 8
4) 8.5

370 The image of $\triangle ABC$ after a rotation of 90º clockwise about the origin is $\triangle DEF$, as shown below.



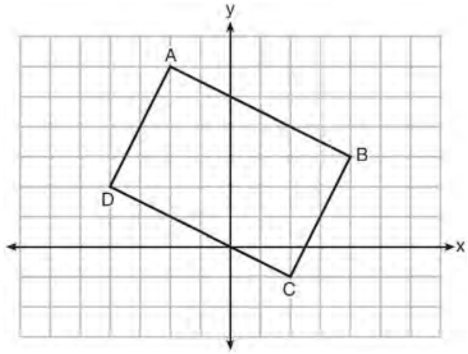
Which statement is true?
1) $\overline{BC} \cong \overline{DE}$
2) $\overline{AB} \cong \overline{DF}$
3) $\angle C \cong \angle E$
4) $\angle A \cong \angle D$

371 In the diagram below, a sequence of rigid motions maps $ABCD$ onto $JKLM$.



If $m\angle A = 82°$, $m\angle B = 104°$, and $m\angle L = 121°$, the measure of $\angle M$ is
1) 53°
2) 82°
3) 104°
4) 121°

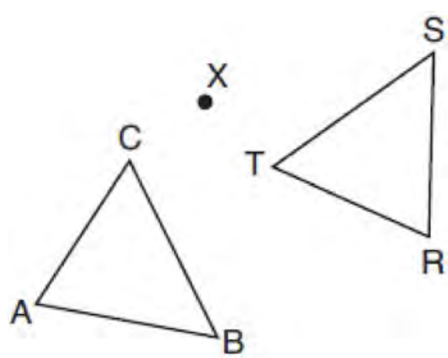
372 Quadrilateral $ABCD$ is graphed on the set of axes below.



When $ABCD$ is rotated 90° in a counterclockwise direction about the origin, its image is quadrilateral $A'B'C'D'$. Is distance preserved under this rotation, and which coordinates are correct for the given vertex?

1) no and $C'(1,2)$
2) no and $D'(2,4)$
3) yes and $A'(6,2)$
4) yes and $B'(-3,4)$

373 After a counterclockwise rotation about point X, scalene triangle ABC maps onto $\triangle RST$, as shown in the diagram below.



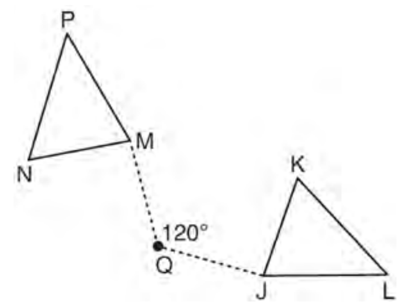
Which statement must be true?

1) $\angle A \cong \angle R$
2) $\angle A \cong \angle S$
3) $\overline{CB} \cong \overline{TR}$
4) $\overline{CA} \cong \overline{TS}$

374 If $\triangle ABC$ is mapped onto $\triangle DEF$ after a line reflection and $\triangle DEF$ is mapped onto $\triangle XYZ$ after a translation, the relationship between $\triangle ABC$ and $\triangle XYZ$ is that they are always

1) congruent and similar
2) congruent but not similar
3) similar but not congruent
4) neither similar nor congruent

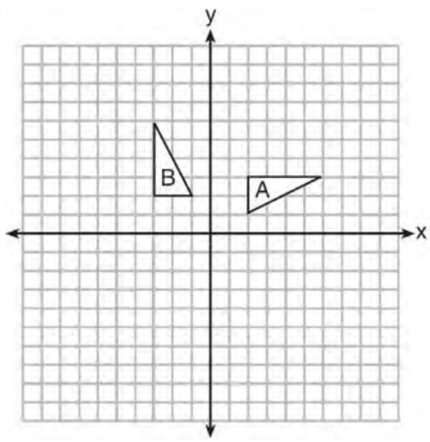
375 Triangle MNP is the image of triangle JKL after a 120° counterclockwise rotation about point Q. If the measure of angle L is 47° and the measure of angle N is 57°, determine the measure of angle M. Explain how you arrived at your answer.



376 Triangle $A'B'C'$ is the image of triangle ABC after a translation of 2 units to the right and 3 units up. Is triangle ABC congruent to triangle $A'B'C'$? Explain why.

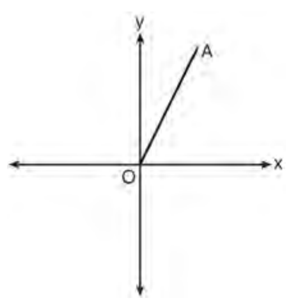
G.CO.A.2: IDENTIFYING TRANSFORMATIONS

377 In the diagram below, which single transformation was used to map triangle *A* onto triangle *B*?



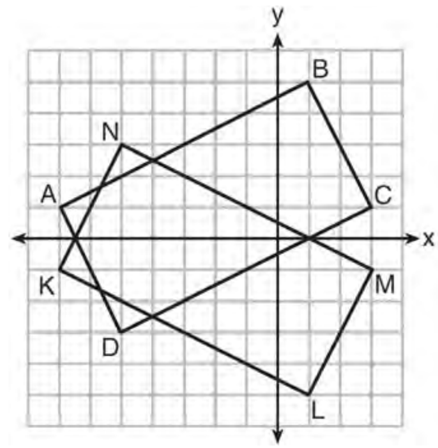
1) line reflection
2) rotation
3) dilation
4) translation

378 Which transformation of $\overline{OA}$ would result in an image parallel to $\overline{OA}$?



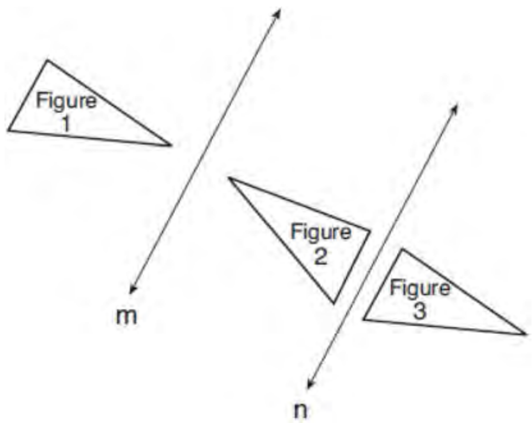
1) a translation of two units down
2) a reflection over the *x*-axis
3) a reflection over the *y*-axis
4) a clockwise rotation of 90° about the origin

379 On the set of axes below, rectangle *ABCD* can be proven congruent to rectangle *KLMN* using which transformation?



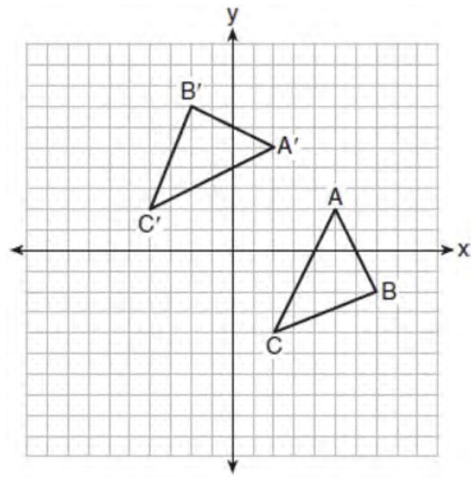
1) rotation
2) translation
3) reflection over the *x*-axis
4) reflection over the *y*-axis

380 In the diagram below, line *m* is parallel to line *n*. Figure 2 is the image of Figure 1 after a reflection over line *m*. Figure 3 is the image of Figure 2 after a reflection over line *n*.



Which single transformation would carry Figure 1 onto Figure 3?
1) a dilation
2) a rotation
3) a reflection
4) a translation

381 The graph below shows two congruent triangles, *ABC* and *A'B'C'*.



Which rigid motion would map $\triangle ABC$ onto $\triangle A'B'C'$?
1) a rotation of 90 degrees counterclockwise about the origin
2) a translation of three units to the left and three units up
3) a rotation of 180 degrees about the origin
4) a reflection over the line $y = x$

382 The vertices of $\triangle JKL$ have coordinates $J(5,1)$, $K(-2,-3)$, and $L(-4,1)$. Under which transformation is the image $\triangle J'K'L'$ *not* congruent to $\triangle JKL$?
1) a translation of two units to the right and two units down
2) a counterclockwise rotation of 180 degrees around the origin
3) a reflection over the x-axis
4) a dilation with a scale factor of 2 and centered at the origin

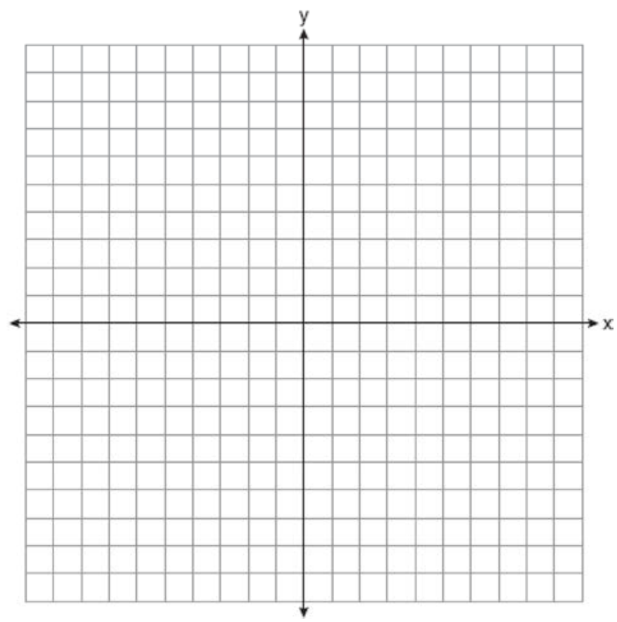
383 Which transformation would *not* always produce an image that would be congruent to the original figure?
1) translation
2) dilation
3) rotation
4) reflection

384 If $\triangle A'B'C'$ is the image of $\triangle ABC$, under which transformation will the triangles *not* be congruent?
1) reflection over the *x*-axis
2) translation to the left 5 and down 4
3) dilation centered at the origin with scale factor 2
4) rotation of 270° counterclockwise about the origin

385 Under which transformation would $\triangle A'B'C'$, the image of $\triangle ABC$, *not* be congruent to $\triangle ABC$?
1) reflection over the *y*-axis
2) rotation of 90° clockwise about the origin
3) translation of 3 units right and 2 units down
4) dilation with a scale factor of 2 centered at the origin

386 The image of $\triangle DEF$ is $\triangle D'E'F'$. Under which transformation will he triangles *not* be congruent?
1) a reflection through the origin
2) a reflection over the line $y = x$
3) a dilation with a scale factor of 1 centered at $(2,3)$
4) a dilation with a scale factor of $\frac{3}{2}$ centered at the origin

387 Triangle *ABC* has vertices at $A(-5,2)$, $B(-4,7)$, and $C(-2,7)$, and triangle *DEF* has vertices at $D(3,2)$, $E(2,7)$, and $F(0,7)$. Graph and label $\triangle ABC$ and $\triangle DEF$ on the set of axes below. Determine and state the single transformation where $\triangle DEF$ is the image of $\triangle ABC$. Use your transformation to explain why $\triangle ABC \cong \triangle DEF$.



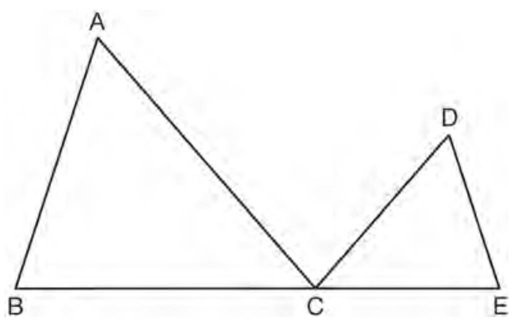
G.CO.A.2: ANALYTICAL REPRESENTATIONS OF TRANSFORMATIONS

388 Which transformation would result in the perimeter of a triangle being different from the perimeter of its image?
1) $(x,y) \rightarrow (y,x)$
2) $(x,y) \rightarrow (x,-y)$
3) $(x,y) \rightarrow (4x,4y)$
4) $(x,y) \rightarrow (x+2,y-5)$

389 The vertices of $\triangle PQR$ have coordinates $P(2,3)$, $Q(3,8)$, and $R(7,3)$. Under which transformation of $\triangle PQR$ are distance and angle measure preserved?
1) $(x,y) \to (2x,3y)$
2) $(x,y) \to (x+2,3y)$
3) $(x,y) \to (2x,y+3)$
4) $(x,y) \to (x+2,y+3)$

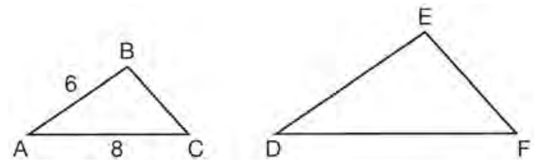
G.SRT.B.5: SIMILARITY

390 In the diagram below, $\triangle ABC \sim \triangle DEC$.



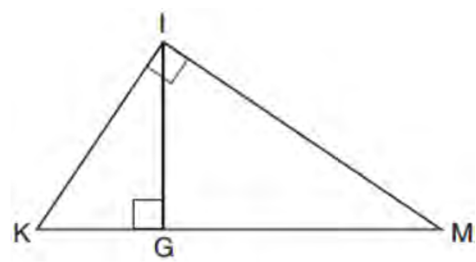
If $AC = 12$, $DC = 7$, $DE = 5$, and the perimeter of $\triangle ABC$ is 30, what is the perimeter of $\triangle DEC$?
1) 12.5
2) 14.0
3) 14.8
4) 17.5

391 In the diagram below, $\triangle ABC \sim \triangle DEF$.



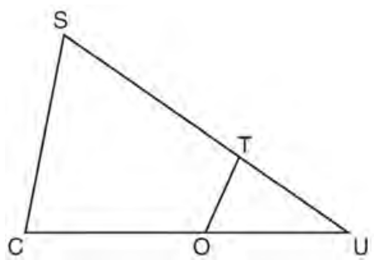
If $AB = 6$ and $AC = 8$, which statement will justify similarity by SAS?
1) $DE = 9$, $DF = 12$, and $\angle A \cong \angle D$
2) $DE = 8$, $DF = 10$, and $\angle A \cong \angle D$
3) $DE = 36$, $DF = 64$, and $\angle C \cong \angle F$
4) $DE = 15$, $DF = 20$, and $\angle C \cong \angle F$

392 In the diagram below of right triangle KMI, altitude $\overline{IG}$ is drawn to hypotenuse $\overline{KM}$.



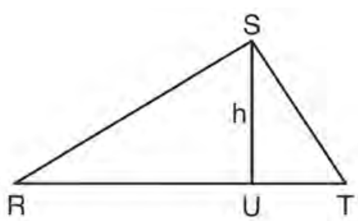
If $KG = 9$ and $IG = 12$, the length of $\overline{IM}$ is
1) 15
2) 16
3) 20
4) 25

393 In $\triangle SCU$ shown below, points T and O are on $\overline{SU}$ and $\overline{CU}$, respectively. Segment OT is drawn so that $\angle C \cong \angle OTU$.



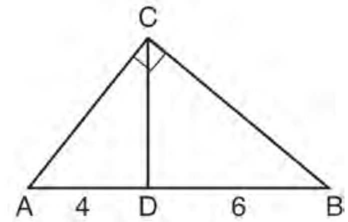
If $TU = 4$, $OU = 5$, and $OC = 7$, what is the length of $\overline{ST}$?
1) 5.6
2) 8.75
3) 11
4) 15

394 In $\triangle RST$ shown below, altitude $\overline{SU}$ is drawn to $\overline{RT}$ at U.



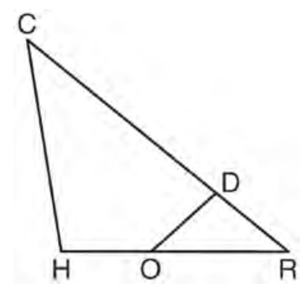
If $SU = h$, $UT = 12$, and $RT = 42$, which value of h will make $\triangle RST$ a right triangle with $\angle RST$ as a right angle?
1) $6\sqrt{3}$
2) $6\sqrt{10}$
3) $6\sqrt{14}$
4) $6\sqrt{35}$

395 In the diagram of right triangle ABC, $\overline{CD}$ intersects hypotenuse $\overline{AB}$ at D.



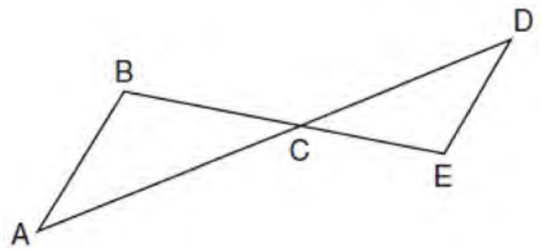
If $AD = 4$ and $DB = 6$, which length of $\overline{AC}$ makes $\overline{CD} \perp \overline{AB}$?
1) $2\sqrt{6}$
2) $2\sqrt{10}$
3) $2\sqrt{15}$
4) $4\sqrt{2}$

396 In triangle CHR, O is on $\overline{HR}$, and D is on $\overline{CR}$ so that $\angle H \cong \angle RDO$.



If $RD = 4$, $RO = 6$, and $OH = 4$, what is the length of $\overline{CD}$?
1) $2\frac{2}{3}$
2) $6\frac{2}{3}$
3) 11
4) 15

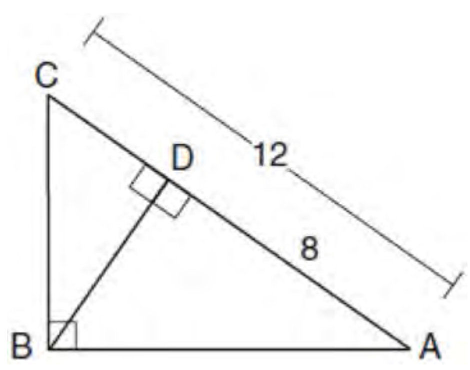
397 In the diagram below, $\overline{AD}$ intersects $\overline{BE}$ at C, and $\overline{AB} \parallel \overline{DE}$.



If $CD = 6.6$ cm, $DE = 3.4$ cm, $CE = 4.2$ cm, and $BC = 5.25$ cm, what is the length of $\overline{AC}$, to the *nearest hundredth of a centimeter*?

1) 2.70
2) 3.34
3) 5.28
4) 8.25

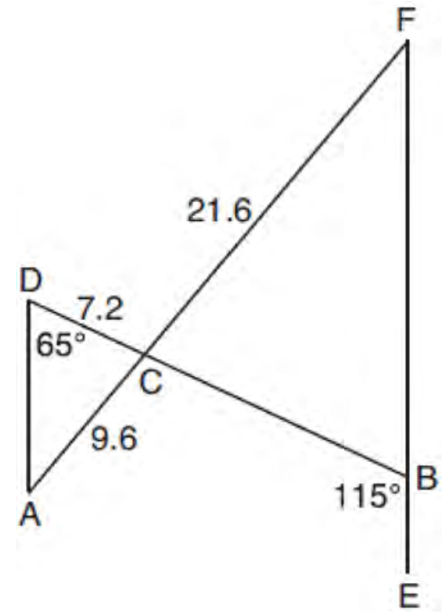
398 In the diagram below of $\triangle ABC$, $\angle ABC$ is a right angle, $AC = 12$, $AD = 8$, and altitude $\overline{BD}$ is drawn.



What is the length of $\overline{BC}$?

1) $4\sqrt{2}$
2) $4\sqrt{3}$
3) $4\sqrt{5}$
4) $4\sqrt{6}$

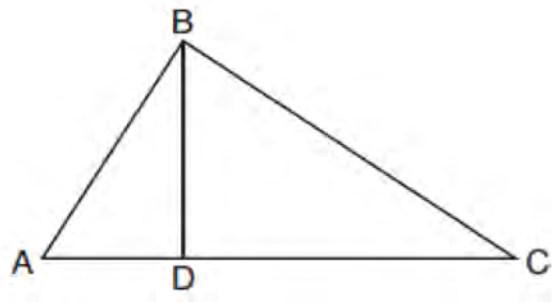
399 In the diagram below, $\overline{AF}$, and $\overline{DB}$ intersect at C, and $\overline{AD}$ and $\overline{FBE}$ are drawn such that $m\angle D = 65°$, $m\angle CBE = 115°$, $DC = 7.2$, $AC = 9.6$, and $FC = 21.6$.



What is the length of $\overline{CB}$?

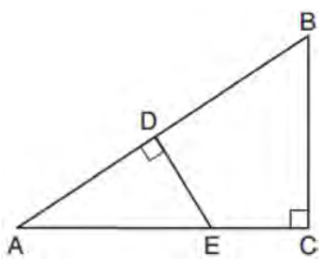
1) 3.2
2) 4.8
3) 16.2
4) 19.2

400 In the diagram below of right triangle ABC, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$.



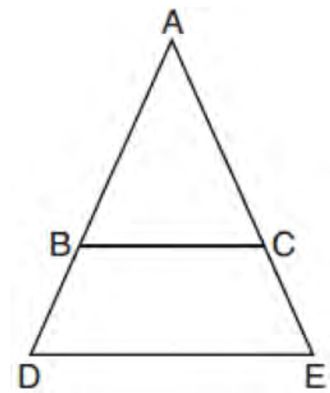
If $BD = 4$, $AD = x - 6$, and $CD = x$, what is the length of $\overline{CD}$?
1) 5
2) 2
3) 8
4) 11

401 In $\triangle ABC$ shown below, $\angle ACB$ is a right angle, E is a point on $\overline{AC}$, and $\overline{ED}$ is drawn perpendicular to hypotenuse $\overline{AB}$.



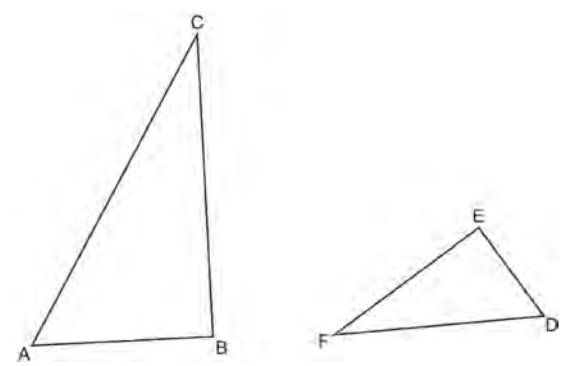
If $AB = 9$, $BC = 6$, and $DE = 4$, what is the length of $\overline{AE}$?
1) 5
2) 6
3) 7
4) 8

402 In the diagram below, $\overline{BC}$ connects points B and C on the congruent sides of isosceles triangle ADE, such that $\triangle ABC$ is isosceles with vertex angle A.



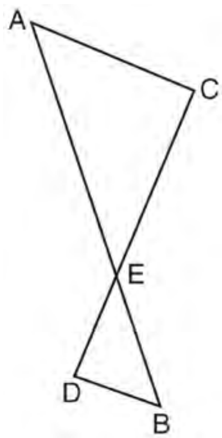
If $AB = 10$, $BD = 5$, and $DE = 12$, what is the length of $\overline{BC}$?
1) 6
2) 7
3) 8
4) 9

403 Triangles ABC and DEF are drawn below.



If $AB = 9$, $BC = 15$, $DE = 6$, $EF = 10$, and $\angle B \cong \angle E$, which statement is true?
1) $\angle CAB \cong \angle DEF$
2) $\frac{AB}{CB} = \frac{FE}{DE}$
3) $\triangle ABC \sim \triangle DEF$
4) $\frac{AB}{DE} = \frac{FE}{CB}$

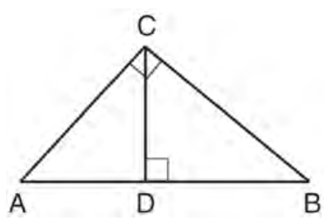
404 As shown in the diagram below, $\overline{AB}$ and $\overline{CD}$ intersect at E, and $\overline{AC} \parallel \overline{BD}$.



Given $\triangle AEC \sim \triangle BED$, which equation is true?

1) $\frac{CE}{DE} = \frac{EB}{EA}$
2) $\frac{AE}{BE} = \frac{AC}{BD}$
3) $\frac{EC}{AE} = \frac{BE}{ED}$
4) $\frac{ED}{EC} = \frac{AC}{BD}$

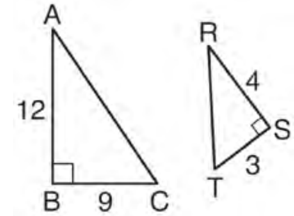
405 In the diagram below, $\overline{CD}$ is the altitude drawn to the hypotenuse $\overline{AB}$ of right triangle ABC.

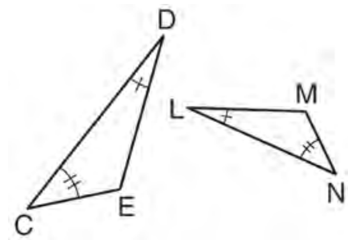


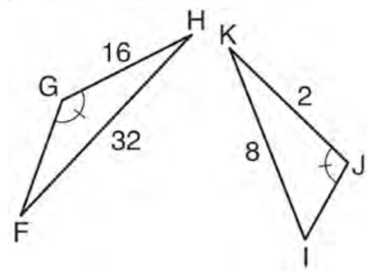
Which lengths would *not* produce an altitude that measures $6\sqrt{2}$?

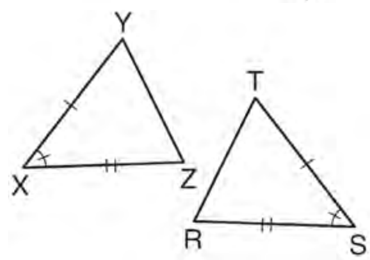
1) $AD = 2$ and $DB = 36$
2) $AD = 3$ and $AB = 24$
3) $AD = 6$ and $DB = 12$
4) $AD = 8$ and $AB = 17$

406 Using the information given below, which set of triangles can *not* be proven similar?

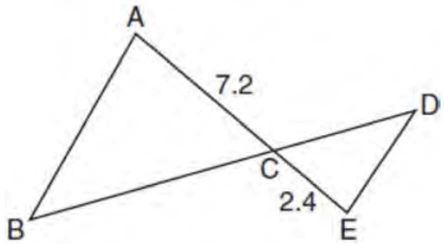
1) 

2) 

3) 

4) 

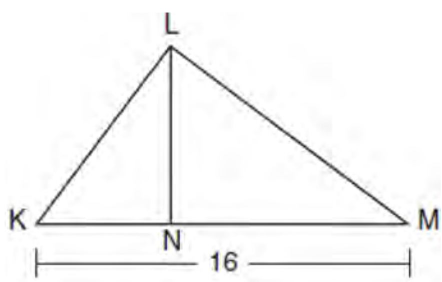
407 In the diagram below, $AC = 7.2$ and $CE = 2.4$.



Which statement is *not* sufficient to prove $\triangle ABC \sim \triangle EDC$?

1) $\overline{AB} \parallel \overline{ED}$
2) $DE = 2.7$ and $AB = 8.1$
3) $CD = 3.6$ and $BC = 10.8$
4) $DE = 3.0$, $AB = 9.0$, $CD = 2.9$, and $BC = 8.7$

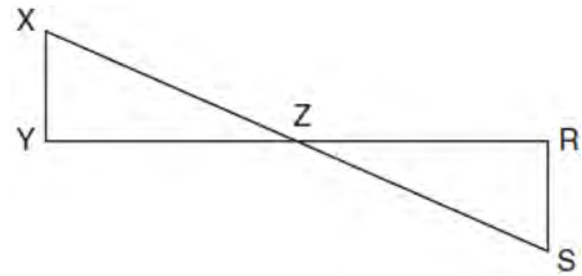
408 Kirstie is testing values that would make triangle KLM a right triangle when $\overline{LN}$ is an altitude, and $KM = 16$, as shown below.



Which lengths would make triangle KLM a right triangle?

1) $LM = 13$ and $KN = 6$
2) $LM = 12$ and $NM = 9$
3) $KL = 11$ and $KN = 7$
4) $LN = 8$ and $NM = 10$

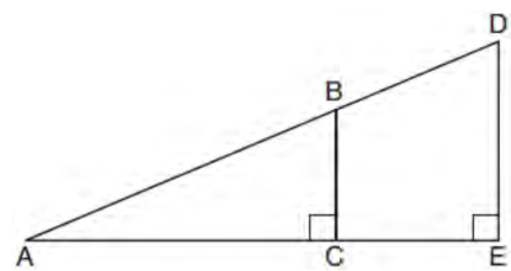
409 In the diagram below, $\overline{XS}$ and $\overline{YR}$ intersect at Z. Segments XY and RS are drawn perpendicular to $\overline{YR}$ to form triangles XYZ and SRZ.



Which statement is always true?

1) $(XY)(SR) = (XZ)(RZ)$
2) $\triangle XYZ \cong \triangle SRZ$
3) $\overline{XS} \cong \overline{YR}$
4) $\dfrac{XY}{SR} = \dfrac{YZ}{RZ}$

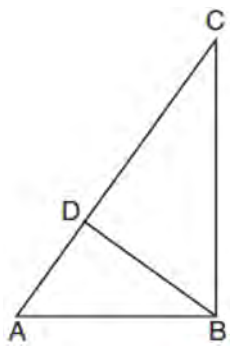
410 In the diagram below of right triangle AED, $\overline{BC} \parallel \overline{DE}$.



Which statement is always true?

1) $\dfrac{AC}{BC} = \dfrac{DE}{AE}$
2) $\dfrac{AB}{AD} = \dfrac{BC}{DE}$
3) $\dfrac{AC}{CE} = \dfrac{BC}{DE}$
4) $\dfrac{DE}{BC} = \dfrac{DB}{AB}$

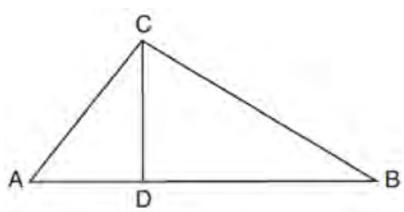
411 In the accompanying diagram of right triangle ABC, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$.



Which statement must always be true?

1) $\frac{AD}{AB} = \frac{BC}{AC}$
2) $\frac{AD}{AB} = \frac{AB}{AC}$
3) $\frac{BD}{BC} = \frac{AB}{AD}$
4) $\frac{AB}{BC} = \frac{BD}{AC}$

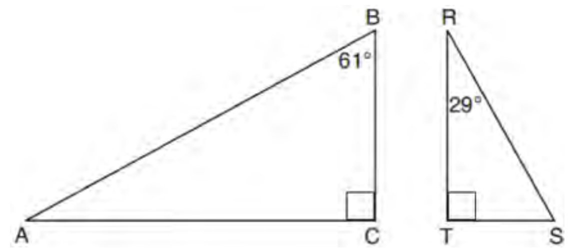
412 In the diagram below of right triangle ABC, altitude $\overline{CD}$ intersects hypotenuse $\overline{AB}$ at D.



Which equation is always true?

1) $\frac{AD}{AC} = \frac{CD}{BC}$
2) $\frac{AD}{CD} = \frac{BD}{CD}$
3) $\frac{AC}{CD} = \frac{BC}{CD}$
4) $\frac{AD}{AC} = \frac{AC}{BD}$

413 Given right triangle ABC with a right angle at C, $m\angle B = 61°$. Given right triangle RST with a right angle at T, $m\angle R = 29°$.



Which proportion in relation to $\triangle ABC$ and $\triangle RST$ is *not* correct?

1) $\frac{AB}{RS} = \frac{RT}{AC}$
2) $\frac{BC}{ST} = \frac{AB}{RS}$
3) $\frac{BC}{ST} = \frac{AC}{RT}$
4) $\frac{AB}{AC} = \frac{RS}{RT}$

414 The ratio of similarity of $\triangle BOY$ to $\triangle GRL$ is $1:2$. If $BO = x + 3$ and $GR = 3x - 1$, then the length of $\overline{GR}$ is

1) 5
2) 7
3) 10
4) 20

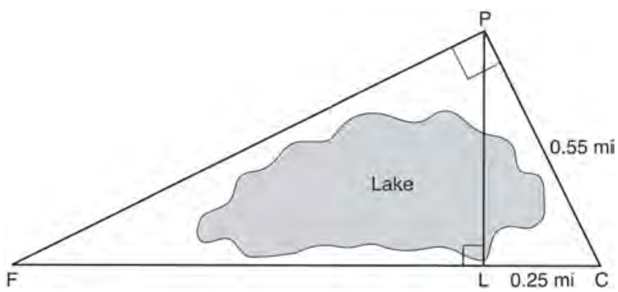
415 Line segment CD is the altitude drawn to hypotenuse $\overline{EF}$ in right triangle ECF. If $EC = 10$ and $EF = 24$, then, to the *nearest tenth*, ED is

1) 4.2
2) 5.4
3) 15.5
4) 21.8

416 In right triangle RST, altitude $\overline{TV}$ is drawn to hypotenuse $\overline{RS}$. If $RV = 12$ and $RT = 18$, what is the length of $\overline{SV}$?

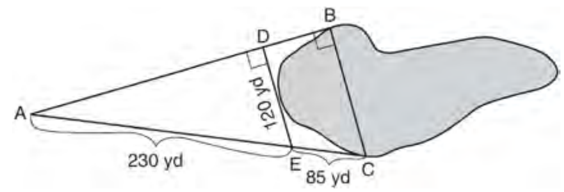
1) $6\sqrt{5}$
2) 15
3) $6\sqrt{6}$
4) 27

417 In the diagram below, the line of sight from the park ranger station, P, to the lifeguard chair, L, on the beach of a lake is perpendicular to the path joining the campground, C, and the first aid station, F. The campground is 0.25 mile from the lifeguard chair. The straight paths from both the campground and first aid station to the park ranger station are perpendicular.



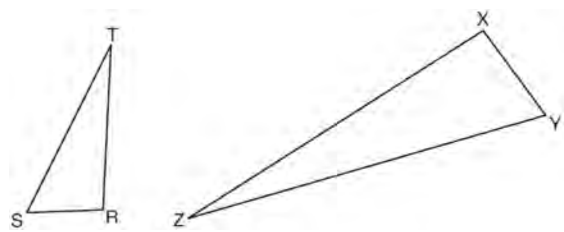
If the path from the park ranger station to the campground is 0.55 mile, determine and state, to the *nearest hundredth of a mile*, the distance between the park ranger station and the lifeguard chair. Gerald believes the distance from the first aid station to the campground is at least 1.5 miles. Is Gerald correct? Justify your answer.

418 To find the distance across a pond from point B to point C, a surveyor drew the diagram below. The measurements he made are indicated on his diagram.

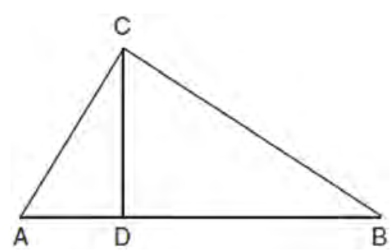


Use the surveyor's information to determine and state the distance from point B to point C, to the *nearest yard*.

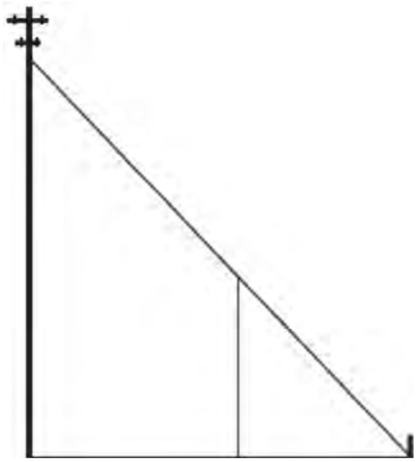
419 Triangles RST and XYZ are drawn below. If $RS = 6$, $ST = 14$, $XY = 9$, $YZ = 21$, and $\angle S \cong \angle Y$, is $\triangle RST$ similar to $\triangle XYZ$? Justify your answer.



420 In right triangle ABC shown below, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. Explain why $\triangle ABC \sim \triangle ACD$.

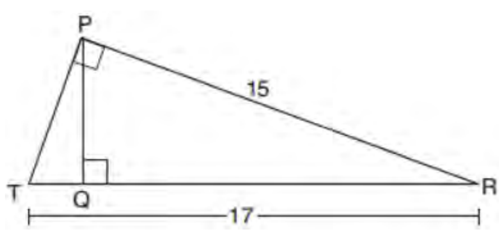


421 In the model below, a support wire for a telephone pole is attached to the pole and anchored to a stake in the ground 15 feet from the base of the telephone pole. Jamal places a 6-foot wooden pole under the support wire parallel to the telephone pole, such that one end of the pole is on the ground and the top of the pole is touching the support wire. He measures the distance between the bottom of the pole and the stake in the ground.



Jamal says he can approximate how high the support wire attaches to the telephone pole by using similar triangles. Explain why the triangles are similar.

422 In right triangle PRT, $m\angle P = 90°$, altitude $\overline{PQ}$ is drawn to hypotenuse $\overline{RT}$, $RT = 17$, and $PR = 15$.



Determine and state, to the *nearest tenth*, the length of $\overline{RQ}$.

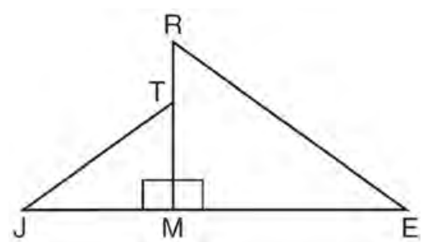
423 A flagpole casts a shadow 16.60 meters long. Tim stands at a distance of 12.45 meters from the base of the flagpole, such that the end of Tim's shadow meets the end of the flagpole's shadow. If Tim is 1.65 meters tall, determine and state the height of the flagpole to the *nearest tenth of a meter*.

424 The aspect ratio (the ratio of screen width to height) of a rectangular flat-screen television is 16:9. The length of the diagonal of the screen is the television's screen size. Determine and state, to the *nearest inch*, the screen size (diagonal) of this flat-screen television with a screen height of 20.6 inches.

TRIGONOMETRY

G.SRT.C.6: TRIGONOMETRIC RATIOS

425 In the diagram below, $\triangle ERM \sim \triangle JTM$.

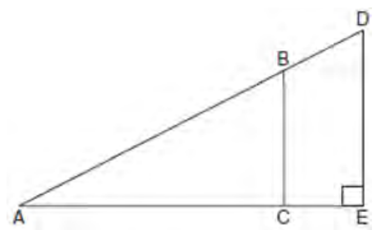


Which statement is always true?

1) $\cos J = \frac{RM}{RE}$
2) $\cos R = \frac{JM}{JT}$
3) $\tan T = \frac{RM}{EM}$
4) $\tan E = \frac{TM}{JM}$

Geometry Regents Exam Questions by State Standard: Topic

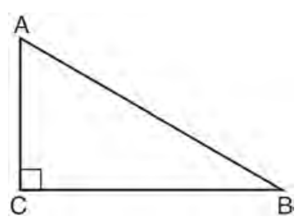
426 In the diagram of right triangle ADE below, $\overline{BC} \parallel \overline{DE}$.



Which ratio is always equivalent to the sine of $\angle A$?
1) $\frac{AD}{DE}$
2) $\frac{AE}{AD}$
3) $\frac{BC}{AB}$
4) $\frac{AB}{AC}$

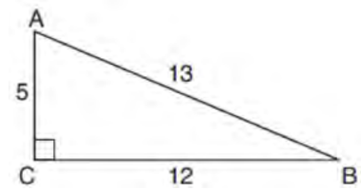
G.SRT.C.7: COFUNCTIONS

427 In scalene triangle ABC shown in the diagram below, $m\angle C = 90°$.



Which equation is always true?
1) $\sin A = \sin B$
2) $\cos A = \cos B$
3) $\cos A = \sin C$
4) $\sin A = \cos B$

428 In $\triangle ABC$ below, angle C is a right angle.



Which statement must be true?
1) $\sin A = \cos B$
2) $\sin A = \tan B$
3) $\sin B = \tan A$
4) $\sin B = \cos B$

429 In $\triangle ABC$, where $\angle C$ is a right angle, $\cos A = \frac{\sqrt{21}}{5}$. What is $\sin B$?
1) $\frac{\sqrt{21}}{5}$
2) $\frac{\sqrt{21}}{2}$
3) $\frac{2}{5}$
4) $\frac{5}{\sqrt{21}}$

430 In a right triangle, $\sin(40 - x)° = \cos(3x)°$. What is the value of x?
1) 10
2) 15
3) 20
4) 25

431 In a right triangle, the acute angles have the relationship $\sin(2x+4) = \cos(46)$. What is the value of x?
1) 20
2) 21
3) 24
4) 25

432 If $\sin(2x+7)^\circ = \cos(4x-7)^\circ$, what is the value of x?
1) 7
2) 15
3) 21
4) 30

433 Which expression is always equivalent to $\sin x$ when $0^\circ < x < 90^\circ$?
1) $\cos(90^\circ - x)$
2) $\cos(45^\circ - x)$
3) $\cos(2x)$
4) $\cos x$

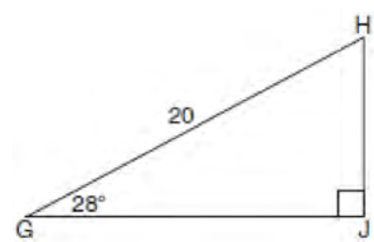
434 In $\triangle ABC$, the complement of $\angle B$ is $\angle A$. Which statement is always true?
1) $\tan\angle A = \tan\angle B$
2) $\sin\angle A = \sin\angle B$
3) $\cos\angle A = \tan\angle B$
4) $\sin\angle A = \cos\angle B$

435 In right triangle ABC, $m\angle C = 90^\circ$. If $\cos B = \frac{5}{13}$, which function also equals $\frac{5}{13}$?
1) $\tan A$
2) $\tan B$
3) $\sin A$
4) $\sin B$

436 In right triangle ABC, $m\angle C = 90^\circ$ and $AC \neq BC$. Which trigonometric ratio is equivalent to $\sin B$?
1) $\cos A$
2) $\cos B$
3) $\tan A$
4) $\tan B$

437 The expression $\sin 57^\circ$ is equal to
1) $\tan 33^\circ$
2) $\cos 33^\circ$
3) $\tan 57^\circ$
4) $\cos 57^\circ$

438 When instructed to find the length of $\overline{HJ}$ in right triangle HJG, Alex wrote the equation $\sin 28^\circ = \frac{HJ}{20}$ while Marlene wrote $\cos 62^\circ = \frac{HJ}{20}$. Are both students' equations correct? Explain why.



439 Explain why $\cos(x) = \sin(90-x)$ for x such that $0 < x < 90$.

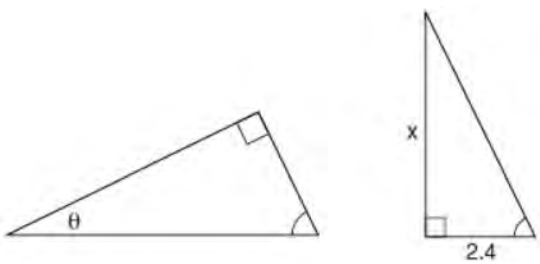
440 In right triangle ABC with the right angle at C, $\sin A = 2x + 0.1$ and $\cos B = 4x - 0.7$. Determine and state the value of x. Explain your answer.

441 Find the value of R that will make the equation $\sin 73° = \cos R$ true when $0° < R < 90°$. Explain your answer.

442 Given: Right triangle ABC with right angle at C. If $\sin A$ increases, does $\cos B$ increase or decrease? Explain why.

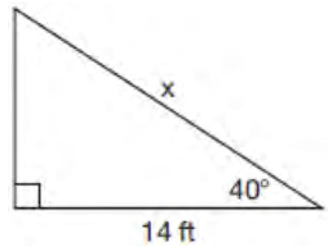
G.SRT.C.8: USING TRIGONOMETRY TO FIND A SIDE

443 The diagram below shows two similar triangles.



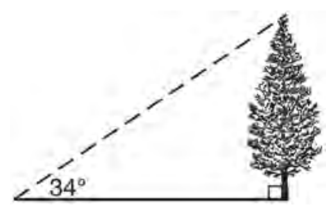
If $\tan \theta = \frac{3}{7}$, what is the value of x, to the *nearest tenth*?
1) 1.2
2) 5.6
3) 7.6
4) 8.8

444 Given the right triangle in the diagram below, what is the value of x, to the *nearest foot*?



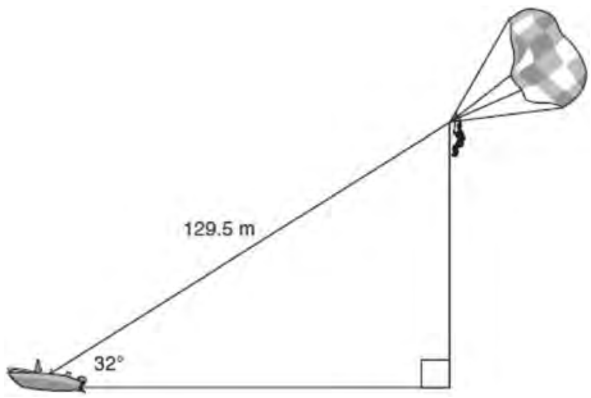
1) 11
2) 17
3) 18
4) 22

445 As shown in the diagram below, the angle of elevation from a point on the ground to the top of the tree is 34°.



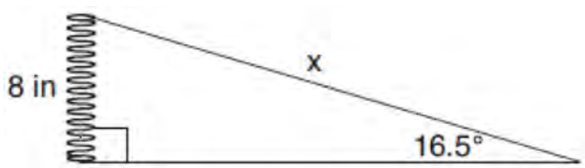
If the point is 20 feet from the base of the tree, what is the height of the tree, to the *nearest tenth of a foot*?
1) 29.7
2) 16.6
3) 13.5
4) 11.2

446 A man was parasailing above a lake at an angle of elevation of 32° from a boat, as modeled in the diagram below.



If 129.5 meters of cable connected the boat to the parasail, approximately how many meters above the lake was the man?
1) 68.6
2) 80.9
3) 109.8
4) 244.4

447 Yolanda is making a springboard to use for gymnastics. She has 8-inch-tall springs and wants to form a 16.5° angle with the base, as modeled in the diagram below.



To the *nearest tenth of an inch*, what will be the length of the springboard, x?
1) 2.3
2) 8.3
3) 27.0
4) 28.2

448 A 20-foot support post leans against a wall, making a 70° angle with the ground. To the *nearest tenth of a foot*, how far up the wall will the support post reach?
1) 6.8
2) 6.9
3) 18.7
4) 18.8

449 A ladder 20 feet long leans against a building, forming an angle of 71° with the level ground. To the *nearest foot*, how high up the wall of the building does the ladder touch the building?
1) 15
2) 16
3) 18
4) 19

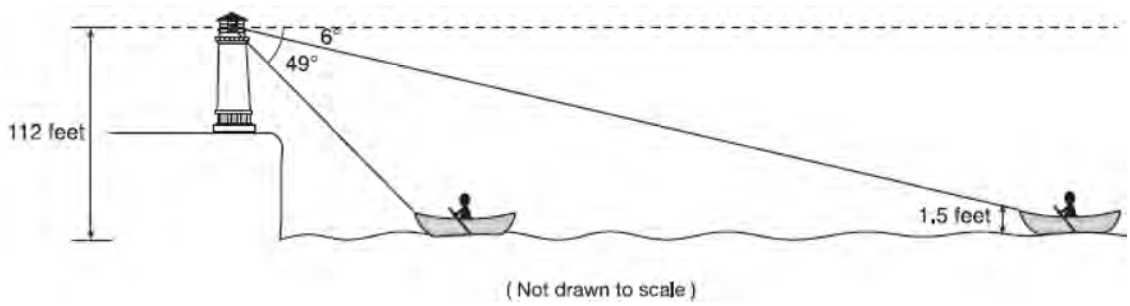
450 In right triangle ABC, $m\angle A = 32°$, $m\angle B = 90°$, and $AC = 6.2$ cm. What is the length of $\overline{BC}$, to the *nearest tenth of a centimeter*?
1) 3.3
2) 3.9
3) 5.3
4) 11.7

451 From a point on the ground one-half mile from the base of a historic monument, the angle of elevation to its top is 11.87°. To the *nearest foot*, what is the height of the monument?
1) 543
2) 555
3) 1086
4) 1110

452 Chelsea is sitting 8 feet from the foot of a tree. From where she is sitting, the angle of elevation of her line of sight to the top of the tree is 36°. If her line of sight starts 1.5 feet above ground, how tall is the tree, to the *nearest foot*?
1) 8
2) 7
3) 6
4) 4

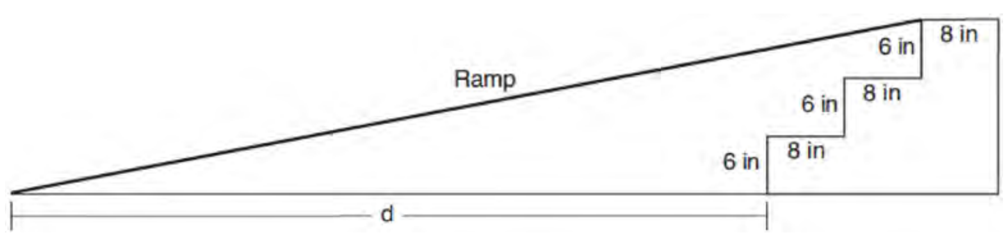
453 A 15-foot ladder leans against a wall and makes an angle of 65° with the ground. What is the horizontal distance from the wall to the base of the ladder, to the *nearest tenth of a foot*?
1) 6.3
2) 7.0
3) 12.9
4) 13.6

454 As shown below, a canoe is approaching a lighthouse on the coastline of a lake. The front of the canoe is 1.5 feet above the water and an observer in the lighthouse is 112 feet above the water.



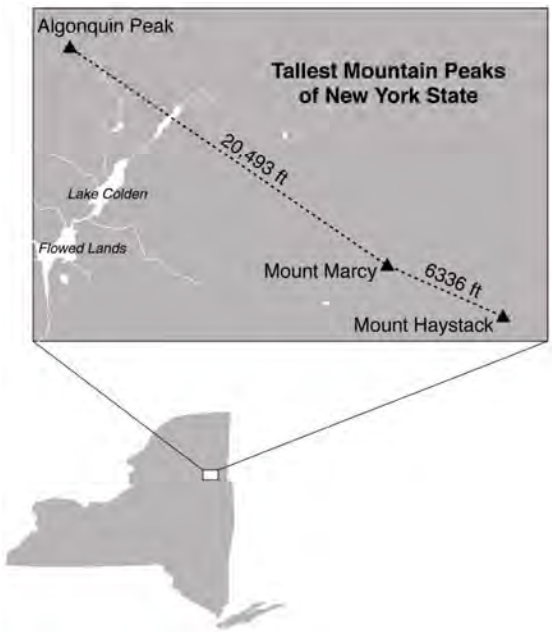
At 5:00, the observer in the lighthouse measured the angle of depression to the front of the canoe to be 6°. Five minutes later, the observer measured and saw the angle of depression to the front of the canoe had increased by 49°. Determine and state, to the *nearest foot per minute*, the average speed at which the canoe traveled toward the lighthouse.

455 As modeled in the diagram below, an access ramp starts on flat ground and ends at the beginning of the top step. Each step is 6 inches tall and 8 inches deep.



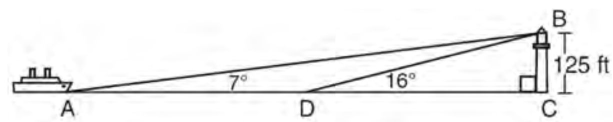
If the angle of elevation of the ramp is 4.76°, determine and state the length of the ramp, to the *nearest tenth of a foot*. Determine and state, to the *nearest tenth of a foot*, the horizontal distance, *d*, from the bottom of the stairs to the bottom of the ramp.

456 The map below shows the three tallest mountain peaks in New York State: Mount Marcy, Algonquin Peak, and Mount Haystack. Mount Haystack, the shortest peak, is 4960 feet tall. Surveyors have determined the horizontal distance between Mount Haystack and Mount Marcy is 6336 feet and the horizontal distance between Mount Marcy and Algonquin Peak is 20,493 feet.



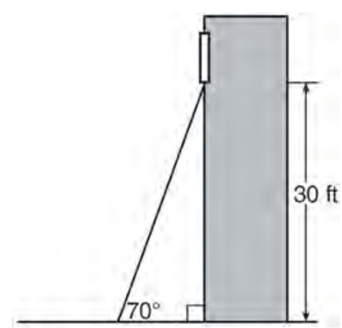
The angle of depression from the peak of Mount Marcy to the peak of Mount Haystack is 3.47 degrees. The angle of elevation from the peak of Algonquin Peak to the peak of Mount Marcy is 0.64 degrees. What are the heights, to the *nearest foot*, of Mount Marcy and Algonquin Peak? Justify your answer.

457 As shown in the diagram below, a ship is heading directly toward a lighthouse whose beacon is 125 feet above sea level. At the first sighting, point *A*, the angle of elevation from the ship to the light was 7°. A short time later, at point *D*, the angle of elevation was 16°.

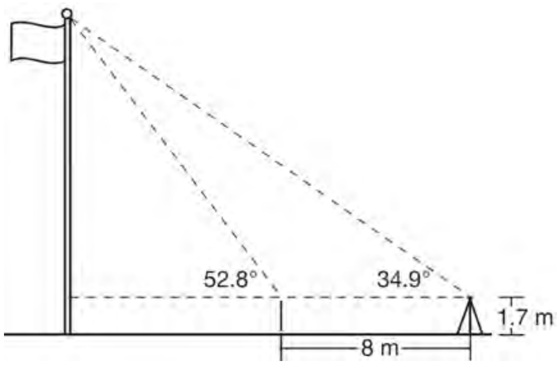


To the *nearest foot*, determine and state how far the ship traveled from point *A* to point *D*.

458 A carpenter leans an extension ladder against a house to reach the bottom of a window 30 feet above the ground. As shown in the diagram below, the ladder makes a 70° angle with the ground. To the *nearest foot*, determine and state the length of the ladder.

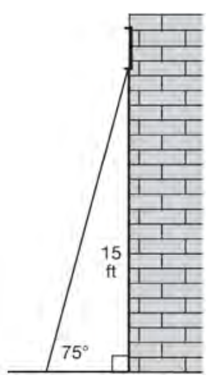


459 Cathy wants to determine the height of the flagpole shown in the diagram below. She uses a survey instrument to measure the angle of elevation to the top of the flagpole, and determines it to be 34.9°. She walks 8 meters closer and determines the new measure of the angle of elevation to be 52.8°. At each measurement, the survey instrument is 1.7 meters above the ground.

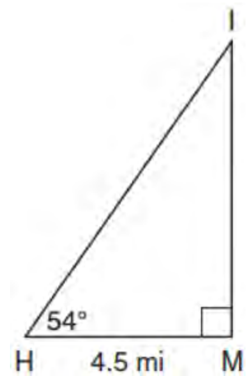


Determine and state, to the *nearest tenth of a meter*, the height of the flagpole.

460 In the diagram below, a window of a house is 15 feet above the ground. A ladder is placed against the house with its base at an angle of 75° with the ground. Determine and state the length of the ladder to the *nearest tenth of a foot*.

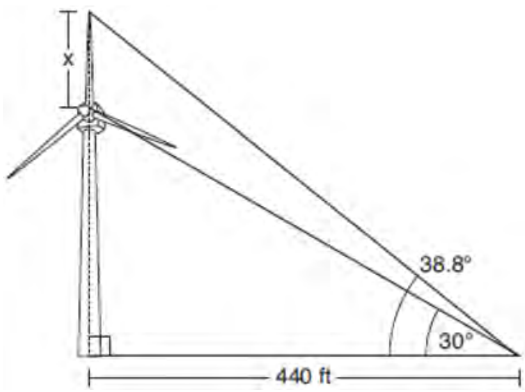


461 As shown in the diagram below, an island (*I*) is due north of a marina (*M*). A boat house (*H*) is 4.5 miles due west of the marina. From the boat house, the island is located at an angle of 54° from the marina.



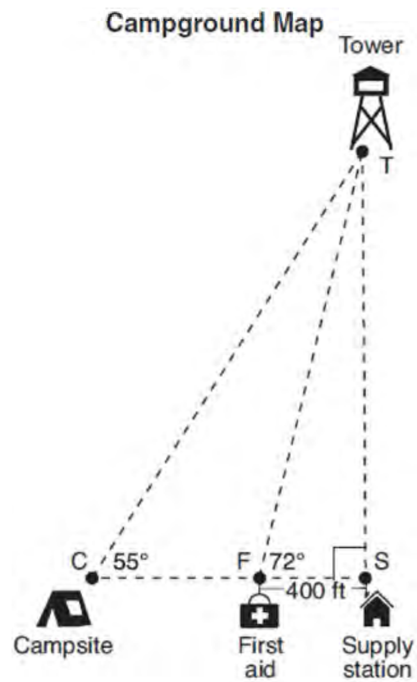
Determine and state, to the *nearest tenth of a mile*, the distance from the boat house (*H*) to the island (*I*). Determine and state, to the *nearest tenth of a mile*, the distance from the island (*I*) to the marina (*M*).

462 Nick wanted to determine the length of one blade of the windmill pictured below. He stood at a point on the ground 440 feet from the windmill's base. Using surveyor's tools, Nick measured the angle between the ground and the highest point reached by the top blade and found it was 38.8°. He also measured the angle between the ground and the lowest point of the top blade, and found it was 30°.



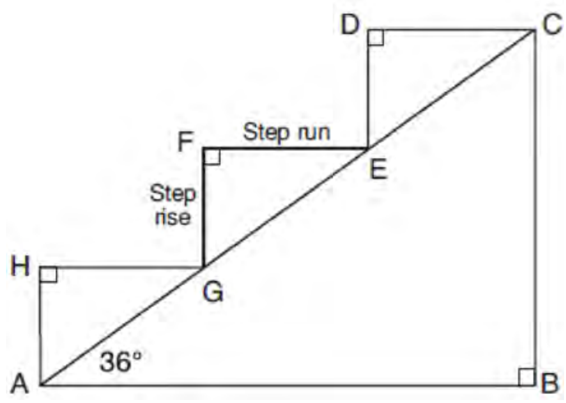
Determine and state a blade's length, x, to the *nearest foot*.

463 The map of a campground is shown below. Campsite C, first aid station F, and supply station S lie along a straight path. The path from the supply station to the tower, T, is perpendicular to the path from the supply station to the campsite. The length of path $\overline{FS}$ is 400 feet. The angle formed by path $\overline{TF}$ and path $\overline{FS}$ is 72°. The angle formed by path $\overline{TC}$ and path $\overline{CS}$ is 55°.



Determine and state, to the *nearest foot*, the distance from the campsite to the tower.

464 A homeowner is building three steps leading to a deck, as modeled by the diagram below. All three step rises, $\overline{HA}$, $\overline{FG}$, and $\overline{DE}$, are congruent, and all three step runs, $\overline{HG}$, $\overline{FE}$, and $\overline{DC}$, are congruent. Each step rise is perpendicular to the step run it joins. The measure of $\angle CAB = 36°$ and $\angle CBA = 90°$.



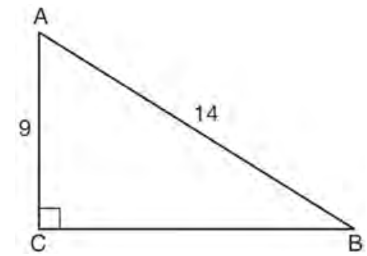
If each step run is parallel to $\overline{AB}$ and has a length of 10 inches, determine and state the length of each step rise, to the *nearest tenth of an inch*. Determine and state the length of $\overline{AC}$, to the *nearest inch*.

465 Freda, who is training to use a radar system, detects an airplane flying at a constant speed and heading in a straight line to pass directly over her location. She sees the airplane at an angle of elevation of 15° and notes that it is maintaining a constant altitude of 6250 feet. One minute later, she sees the airplane at an angle of elevation of 52°. How far has the airplane traveled, to the *nearest foot*? Determine and state the speed of the airplane, to the *nearest mile per hour*.

466 A support wire reaches from the top of a pole to a clamp on the ground. The pole is perpendicular to the level ground and the clamp is 10 feet from the base of the pole. The support wire makes a 68° angle with the ground. Find the length of the support wire to the *nearest foot*.

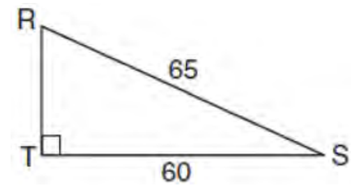
G.SRT.C.8: USING TRIGONOMETRY TO FIND AN ANGLE

467 In the diagram of right triangle *ABC* shown below, $AB = 14$ and $AC = 9$.



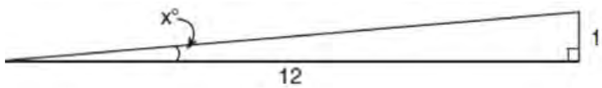
What is the measure of $\angle A$, to the *nearest degree*?
1) 33
2) 40
3) 50
4) 57

468 In the diagram of $\triangle RST$ below, $m\angle T = 90°$, $RS = 65$, and $ST = 60$.



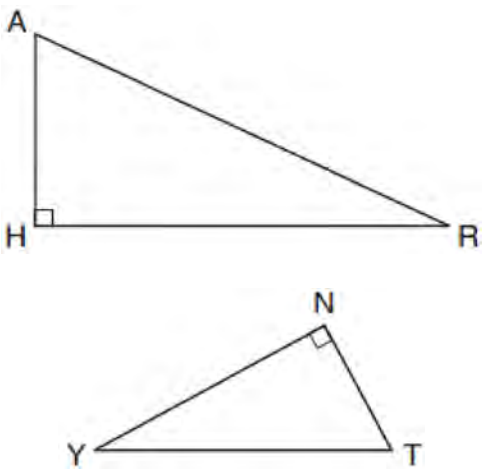
What is the measure of $\angle S$, to the *nearest degree*?
1) 23º
2) 43º
3) 47º
4) 67º

469 To build a handicapped-access ramp, the building code states that for every 1 inch of vertical rise in height, the ramp must extend out 12 inches horizontally, as shown in the diagram below.



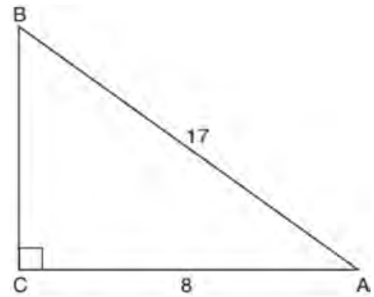
What is the angle of inclination, x, of this ramp, to the *nearest hundredth of a degree*?
1) 4.76
2) 4.78
3) 85.22
4) 85.24

470 In the diagram below of $\triangle HAR$ and $\triangle NTY$, angles H and N are right angles, and $\triangle HAR \sim \triangle NTY$.



If $AR = 13$ and $HR = 12$, what is the measure of angle Y, to the *nearest degree*?
1) 23°
2) 25°
3) 65°
4) 67°

471 In the diagram below of right triangle ABC, $AC = 8$, and $AB = 17$.



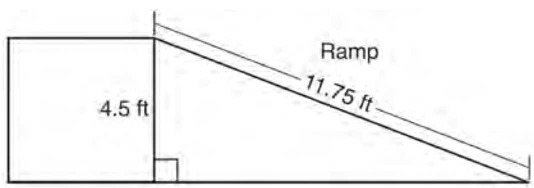
Which equation would determine the value of angle A?
1) $\sin A = \frac{8}{17}$
2) $\tan A = \frac{8}{15}$
3) $\cos A = \frac{15}{17}$
4) $\tan A = \frac{15}{8}$

472 A man who is 5 feet 9 inches tall casts a shadow of 8 feet 6 inches. Assuming that the man is standing perpendicular to the ground, what is the angle of elevation from the end of the shadow to the top of the man's head, to the *nearest tenth of a degree*?
1) 34.1
2) 34.5
3) 42.6
4) 55.9

473 In right triangle ABC, hypotenuse $\overline{AB}$ has a length of 26 cm, and side $\overline{BC}$ has a length of 17.6 cm. What is the measure of angle B, to the *nearest degree*?
1) 48°
2) 47°
3) 43°
4) 34°

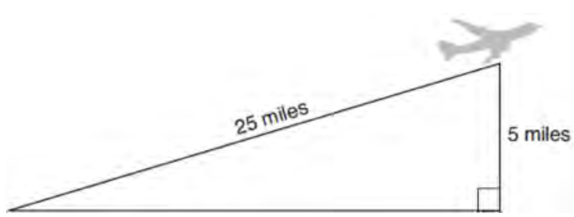
474 A 12-foot ladder leans against a building and reaches a window 10 feet above ground. What is the measure of the angle, to the *nearest degree*, that the ladder forms with the ground?
1) 34
2) 40
3) 50
4) 56

475 The diagram below shows a ramp connecting the ground to a loading platform 4.5 feet above the ground. The ramp measures 11.75 feet from the ground to the top of the loading platform.



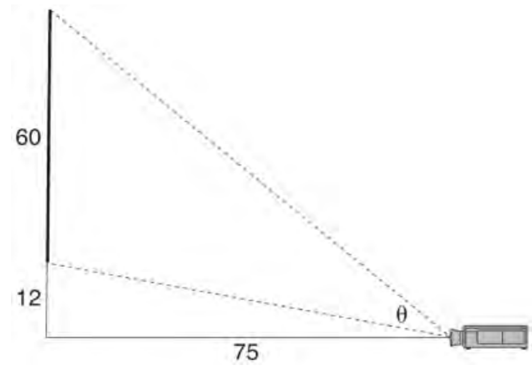
Determine and state, to the *nearest degree*, the angle of elevation formed by the ramp and the ground.

476 An airplane took off at a constant angle of elevation. After the plane traveled for 25 miles, it reached an altitude of 5 miles, as modeled below.



To the *nearest tenth of a degree*, what was the angle of elevation?

477 As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.



Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.

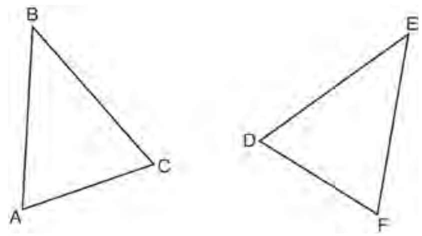
478 Bob places an 18-foot ladder 6 feet from the base of his house and leans it up against the side of his house. Find, to the *nearest degree*, the measure of the angle the bottom of the ladder makes with the ground.

479 A ladder leans against a building. The top of the ladder touches the building 10 feet above the ground. The foot of the ladder is 4 feet from the building. Find, to the *nearest degree*, the angle that the ladder makes with the level ground.

LOGIC

G.CO.B.7: TRIANGLE CONGRUENCY

480 Which statement is sufficient evidence that $\triangle DEF$ is congruent to $\triangle ABC$?

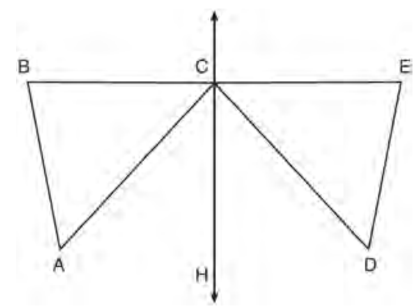


1) $AB = DE$ and $BC = EF$
2) $\angle D \cong \angle A$, $\angle B \cong \angle E$, $\angle C \cong \angle F$
3) There is a sequence of rigid motions that maps $\overline{AB}$ onto $\overline{DE}$, $\overline{BC}$ onto $\overline{EF}$, and $\overline{AC}$ onto $\overline{DF}$.
4) There is a sequence of rigid motions that maps point A onto point D, $\overline{AB}$ onto $\overline{DE}$, and $\angle B$ onto $\angle E$.

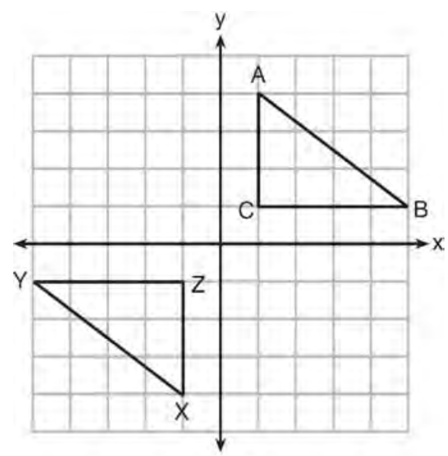
481 In the two distinct acute triangles ABC and DEF, $\angle B \cong \angle E$. Triangles ABC and DEF are congruent when there is a sequence of rigid motions that maps
1) $\angle A$ onto $\angle D$, and $\angle C$ onto $\angle F$
2) $\overline{AC}$ onto $\overline{DF}$, and $\overline{BC}$ onto $\overline{EF}$
3) $\angle C$ onto $\angle F$, and $\overline{BC}$ onto $\overline{EF}$
4) point A onto point D, and $\overline{AB}$ onto $\overline{DE}$

482 Triangles JOE and SAM are drawn such that $\angle E \cong \angle M$ and $\overline{EJ} \cong \overline{MS}$. Which mapping would *not* always lead to $\triangle JOE \cong \triangle SAM$?
1) $\angle J$ maps onto $\angle S$
2) $\angle O$ maps onto $\angle A$
3) $\overline{EO}$ maps onto $\overline{MA}$
4) $\overline{JO}$ maps onto $\overline{SA}$

483 Given: D is the image of A after a reflection over $\overleftrightarrow{CH}$.
$\overleftrightarrow{CH}$ is the perpendicular bisector of $\overline{BCE}$
$\triangle ABC$ and $\triangle DEC$ are drawn
Prove: $\triangle ABC \cong \triangle DEC$

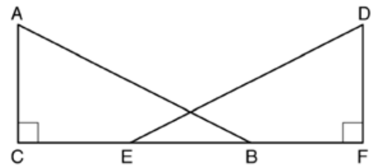


484 In the diagram below, $\triangle ABC$ and $\triangle XYZ$ are graphed.

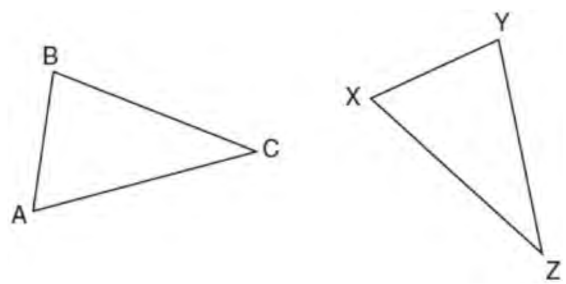


Use the properties of rigid motions to explain why $\triangle ABC \cong \triangle XYZ$.

485 Given right triangles ABC and DEF where $\angle C$ and $\angle F$ are right angles, $\overline{AC} \cong \overline{DF}$ and $\overline{CB} \cong \overline{FE}$. Describe a precise sequence of rigid motions which would show $\triangle ABC \cong \triangle DEF$.

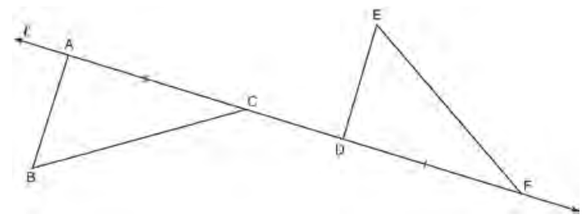


486 In the diagram below of $\triangle ABC$ and $\triangle XYZ$, a sequence of rigid motions maps $\angle A$ onto $\angle X$, $\angle C$ onto $\angle Z$, and $\overline{AC}$ onto $\overline{XZ}$.



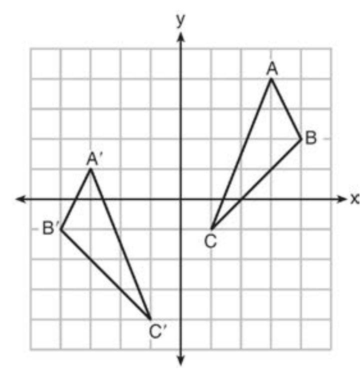
Determine and state whether $\overline{BC} \cong \overline{YZ}$. Explain why.

487 In the diagram below, $\overline{AC} \cong \overline{DF}$ and points A, C, D, and F are collinear on line ℓ.



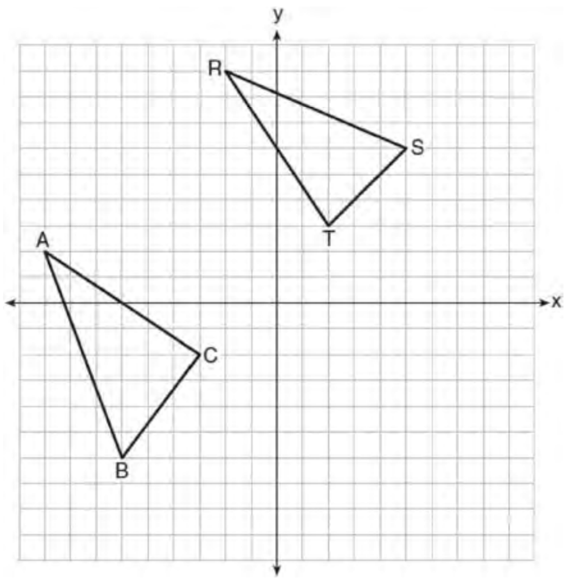
Let $\triangle D'E'F'$ be the image of $\triangle DEF$ after a translation along ℓ, such that point D is mapped onto point A. Determine and state the location of F'. Explain your answer. Let $\triangle D''E''F''$ be the image of $\triangle D'E'F'$ after a reflection across line ℓ. Suppose that E'' is located at B. Is $\triangle DEF$ congruent to $\triangle ABC$? Explain your answer.

488 As graphed on the set of axes below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a sequence of transformations.



Is $\triangle A'B'C'$ congruent to $\triangle ABC$? Use the properties of rigid motion to explain your answer.

489 In the graph below, $\triangle ABC$ has coordinates $A(-9,2)$, $B(-6,-6)$, and $C(-3,-2)$, and $\triangle RST$ has coordinates $R(-2,9)$, $S(5,6)$, and $T(2,3)$.

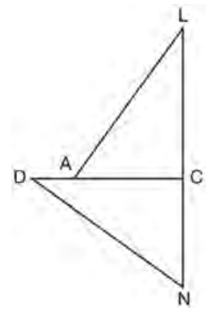


Is $\triangle ABC$ congruent to $\triangle RST$? Use the properties of rigid motions to explain your reasoning.

490 After a reflection over a line, $\triangle A'B'C'$ is the image of $\triangle ABC$. Explain why triangle ABC is congruent to triangle $\triangle A'B'C'$.

G.CO.B.8: TRIANGLE CONGRUENCY

491 In the diagram of $\triangle LAC$ and $\triangle DNC$ below, $\overline{LA} \cong \overline{DN}$, $\overline{CA} \cong \overline{CN}$, and $\overline{DAC} \perp \overline{LCN}$.

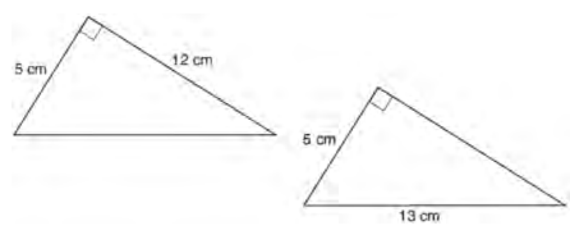


a) Prove that $\triangle LAC \cong \triangle DNC$.
b) Describe a sequence of rigid motions that will map $\triangle LAC$ onto $\triangle DNC$.

G.SRT.B.5: TRIANGLE CONGRUENCY

492 Given $\triangle ABC \cong \triangle DEF$, which statement is *not* always true?
1) $\overline{BC} \cong \overline{DF}$
2) $m\angle A = m\angle D$
3) area of $\triangle ABC$ = area of $\triangle DEF$
4) perimeter of $\triangle ABC$ = perimeter of $\triangle DEF$

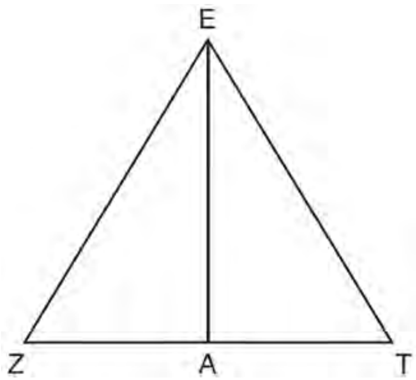
493 Skye says that the two triangles below are congruent. Margaret says that the two triangles are similar.



Are Skye and Margaret both correct? Explain why.

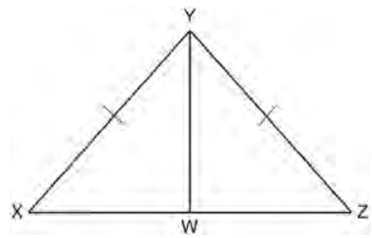
G.CO.C.10: TRIANGLE PROOFS

494 Line segment EA is the perpendicular bisector of $\overline{ZT}$, and $\overline{ZE}$ and $\overline{TE}$ are drawn.

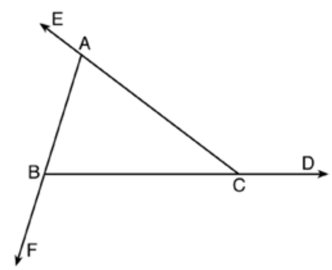


Which conclusion can *not* be proven?
1) $\overline{EA}$ bisects angle ZET.
2) Triangle EZT is equilateral.
3) $\overline{EA}$ is a median of triangle EZT.
4) Angle Z is congruent to angle T.

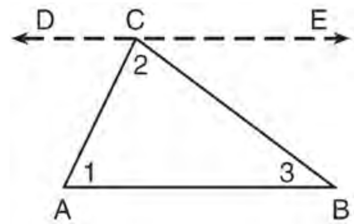
495 Given: $\triangle XYZ$, $\overline{XY} \cong \overline{ZY}$, and $\overline{YW}$ bisects $\angle XYZ$
Prove that $\angle YWZ$ is a right angle.



496 Prove the sum of the exterior angles of a triangle is 360°.



497 Given the theorem, "The sum of the measures of the interior angles of a triangle is 180°," complete the proof for this theorem.

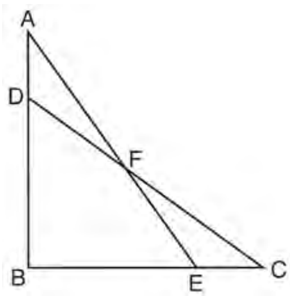


Given: $\triangle ABC$
Prove: $m\angle 1 + m\angle 2 + m\angle 3 = 180°$
Fill in the missing reasons below.

Statements	Reasons
(1) $\triangle ABC$	(1) Given
(2) Through point C, draw $\overleftrightarrow{DCE}$ parallel to $\overline{AB}$.	(2) ______
(3) $m\angle 1 = m\angle ACD$, $m\angle 3 = m\angle BCE$	(3) ______
(4) $m\angle ACD + m\angle 2 + m\angle BCE = 180°$	(4) ______
(5) $m\angle 1 + m\angle 2 + m\angle 3 = 180°$	(5) ______

G.SRT.B.5: TRIANGLE PROOFS

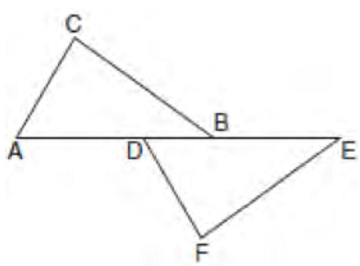
498 Given: $\triangle ABE$ and $\triangle CBD$ shown in the diagram below with $\overline{DB} \cong \overline{BE}$



Which statement is needed to prove $\triangle ABE \cong \triangle CBD$ using only SAS ≅ SAS?

1) $\angle CDB \cong \angle AEB$
2) $\angle AFD \cong \angle EFC$
3) $\overline{AD} \cong \overline{CE}$
4) $\overline{AE} \cong \overline{CD}$

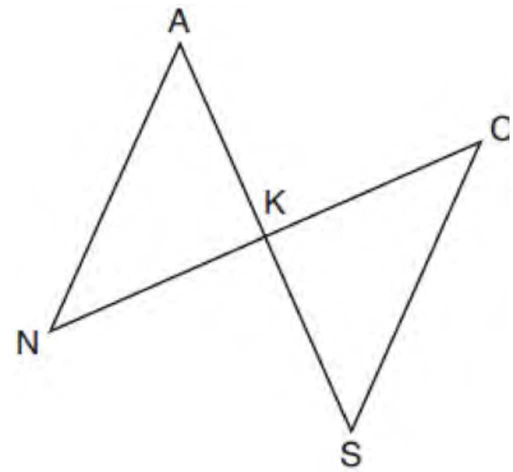
499 Kelly is completing a proof based on the figure below.



She was given that $\angle A \cong \angle EDF$, and has already proven $\overline{AB} \cong \overline{DE}$. Which pair of corresponding parts and triangle congruency method would *not* prove $\triangle ABC \cong \triangle DEF$?

1) $\overline{AC} \cong \overline{DF}$ and SAS
2) $\overline{BC} \cong \overline{EF}$ and SAS
3) $\angle C \cong \angle F$ and AAS
4) $\angle CBA \cong \angle FED$ and ASA

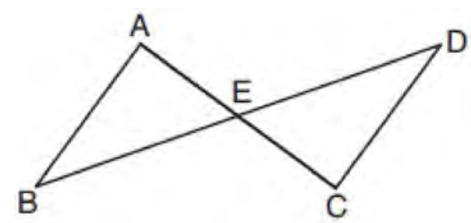
500 In the diagram below, $\overline{AKS}$, $\overline{NKC}$, $\overline{AN}$, and $\overline{SC}$ are drawn such that $\overline{AN} \cong \overline{SC}$.



Which additional statement is sufficient to prove $\triangle KAN \cong \triangle KSC$ by AAS?

1) $\overline{AS}$ and $\overline{NC}$ bisect each other.
2) K is the midpoint of $\overline{NC}$.
3) $\overline{AS} \perp \overline{CN}$
4) $\overline{AN} \parallel \overline{SC}$

501 In the diagram below, $\overline{AC}$ and $\overline{BD}$ intersect at E.

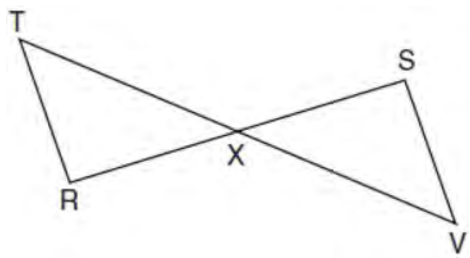


Which information is always sufficient to prove $\triangle ABE \cong \triangle CDE$?

1) $\overline{AB} \parallel \overline{CD}$
2) $\overline{AB} \cong \overline{CD}$ and $\overline{BE} \cong \overline{DE}$
3) E is the midpoint of $\overline{AC}$.
4) $\overline{BD}$ and $\overline{AC}$ bisect each other.

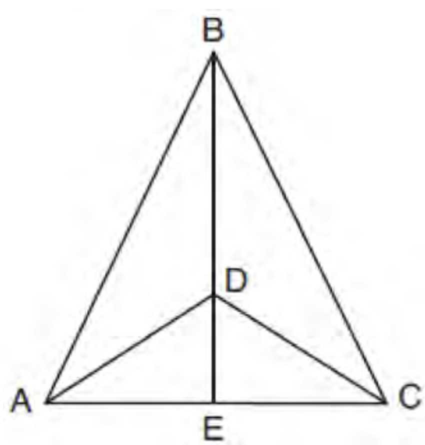
502 Two right triangles must be congruent if
1) an acute angle in each triangle is congruent
2) the lengths of the hypotenuses are equal
3) the corresponding legs are congruent
4) the areas are equal

503 Given: $\overline{RS}$ and $\overline{TV}$ bisect each other at point X
$\overline{TR}$ and $\overline{SV}$ are drawn



Prove: $\overline{TR} \parallel \overline{SV}$

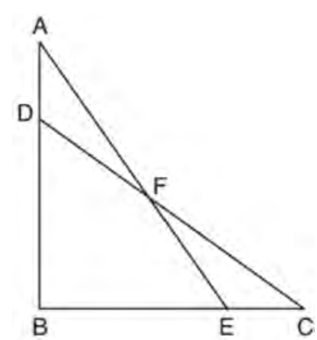
504 Given: $\triangle ABC$, $\overline{AEC}$, $\overline{BDE}$ with $\angle ABE \cong \angle CBE$, and $\angle ADE \cong \angle CDE$
Prove: $\overline{BDE}$ is the perpendicular bisector of $\overline{AC}$



Fill in the missing statement and reasons below.

Statements	Reasons
1 $\triangle ABC$, $\overline{AEC}$, $\overline{BDE}$ with $\angle ABE \cong \angle CBE$, and $\angle ADE \cong \angle CDE$	1 Given
2 $\overline{BD} \cong \overline{BD}$	2
3 $\angle BDA$ and $\angle ADE$ are supplementary. $\angle BDC$ and $\angle CDE$ are supplementary.	3 Linear pairs of angles are supplementary.
4	4 Supplements of congruent angles are congruent.
5 $\triangle ABD \cong \triangle CBD$	5 ASA
6 $\overline{AD} \cong \overline{CD}$, $\overline{AB} \cong \overline{CB}$	6
7 $\overline{BDE}$ is the perpendicular bisector of $\overline{AC}$.	7

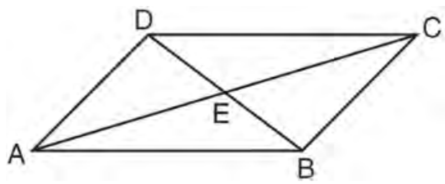
505 In the diagram below, $\triangle ABE \cong \triangle CBD$.



Prove: $\triangle AFD \cong \triangle CFE$

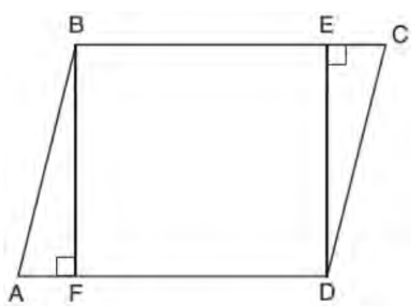
G.CO.C.11: QUADRILATERAL PROOFS

506 In parallelogram *ABCD* shown below, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at *E*.



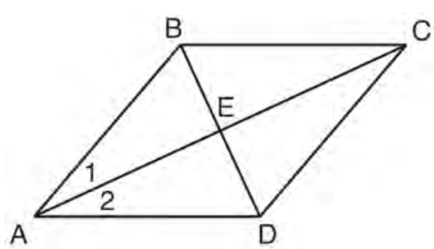
Prove: $\angle ACD \cong \angle CAB$

507 Given: Parallelogram *ABCD*, $\overline{BF} \perp \overline{AFD}$, and $\overline{DE} \perp \overline{BEC}$



Prove: *BEDF* is a rectangle

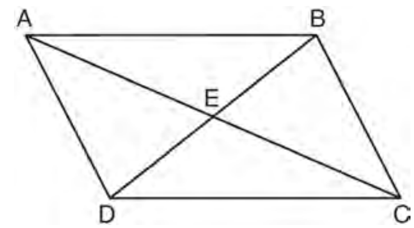
508 Given: Quadrilateral *ABCD* with diagonals $\overline{AC}$ and $\overline{BD}$ that bisect each other, and $\angle 1 \cong \angle 2$



Prove: $\triangle ACD$ is an isosceles triangle and $\triangle AEB$ is a right triangle

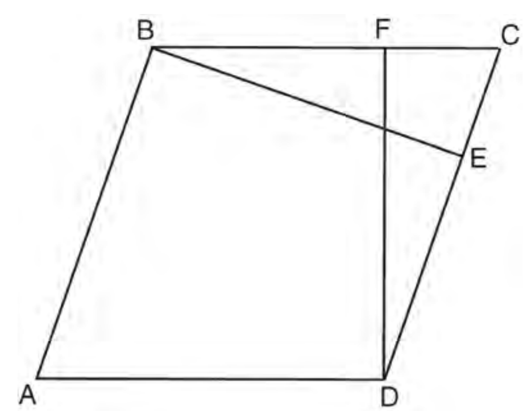
G.SRT.B.5: QUADRILATERAL PROOFS

509 Given: Quadrilateral *ABCD* is a parallelogram with diagonals $\overline{AC}$ and $\overline{BD}$ intersecting at *E*



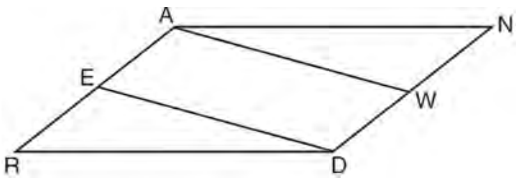
Prove: $\triangle AED \cong \triangle CEB$
Describe a single rigid motion that maps $\triangle AED$ onto $\triangle CEB$.

510 In the diagram of parallelogram *ABCD* below, $\overline{BE} \perp \overline{CED}$, $\overline{DF} \perp \overline{BFC}$, $\overline{CE} \cong \overline{CF}$.



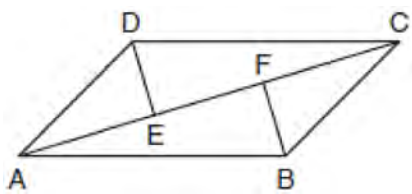
Prove *ABCD* is a rhombus.

511 Given: Parallelogram *ANDR* with $\overline{AW}$ and $\overline{DE}$ bisecting $\overline{NWD}$ and $\overline{REA}$ at points *W* and *E*, respectively



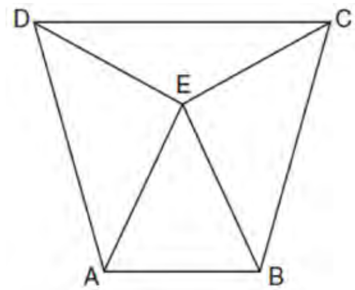
Prove that $\triangle ANW \cong \triangle DRE$. Prove that quadrilateral *AWDE* is a parallelogram.

512 In quadrilateral *ABCD*, $\overline{AB} \cong \overline{CD}$, $\overline{AB} \parallel \overline{CD}$, and $\overline{BF}$ and $\overline{DE}$ are perpendicular to diagonal $\overline{AC}$ at points *F* and *E*.



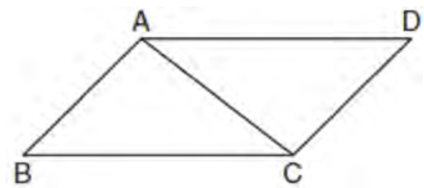
Prove: $\overline{AE} \cong \overline{CF}$

513 Isosceles trapezoid *ABCD* has bases $\overline{DC}$ and $\overline{AB}$ with nonparallel legs $\overline{AD}$ and $\overline{BC}$. Segments *AE*, *BE*, *CE*, and *DE* are drawn in trapezoid *ABCD* such that $\angle CDE \cong \angle DCE$, $\overline{AE} \perp \overline{DE}$, and $\overline{BE} \perp \overline{CE}$.



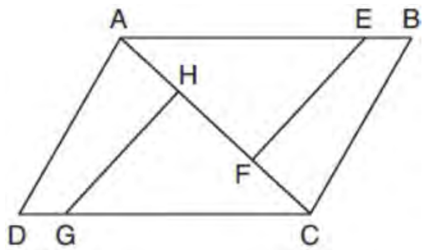
Prove $\triangle ADE \cong \triangle BCE$ and prove $\triangle AEB$ is an isosceles triangle.

514 Given: Parallelogram *ABCD* with diagonal $\overline{AC}$ drawn



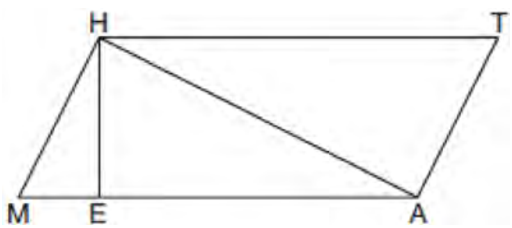
Prove: $\triangle ABC \cong \triangle CDA$

515 In the diagram of quadrilateral $ABCD$ with diagonal $\overline{AC}$ shown below, segments GH and EF are drawn, $\overline{AE} \cong \overline{CG}$, $\overline{BE} \cong \overline{DG}$, $\overline{AH} \cong \overline{CF}$, and $\overline{AD} \cong \overline{CB}$.



Prove: $\overline{EF} \cong \overline{GH}$

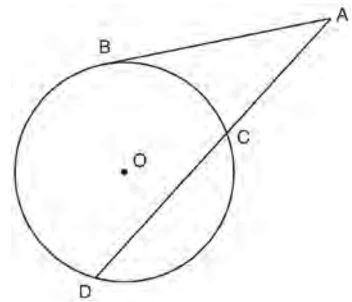
516 Given: Quadrilateral $MATH$, $\overline{HM} \cong \overline{AT}$, $\overline{HT} \cong \overline{AM}$, $\overline{HE} \perp \overline{MEA}$, and $\overline{HA} \perp \overline{AT}$



Prove: $TA \bullet HA = HE \bullet TH$

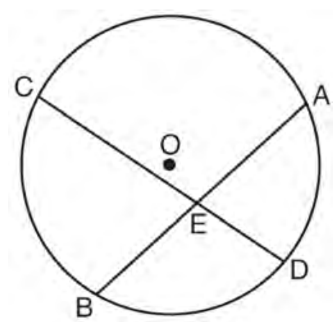
G.SRT.B.5: CIRCLE PROOFS

517 In the diagram below, secant $\overline{ACD}$ and tangent $\overline{AB}$ are drawn from external point A to circle O.



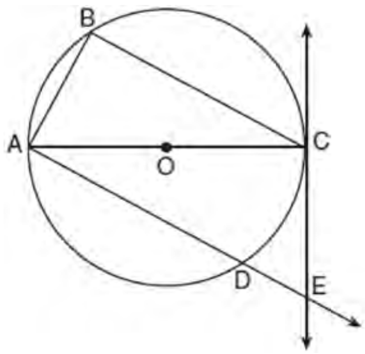
Prove the theorem: If a secant and a tangent are drawn to a circle from an external point, the product of the lengths of the secant segment and its external segment equals the length of the tangent segment squared. ($AC \cdot AD = AB^2$)

518 Given: Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E



Theorem: If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord. Prove this theorem by proving $AE \cdot EB = CE \cdot ED$.

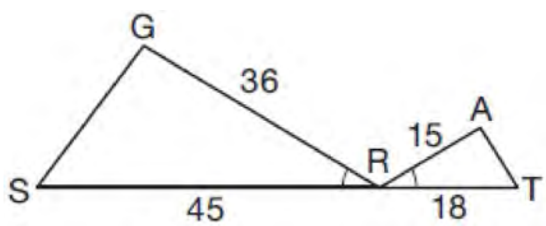
519 In the diagram below of circle O, tangent $\overleftrightarrow{EC}$ is drawn to diameter $\overline{AC}$. Chord $\overline{BC}$ is parallel to secant $\overline{ADE}$, and chord $\overline{AB}$ is drawn.



Prove: $\frac{BC}{CA} = \frac{AB}{EC}$

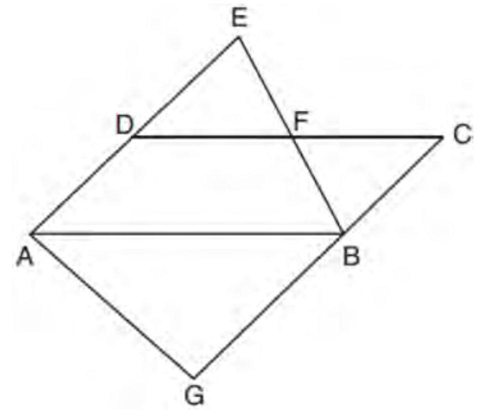
G.SRT.A.3: SIMILARITY PROOFS

520 In the diagram below, $\angle GRS \cong \angle ART$, $GR = 36$, $SR = 45$, $AR = 15$, and $RT = 18$.



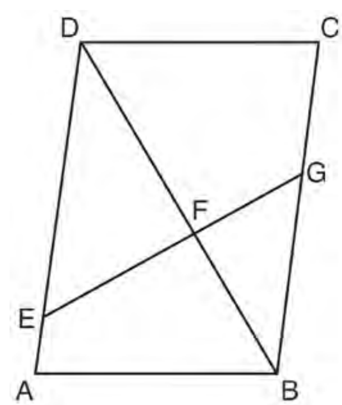
Which triangle similarity statement is correct?
1) $\triangle GRS \sim \triangle ART$ by AA.
2) $\triangle GRS \sim \triangle ART$ by SAS.
3) $\triangle GRS \sim \triangle ART$ by SSS.
4) $\triangle GRS$ is not similar to $\triangle ART$.

521 In the diagram below, $\overline{AB} \parallel \overline{DFC}$, $\overline{EDA} \parallel \overline{CBG}$, and $\overline{EFB}$ and $\overline{AG}$ are drawn.



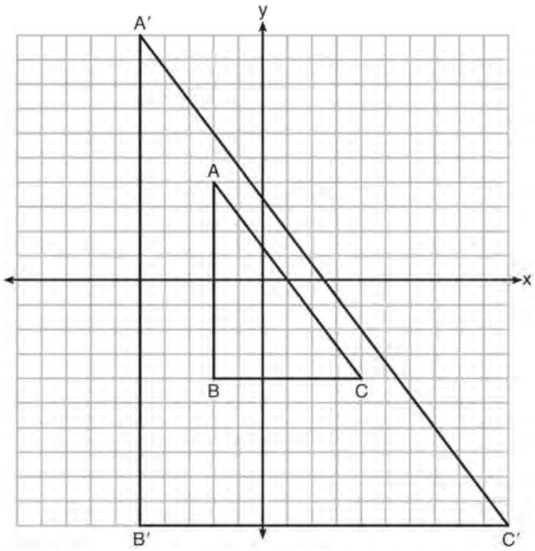
Which statement is always true?
1) $\triangle DEF \cong \triangle CBF$
2) $\triangle BAG \cong \triangle BAE$
3) $\triangle BAG \sim \triangle AEB$
4) $\triangle DEF \sim \triangle AEB$

522 Given: Parallelogram $ABCD$, $\overline{EFG}$, and diagonal $\overline{DFB}$



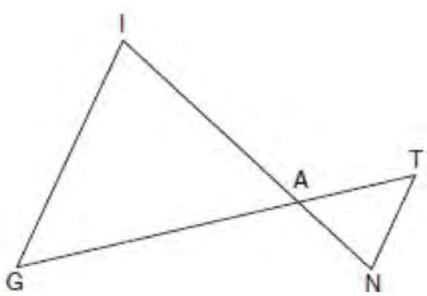
Prove: $\triangle DEF \sim \triangle BGF$

523 In the diagram below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a transformation.



Describe the transformation that was performed. Explain why $\triangle A'B'C' \sim \triangle ABC$.

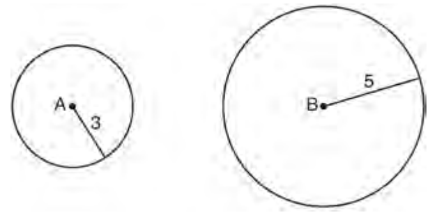
524 In the diagram below, $\overline{GI}$ is parallel to $\overline{NT}$, and $\overline{IN}$ intersects $\overline{GT}$ at A.



Prove: $\triangle GIA \sim \triangle TNA$

G.C.A.1: SIMILARITY PROOFS

525 As shown in the diagram below, circle A has a radius of 3 and circle B has a radius of 5.



Use transformations to explain why circles A and B are similar.

Geometry Regents Exam Questions by State Standard: Topic
Answer Section

1 ANS: 3 PTS: 2 REF: 061601geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

2 ANS: 4 PTS: 2 REF: 061501geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

3 ANS: 4 PTS: 2 REF: 081503geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

4 ANS: 1 PTS: 2 REF: 081603geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

5 ANS: 1

$$V = \frac{1}{3}\pi(4)^2(6) = 32\pi$$

PTS: 2 REF: 061718geo NAT: G.GMD.B.4 TOP: Rotations of Two-Dimensional Objects

6 ANS: 3

$$\begin{array}{ll} v = \pi r^2 h & (1)\ 6^2 \cdot 10 = 360 \\ 150\pi = \pi r^2 h & (2)\ 10^2 \cdot 6 = 600 \\ 150 = r^2 h & (3)\ 5^2 \cdot 6 = 150 \\ & (4)\ 3^2 \cdot 10 = 900 \end{array}$$

PTS: 2 REF: 081713geo NAT: G.GMD.B.4 TOP: Rotations of Two-Dimensional Objects

7 ANS: 4 PTS: 2 REF: 011810geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

8 ANS: 3 PTS: 2 REF: 061816geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

9 ANS: 4 PTS: 2 REF: 081803geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

10 ANS: 3 PTS: 2 REF: 011911geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

11 ANS: 2 PTS: 2 REF: 061903geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

12 ANS: 4 PTS: 2 REF: 081911geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

13 ANS: 3 PTS: 2 REF: 081613geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

14 ANS: 4 PTS: 2 REF: 011723geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

15 ANS: 2 PTS: 2 REF: 011805geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

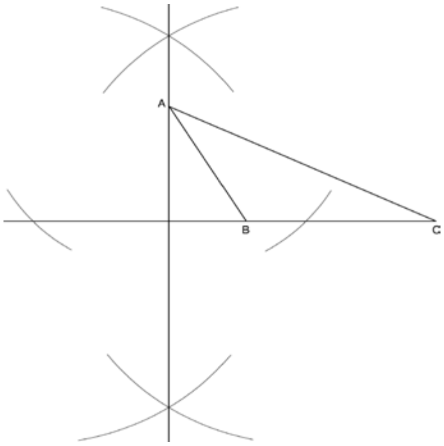
16 ANS: 3 PTS: 2 REF: 081805geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

17 ANS: 2 PTS: 2 REF: 081701geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

18 ANS: 2 PTS: 2 REF: 061506geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

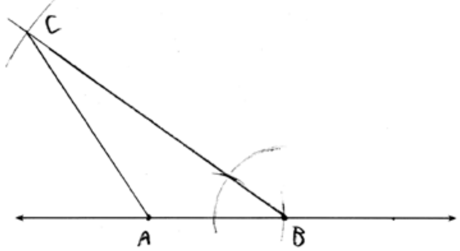
19 ANS: 1 PTS: 2 REF: 011601geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

20 ANS:



PTS: 2 REF: fall1409geo NAT: G.CO.D.12 TOP: Constructions
KEY: parallel and perpendicular lines

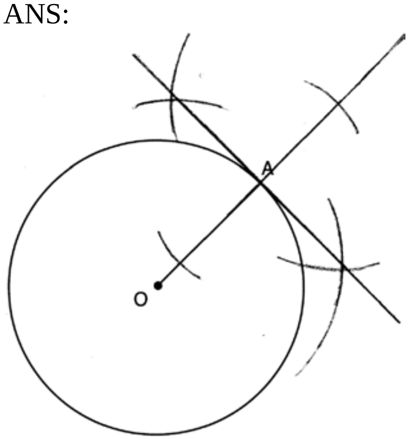
21 ANS:



SAS ≅ SAS

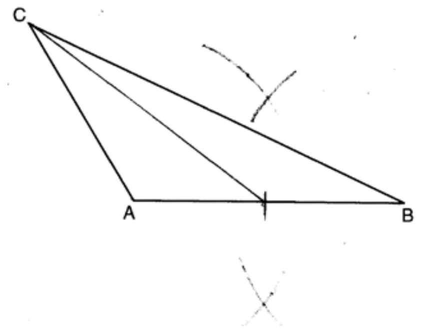
PTS: 4 REF: 011634geo NAT: G.CO.D.12 TOP: Constructions
KEY: congruent and similar figures

22 ANS:



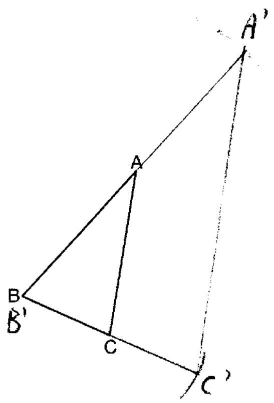
PTS: 2 REF: 061631geo NAT: G.CO.D.12 TOP: Constructions
KEY: parallel and perpendicular lines

23 ANS:



PTS: 2 REF: 081628geo NAT: G.CO.D.12 TOP: Constructions
KEY: line bisector

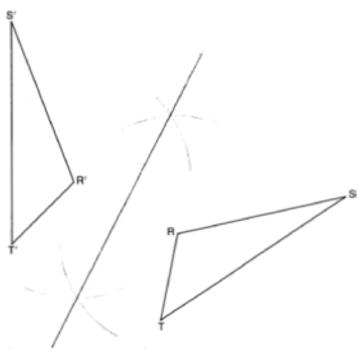
24 ANS:



The length of $\overline{A'C'}$ is twice $\overline{AC}$.

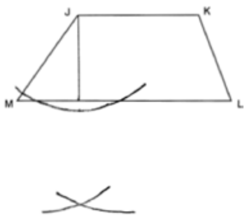
PTS: 4 REF: 081632geo NAT: G.CO.D.12 TOP: Constructions
KEY: congruent and similar figures

25 ANS:



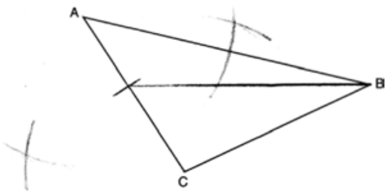
PTS: 2 REF: 011725geo NAT: G.CO.D.12 TOP: Constructions
KEY: line bisector

26 ANS:



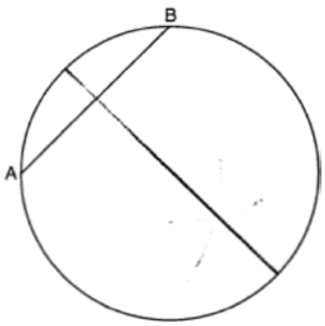
PTS: 2 REF: 061725geo NAT: G.CO.D.12 TOP: Constructions
KEY: parallel and perpendicular lines

27 ANS:



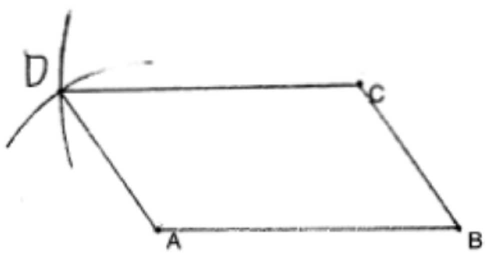
PTS: 2 REF: 061829geo NAT: G.CO.D.12 TOP: Constructions
KEY: line bisector

28 ANS:



PTS: 2 REF: 081825geo NAT: G.CO.D.12 TOP: Constructions
KEY: parallel and perpendicular lines

29 ANS:



PTS: 2 REF: 011929geo NAT: G.CO.D.12 TOP: Constructions
KEY: equilateral triangles

30 ANS:

30° $\triangle CAD$ is an equilateral triangle, so $\angle CAB = 60°$. Since $\overrightarrow{AD}$ is an angle bisector, $\angle CAD = 30°$.

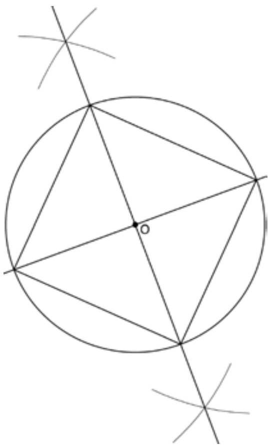
PTS: 2 REF: 081929geo NAT: G.CO.D.12 TOP: Constructions
KEY: equilateral triangles

31 ANS:

Yes, because a dilation preserves angle measure.

PTS: 4 REF: 081932geo NAT: G.CO.D.12 TOP: Constructions
KEY: congruent and similar figures

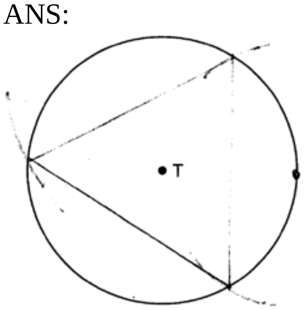
32 ANS:



Since the square is inscribed, each vertex of the square is on the circle and the diagonals of the square are diameters of the circle. Therefore, each angle of the square is an inscribed angle in the circle that intercepts the circle at the endpoints of the diameters. Each angle of the square, which is an inscribed angle, measures 90 degrees. Therefore, the measure of the arc intercepted by two adjacent sides of the square is 180 degrees because it is twice the measure of its inscribed angle.

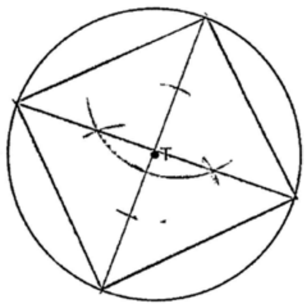
PTS: 4 REF: fall1412geo NAT: G.CO.D.13 TOP: Constructions

33 ANS:



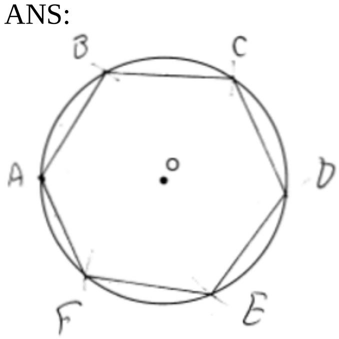
PTS: 2 REF: 081526geo NAT: G.CO.D.13 TOP: Constructions

34 ANS:



PTS: 2 REF: 061525geo NAT: G.CO.D.13 TOP: Constructions

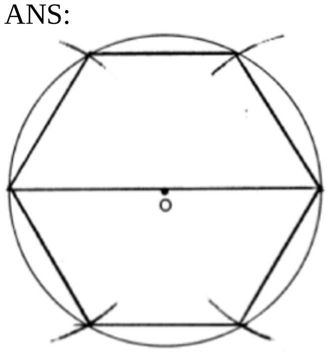
35 ANS:



Right triangle because $\angle CBF$ is inscribed in a semi-circle.

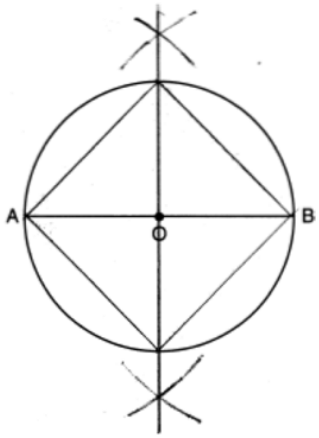
PTS: 4 REF: 011733geo NAT: G.CO.D.13 TOP: Constructions

36 ANS:



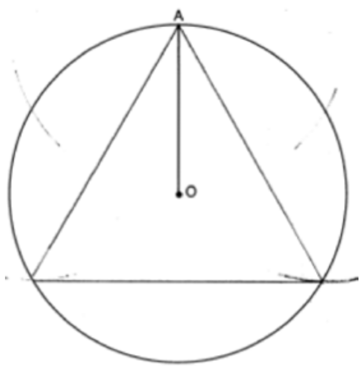
PTS: 2 REF: 081728geo NAT: G.CO.D.13 TOP: Constructions

37 ANS:



PTS: 2 REF: 011826geo NAT: G.CO.D.13 TOP: Constructions

38 ANS:



PTS: 2 REF: 061931geo NAT: G.CO.D.13 TOP: Constructions

39 ANS: 1

$x = -5 + \frac{1}{3}(4 - -5) = -5 + 3 = -2 \quad y = 2 + \frac{1}{3}(-10 - 2) = 2 - 4 = -2$

PTS: 2 REF: 011806geo NAT: G.GPE.B.6 TOP: Directed Line Segments

40 ANS: 4

$$-5 + \frac{3}{5}(5 - -5) \quad -4 + \frac{3}{5}(1 - -4)$$

$$-5 + \frac{3}{5}(10) \qquad -4 + \frac{3}{5}(5)$$

$$-5 + 6 \qquad -4 + 3$$

$$1 \qquad -1$$

PTS: 2 REF: spr1401geo NAT: G.GPE.B.6 TOP: Directed Line Segments

41 ANS: 4

$x = -6 + \frac{1}{6}(6 - -6) = -6 + 2 = -4$ $y = -2 + \frac{1}{6}(7 - -2) = -2 + \frac{9}{6} = -\frac{1}{2}$

PTS: 2 REF: 081618geo NAT: G.GPE.B.6 TOP: Directed Line Segments

42 ANS: 1

$3 + \frac{2}{5}(8 - 3) = 3 + \frac{2}{5}(5) = 3 + 2 = 5$ $5 + \frac{2}{5}(-5 - 5) = 5 + \frac{2}{5}(-10) = 5 - 4 = 1$

PTS: 2 REF: 011720geo NAT: G.GPE.B.6 TOP: Directed Line Segments

43 ANS: 2

$-4 + \frac{2}{5}(6 - -4) = -4 + \frac{2}{5}(10) = -4 + 4 = 0$ $5 + \frac{2}{5}(20 - 5) = 5 + \frac{2}{5}(15) = 5 + 6 = 11$

PTS: 2 REF: 061715geo NAT: G.GPE.B.6 TOP: Directed Line Segments

44 ANS: 1

$-8 + \frac{3}{8}(16 - -8) = -8 + \frac{3}{8}(24) = -8 + 9 = 1$ $-2 + \frac{3}{8}(6 - -2) = -2 + \frac{3}{8}(8) = -2 + 3 = 1$

PTS: 2 REF: 081717geo NAT: G.GPE.B.6 TOP: Directed Line Segments

45 ANS: 2

$-4 + \frac{2}{5}(1 - -4) = -4 + \frac{2}{5}(5) = -4 + 2 = -2$ $-2 + \frac{2}{5}(8 - -2) = -2 + \frac{2}{5}(10) = -2 + 4 = 2$

PTS: 2 REF: 061814geo NAT: G.GPE.B.6 TOP: Directed Line Segments

46 ANS: 1

$-8 + \frac{3}{5}(7 - -8) = -8 + 9 = 1$ $7 + \frac{3}{5}(-13 - 7) = 7 - 12 = -5$

PTS: 2 REF: 081815geo NAT: G.GPE.B.6 TOP: Directed Line Segments

47 ANS: 1

$-1 + \frac{1}{3}(8 - -1) = -1 + \frac{1}{3}(9) = -1 + 3 = 2$ $-3 + \frac{1}{3}(9 - -3) = -3 + \frac{1}{3}(12) = -3 + 4 = 1$

PTS: 2 REF: 011915geo NAT: G.GPE.B.6 TOP: Directed Line Segments

48 ANS: 4

$-8 + \frac{2}{3}(10 - -8) = -8 + \frac{2}{3}(18) = -8 + 12 = 4$ $4 + \frac{2}{3}(-2 - 4) = 4 + \frac{2}{3}(-6) = 4 - 4 = 0$

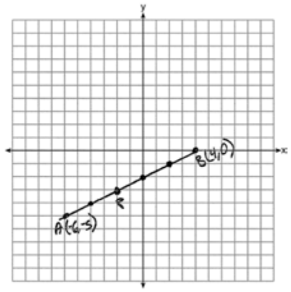
PTS: 2 REF: 061919geo NAT: G.GPE.B.6 TOP: Directed Line Segments

49 ANS: 3

$-9 + \frac{1}{3}(9 - -9) = -9 + \frac{1}{3}(18) = -9 + 6 = -3$ $8 + \frac{1}{3}(-4 - 8) = 8 + \frac{1}{3}(-12) = 8 - 4 = 4$

PTS: 2 REF: 081903geo NAT: G.GPE.B.6 TOP: Directed Line Segments

50 ANS:



$-6+\frac{2}{5}(4--6)$ $-5+\frac{2}{5}(0--5)$ $(-2,-3)$

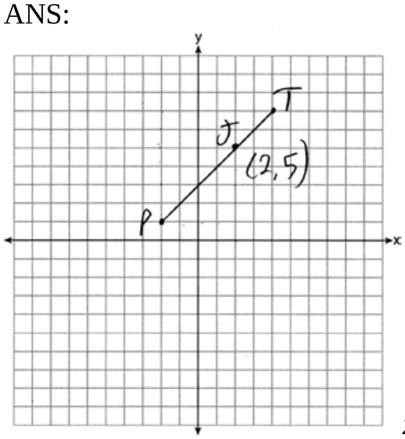
$-6+\frac{2}{5}(10)$ $-5+\frac{2}{5}(5)$

$-6+4$ $-5+2$

-2 -3

PTS: 2 REF: 061527geo NAT: G.GPE.B.6 TOP: Directed Line Segments

51 ANS:



$x=\frac{2}{3}(4--2)=4$ $-2+4=2$ $J(2,5)$

$y=\frac{2}{3}(7-1)=4$ $1+4=5$

PTS: 2 REF: 011627geo NAT: G.GPE.B.6 TOP: Directed Line Segments

52 ANS:

$\frac{2}{5}\cdot(16-1)=6$ $\frac{2}{5}\cdot(14-4)=4$ $(1+6,4+4)=(7,8)$

PTS: 2 REF: 081531geo NAT: G.GPE.B.6 TOP: Directed Line Segments

53 ANS:

$4+\frac{4}{9}(22-4)$ $2+\frac{4}{9}(2-2)$ $(12,2)$

$4+\frac{4}{9}(18)$ $2+\frac{4}{9}(0)$

$4+8$ $2+0$

12 2

PTS: 2 REF: 061626geo NAT: G.GPE.B.6 TOP: Directed Line Segments

54 ANS: 1

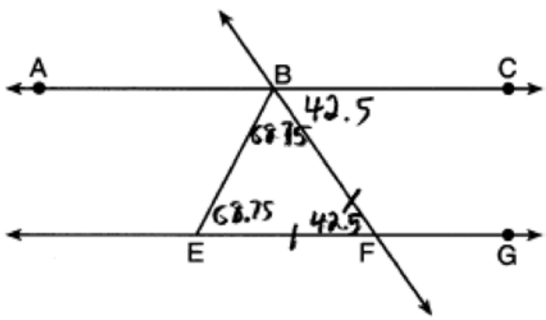
$\frac{f}{4}=\frac{15}{6}$

$f=10$

PTS: 2 REF: 061617geo NAT: G.CO.C.9 TOP: Lines and Angles

55 ANS: 4 PTS: 2 REF: 081801geo NAT: G.CO.C.9
TOP: Lines and Angles

56 ANS: 2



PTS: 2 REF: 011818geo NAT: G.CO.C.9 TOP: Lines and Angles

57 ANS: 1
Alternate interior angles

PTS: 2 REF: 061517geo NAT: G.CO.C.9 TOP: Lines and Angles

58 ANS: 1 PTS: 2 REF: 011606geo NAT: G.CO.C.9
TOP: Lines and Angles

59 ANS: 2 PTS: 2 REF: 081601geo NAT: G.CO.C.9
TOP: Lines and Angles

60 ANS: 3 PTS: 2 REF: 061802geo NAT: G.CO.C.9
TOP: Lines and Angles

61 ANS:

Since linear angles are supplementary, $m\angle GIH = 65^\circ$. Since $\overline{GH} \cong \overline{IH}$, $m\angle GHI = 50^\circ$ $(180-(65+65))$. Since $\angle EGB \cong \angle GHI$, the corresponding angles formed by the transversal and lines are congruent and $\overline{AB} \parallel \overline{CD}$.

PTS: 4 REF: 061532geo NAT: G.CO.C.9 TOP: Lines and Angles

62 ANS: 4 PTS: 2 REF: 081611geo NAT: G.CO.C.9
TOP: Lines and Angles

63 ANS: 1

$m = -\frac{2}{3}$ $1 = \left(-\frac{2}{3}\right)6 + b$

$1 = -4 + b$

$5 = b$

PTS: 2 REF: 081510geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

64 ANS: 4

The segment's midpoint is the origin and slope is -2. The slope of a perpendicular line is $\frac{1}{2}$. $y = \frac{1}{2}x + 0$

$2y = x$

$2y - x = 0$

PTS: 2 REF: 081724geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: perpendicular bisector

65 ANS: 4

$m = -\frac{1}{2}$ $-4 = 2(6) + b$

$m_{\perp} = 2$ $-4 = 12 + b$

$-16 = b$

PTS: 2 REF: 011602geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

66 ANS: 1

$m = \left(\frac{-11+5}{2}, \frac{5+-7}{2}\right) = (-3,-1)$ $m = \frac{5--7}{-11-5} = \frac{12}{-16} = -\frac{3}{4}$ $m_{\perp} = \frac{4}{3}$

PTS: 2 REF: 061612geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: perpendicular bisector

67 ANS: 3

$y = mx + b$

$2 = \frac{1}{2}(-2) + b$

$3 = b$

PTS: 2 REF: 011701geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

68 ANS: 2

$m = \frac{3}{2}$. $1 = -\frac{2}{3}(-6) + b$

$m_{\perp} = -\frac{2}{3}$ $1 = 4 + b$

$-3 = b$

PTS: 2 REF: 061719geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

69 ANS: 1

$m = \frac{-4}{-6} = \frac{2}{3}$

$m_{\perp} = -\frac{3}{2}$

PTS: 2 REF: 011820geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

70 ANS: 2

$m = \frac{3}{2}$

$m_{\perp} = -\frac{2}{3}$

PTS: 2 REF: 061812geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

71 ANS: 2

$m = \frac{-(-2)}{3} = \frac{2}{3}$

PTS: 2 REF: 061916geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

72 ANS: 1

$m = \frac{-A}{B} = \frac{-2}{-1} = 2$

$m_{\perp} = -\frac{1}{2}$

PTS: 2 REF: 061509geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: identify perpendicular lines

73 ANS: 1

The slope of $3x + 2y = 12$ is $-\frac{3}{2}$, which is the opposite reciprocal of $\frac{2}{3}$.

PTS: 2 REF: 081811geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: identify perpendicular lines

74 ANS: 1

$m = \frac{-A}{B} = \frac{-3}{2}$ $m_{\perp} = \frac{2}{3}$

PTS: 2 REF: 081908geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: identify perpendicular lines

75 ANS:

$3y + 7 = 2x \quad y - 6 = \frac{2}{3}(x - 2)$

$3y = 2x - 7$

$y = \frac{2}{3}x - \frac{7}{3}$

PTS: 2 REF: 011925geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

76 ANS: 2

$6 + 6\sqrt{3} + 6 + 6\sqrt{3} \approx 32.8$

PTS: 2 REF: 011709geo NAT: G.SRT.C.8 TOP: 30-60-90 Triangles

77 ANS: 3

$\sqrt{20^2 - 10^2} \approx 17.3$

PTS: 2 REF: 081608geo NAT: G.SRT.C.8 TOP: 30-60-90 Triangles

78 ANS: 2

$\frac{12}{4} = \frac{36}{x}$

$12x = 144$

$x = 12$

PTS: 2 REF: 061621geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

79 ANS: 3

$\frac{9}{5} = \frac{9.2}{x}$ $5.1 + 9.2 = 14.3$

$9x = 46$

$x \approx 5.1$

PTS: 2 REF: 061511geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

80 ANS: 4

$\frac{2}{4} = \frac{9 - x}{x}$

$36 - 4x = 2x$

$x = 6$

PTS: 2 REF: 061705geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

81 ANS: 4

$$\frac{1}{3.5}=\frac{x}{18-x}$$

$$3.5x=18-x$$

$$4.5x=18$$

$$x=4$$

PTS: 2 REF: 081707geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

82 ANS: 3

$$\frac{24}{40}=\frac{15}{x}$$

$$24x=600$$

$$x=25$$

PTS: 2 REF: 011813geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

83 ANS: 4

$$\frac{5}{7}=\frac{x}{x+5} \quad 12\frac{1}{2}+5=17\frac{1}{2}$$

$$5x+25=7x$$

$$2x=25$$

$$x=12\frac{1}{2}$$

PTS: 2 REF: 061821geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

84 ANS: 2

$$\frac{x}{x+3}=\frac{14}{21} \qquad 14-6=8$$

$$21x=14x+42$$

$$7x=42$$

$$x=6$$

PTS: 2 REF: 081812geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

85 ANS: 3

$$\frac{x}{6.3}=\frac{3}{5} \quad \frac{y}{9.4}=\frac{6.3}{6.3+3.78}$$

$$x=3.78 \qquad y\approx 5.9$$

PTS: 2 REF: 081816geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

86 ANS: 2

$\frac{x}{15} = \frac{5}{12}$

$x = 6.25$

PTS: 2 REF: 011906geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

87 ANS: 1

$5x = 12 \cdot 7 \quad 16.8 + 7 = 23.8$

$5x = 84$

$x = 16.8$

PTS: 2 REF: 061911geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

88 ANS: 4

$\frac{2}{6} = \frac{5}{15}$

PTS: 2 REF: 081517geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

89 ANS:

$\frac{3.75}{5} = \frac{4.5}{6}$ $\overline{AB}$ is parallel to $\overline{CD}$ because $\overline{AB}$ divides the sides proportionately.

$39.375 = 39.375$

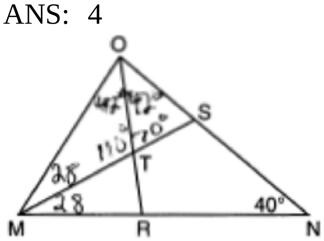
PTS: 2 REF: 061627geo NAT: G.SRT.B.5 TOP: Side Splitter Theorem

90 ANS: 2

$\angle B = 180 - (82 + 26) = 72$; $\angle DEC = 180 - 26 = 154$; $\angle EDB = 360 - (154 + 26 + 72) = 108$; $\angle BDF = \frac{108}{2} = 54$; $\angle DFB = 180 - (54 + 72) = 54$

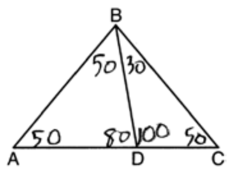
PTS: 2 REF: 061710geo NAT: G.CO.C.10 TOP: Interior and Exterior Angles of Triangles

91 ANS: 4



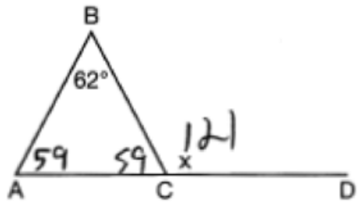
PTS: 2 REF: 061717geo NAT: G.CO.C.10 TOP: Interior and Exterior Angles of Triangles

92 ANS: 2



PTS: 2 REF: 081604geo NAT: G.CO.C.10 TOP: Interior and Exterior Angles of Triangles

93 ANS: 4



PTS: 2 REF: 081711geo NAT: G.CO.C.10 TOP: Exterior Angle Theorem

94 ANS: 3

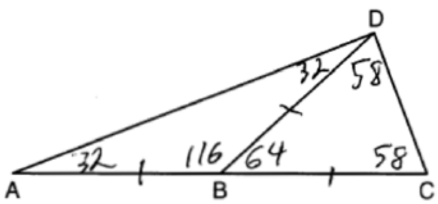
$6x - 40 + x + 20 = 180 - 3x$ $\text{m}\angle BAC = 180 - (80 + 40) = 60$

$10x = 200$

$x = 20$

PTS: 2 REF: 011809geo NAT: G.CO.C.10 TOP: Exterior Angle Theorem

95 ANS: 3



PTS: 2 REF: 081905geo NAT: G.CO.C.10 TOP: Exterior Angle Theorem

96 ANS: 4 PTS: 2 REF: 011916geo NAT: G.CO.C.10
TOP: Exterior Angle Theorem

97 ANS: 3

$\angle N$ is the smallest angle in $\triangle NYA$, so side $\overline{AY}$ is the shortest side of $\triangle NYA$. $\angle VYA$ is the smallest angle in $\triangle VYA$, so side $\overline{VA}$ is the shortest side of both triangles.

PTS: 2 REF: 011919geo NAT: G.CO.C.10 TOP: Angle Side Relationship

98 ANS: 4 PTS: 2 REF: 081822geo NAT: G.CO.C.10
TOP: Medians, Altitudes and Bisectors

99 ANS:

$\triangle MNO$ is congruent to $\triangle PNO$ by SAS. Since $\triangle MNO \cong \triangle PNO$, then $\overline{MO} \cong \overline{PO}$ by CPCTC. So $\overline{NO}$ must divide $\overline{MP}$ in half, and $MO = 8$.

PTS: 2 REF: fall1405geo NAT: G.CO.C.10 TOP: Medians, Altitudes and Bisectors

100 ANS: 4 PTS: 2 REF: 011704geo NAT: G.CO.C.10
TOP: Midsegments

101 ANS: 4 PTS: 2 REF: 081716geo NAT: G.CO.C.10
TOP: Midsegments

102 ANS: 3

$2(2x+8)=7x-2$ $\quad AB=7(6)-2=40$. Since $\overline{EF}$ is a midsegment, $EF=\dfrac{40}{2}=20$. Since $\triangle ABC$ is equilateral,

$4x+16=7x-2$

$18=3x$

$6=x$

$AE=BF=\dfrac{40}{2}=20$. $40+20+20+20=100$

PTS: 2 REF: 061923geo NAT: G.CO.C.10 TOP: Midsegments

103 ANS: 1 PTS: 2 REF: 081904geo NAT: G.CO.C.10
TOP: Centroid, Orthocenter, Incenter and Circumcenter

104 ANS: 1
M is a centroid, and cuts each median 2:1.

PTS: 2 REF: 061818geo NAT: G.CO.C.10
TOP: Centroid, Orthocenter, Incenter and Circumcenter

105 ANS:
$180-2(25)=130$

PTS: 2 REF: 011730geo NAT: G.CO.C.10
TOP: Centroid, Orthocenter, Incenter and Circumcenter

106 ANS: 4
The slope of $\overline{BC}$ is $\dfrac{2}{5}$. Altitude is perpendicular, so its slope is $-\dfrac{5}{2}$.

PTS: 2 REF: 061614geo NAT: G.GPE.B.4 TOP: Triangles in the Coordinate Plane

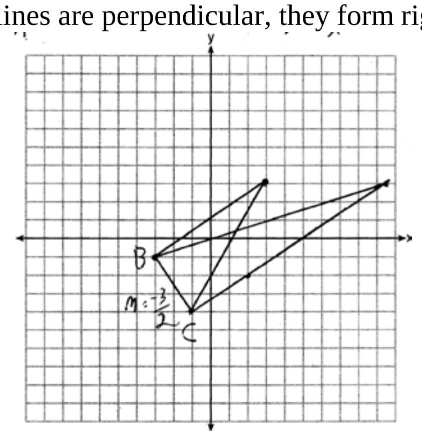
107 ANS: 4 PTS: 2 REF: 011921geo NAT: G.GPE.B.4
TOP: Triangles in the Coordinate Plane

108 ANS: 1
$m_{\overline{RT}}=\dfrac{5--3}{4--2}=\dfrac{8}{6}=\dfrac{4}{3}$ $\quad m_{\overline{ST}}=\dfrac{5-2}{4-8}=\dfrac{3}{-4}=-\dfrac{3}{4}$ Slopes are opposite reciprocals, so lines form a right angle.

PTS: 2 REF: 011618geo NAT: G.GPE.B.4 TOP: Triangles in the Coordinate Plane

109 ANS:

The slopes of perpendicular line are opposite reciprocals. Since the lines are perpendicular, they form right angles and a right triangle.

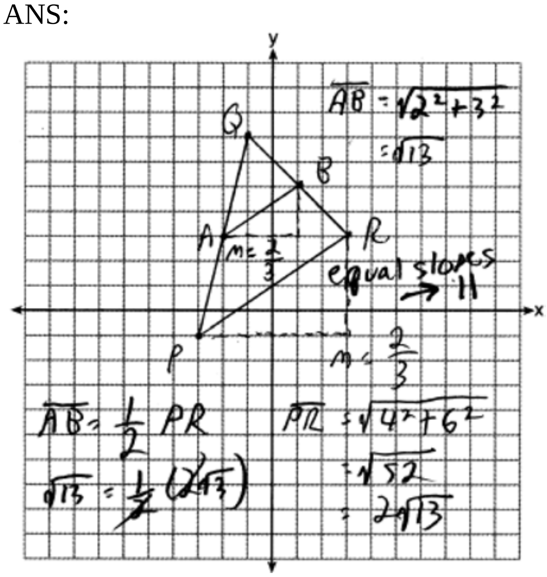


$$m_{\overline{BC}} = -\frac{3}{2} \qquad m_{\perp} = \frac{2}{3}$$

$$\begin{aligned} -1 &= \frac{2}{3}(-3) + b \\ -1 &= -2 + b \\ 1 &= b \\ 3 &= \frac{2}{3}x + 1 \\ 2 &= \frac{2}{3}x \\ 3 &= x \end{aligned} \qquad \text{or} \qquad \begin{aligned} -4 &= \frac{2}{3}(-1) + b \\ \frac{-12}{3} &= \frac{-2}{3} + b \\ -\frac{10}{3} &= b \\ 3 &= \frac{2}{3}x - \frac{10}{3} \\ 9 &= 2x - 10 \\ 19 &= 2x \\ 9.5 &= x \end{aligned}$$

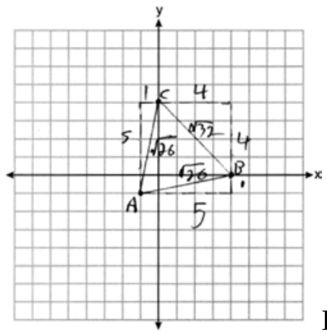
PTS: 4 REF: 081533geo NAT: G.GPE.B.4 TOP: Triangles in the Coordinate Plane

110 ANS:



PTS: 4 REF: 081732geo NAT: G.GPE.B.4 TOP: Triangles in the Coordinate Plane

111 ANS:



Because $\overline{AB} \cong \overline{AC}$, $\triangle ABC$ has two congruent sides and is isosceles. Because $\overline{AB} \cong \overline{BC}$ is not true, $\triangle ABC$ has sides that are not congruent and $\triangle ABC$ is not equilateral.

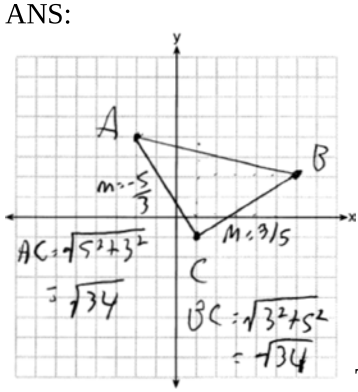
PTS: 4 REF: 061832geo NAT: G.GPE.B.4 TOP: Triangles in the Coordinate Plane

112 ANS:

No. The midpoint of $\overline{DF}$ is $\left(\frac{1+4}{2}, \frac{-1+2}{2}\right) = (2.5, 0.5)$. A median from point E must pass through the midpoint.

PTS: 2 REF: 011930geo NAT: G.GPE.B.4 TOP: Triangles in the Coordinate Plane

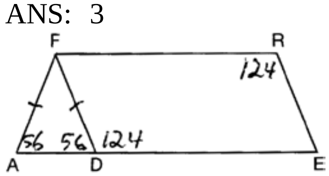
113 ANS:



Triangle with vertices $A(-2,4)$, $B(6,2)$, and $C(1,-1)$ (given); $m_{\overline{AC}} = -\frac{5}{3}$, $m_{\overline{BC}} = \frac{3}{5}$, definition of slope; Because the slopes of the legs of the triangle are opposite reciprocals, the legs are perpendicular (definition of perpendicular); $\angle C$ is a right angle (definition of right angle); $\triangle ABC$ is a right triangle (if a triangle has a right angle, it is a right triangle); $\overline{AC} \cong \overline{BC} = \sqrt{34}$ (distance formula); $\triangle ABC$ is an isosceles triangle (an isosceles triangle has two congruent sides).

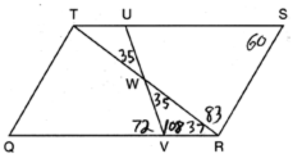
PTS: 4 REF: 011932geo NAT: G.GPE.B.4 TOP: Triangles in the Coordinate Plane

114 ANS: 3



PTS: 2 REF: 081508geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

115 ANS: 3



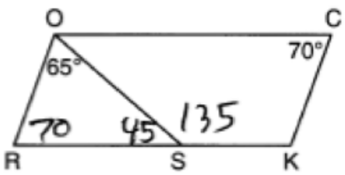
PTS: 2 REF: 011603geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

116 ANS: 1

$180-(68\cdot 2)$

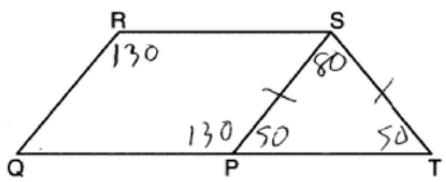
PTS: 2 REF: 081624geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

117 ANS: 4



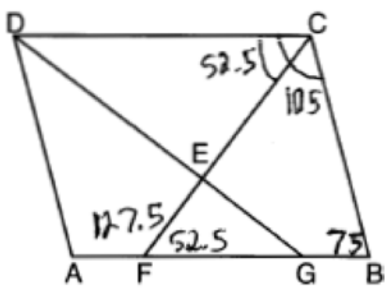
PTS: 2 REF: 081708geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

118 ANS: 2



PTS: 2 REF: 061921geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

119 ANS: 2



PTS: 2 REF: 081907geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

120 ANS:

Opposite angles in a parallelogram are congruent, so $m\angle O=118°$. The interior angles of a triangle equal 180°. $180-(118+22)=40$.

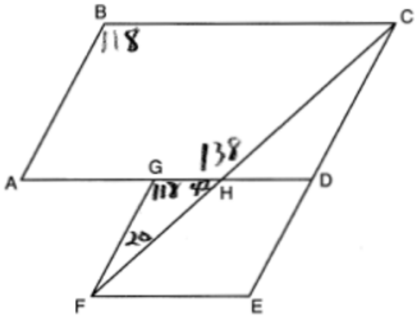
PTS: 2 REF: 061526geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

121 ANS:

$\angle D=46°$ because the angles of a triangle equal 180°. $\angle B=46°$ because opposite angles of a parallelogram are congruent.

PTS: 2 REF: 081925geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

122 ANS:



20º

PTS: 2 REF: 011926geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

123 ANS: 3
(3) Could be a trapezoid.

PTS: 2 REF: 081607geo NAT: G.CO.C.11 TOP: Parallelograms

124 ANS: 2 PTS: 2 REF: 061720geo NAT: G.CO.C.11
TOP: Parallelograms

125 ANS: 2 PTS: 2 REF: 011802geo NAT: G.CO.C.11
TOP: Parallelograms

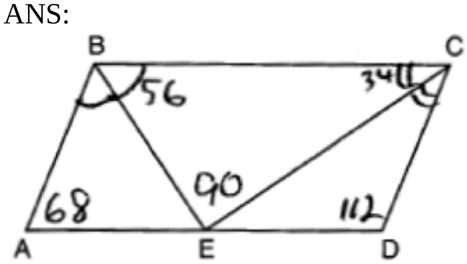
126 ANS: 4 PTS: 2 REF: 061513geo NAT: G.CO.C.11
TOP: Parallelograms

127 ANS: 4 PTS: 2 REF: 081813geo NAT: G.CO.C.11
TOP: Parallelograms

128 ANS: 2 PTS: 2 REF: 011912geo NAT: G.CO.C.11
TOP: Parallelograms

129 ANS: 3 PTS: 2 REF: 061912geo NAT: G.CO.C.11
TOP: Parallelograms

130 ANS:



PTS: 2 REF: 081826geo NAT: G.CO.C.11 TOP: Parallelograms

131 ANS: 2

$ER = \sqrt{17^2 - 8^2} = 15$

PTS: 2 REF: 061917geo NAT: G.CO.C.11 TOP: Special Quadrilaterals

132 ANS: 4 PTS: 2 REF: 011705geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

133 ANS: 4 PTS: 2 REF: 061813geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

134 ANS: 4 PTS: 2 REF: 061711geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

135 ANS: 2

$\sqrt{8^2+6^2}=10$ for one side

PTS: 2 REF: 011907geo NAT: G.CO.C.11 TOP: Special Quadrilaterals

136 ANS: 2 PTS: 2 REF: 081501geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

137 ANS: 1

1) opposite sides; 2) adjacent sides; 3) perpendicular diagonals; 4) diagonal bisects angle

PTS: 2 REF: 061609geo NAT: G.CO.C.11 TOP: Special Quadrilaterals

138 ANS: 1 PTS: 2 REF: 011716geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

139 ANS: 3

In (1) and (2), *ABCD* could be a rectangle with non-congruent sides. (4) is not possible

PTS: 2 REF: 081714geo NAT: G.CO.C.11 TOP: Special Quadrilaterals

140 ANS: 4 PTS: 2 REF: 011819geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

141 ANS: 3 PTS: 2 REF: 061924geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

142 ANS: 3 PTS: 2 REF: 081913geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

143 ANS:

The four small triangles are 8-15-17 triangles. $4\times 17=68$

PTS: 2 REF: 081726geo NAT: G.CO.C.11 TOP: Special Quadrilaterals

144 ANS: 4

$\frac{-2-1}{-1--3}=\frac{-3}{2}$ $\frac{3-2}{0-5}=\frac{1}{-5}$ $\frac{3-1}{0--3}=\frac{2}{3}$ $\frac{2--2}{5--1}=\frac{4}{6}=\frac{2}{3}$

PTS: 2 REF: 081522geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: general

145 ANS: 1

$m_{\overline{TA}}=-1$ $\quad y=mx+b$

$m_{\overline{EM}}=1$ $\quad 1=1(2)+b$

$-1=b$

PTS: 2 REF: 081614geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: general

146 ANS: 3

$M_x = \frac{-5+-1}{2} = -\frac{6}{2} = -3$ $M_y = \frac{5+-1}{2} = \frac{4}{2} = 2$.

PTS: 2 REF: 081902geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: general

147 ANS: 3

$\frac{7-1}{0-2} = \frac{6}{-2} = -3$ The diagonals of a rhombus are perpendicular.

PTS: 2 REF: 011719geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane

148 ANS:

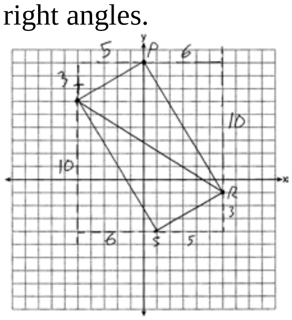
$M\left(\frac{4+0}{2}, \frac{6-1}{2}\right) = M\left(2, \frac{5}{2}\right)$ $m = \frac{6--1}{4-0} = \frac{7}{4}$ $m_{\perp} = -\frac{4}{7}$ $y - 2.5 = -\frac{4}{7}(x-2)$ The diagonals, $\overline{MT}$ and $\overline{AH}$, of rhombus *MATH* are perpendicular bisectors of each other.

PTS: 4 REF: fall1411geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

149 ANS:

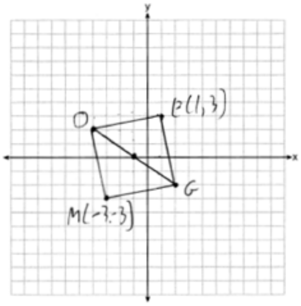
$m_{\overline{TS}} = \frac{-10}{6} = -\frac{5}{3}$ $m_{\overline{SR}} = \frac{3}{5}$ Since the slopes of $\overline{TS}$ and $\overline{SR}$ are opposite reciprocals, they are perpendicular and form a right angle. $\triangle RST$ is a right triangle because $\angle S$ is a right angle. $P(0,9)$ $m_{\overline{RP}} = \frac{-10}{6} = -\frac{5}{3}$ $m_{\overline{PT}} = \frac{3}{5}$

Since the slopes of all four adjacent sides ($\overline{TS}$ and $\overline{SR}$, $\overline{SR}$ and $\overline{RP}$, $\overline{PT}$ and $\overline{TS}$, $\overline{RP}$ and $\overline{PT}$) are opposite reciprocals, they are perpendicular and form right angles. Quadrilateral *RSTP* is a rectangle because it has four right angles.



PTS: 6 REF: 061536geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

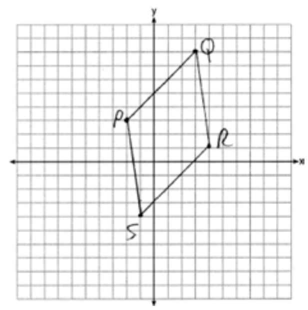
150 ANS:



PTS: 2 REF: 011731geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

151 ANS:

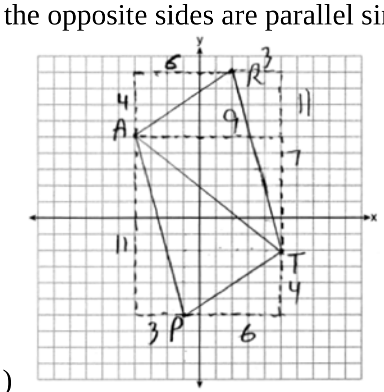
$\overline{PQ}$ $\sqrt{(8-3)^2+(3--2)^2}=\sqrt{50}$ $\overline{QR}$ $\sqrt{(1-8)^2+(4-3)^2}=\sqrt{50}$ $\overline{RS}$ $\sqrt{(-4-1)^2+(-1-4)^2}=\sqrt{50}$
$\overline{PS}$ $\sqrt{(-4-3)^2+(-1--2)^2}=\sqrt{50}$ *PQRS* is a rhombus because all sides are congruent. $m_{\overline{PQ}}=\dfrac{8-3}{3--2}=\dfrac{5}{5}=1$
$m_{\overline{QR}}=\dfrac{1-8}{4-3}=-7$ Because the slopes of adjacent sides are not opposite reciprocals, they are not perpendicular and do not form a right angle. Therefore *PQRS* is not a square.



PTS: 6 REF: 061735geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

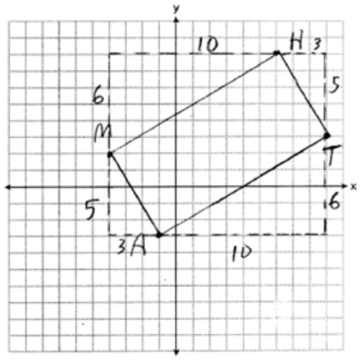
152 ANS:

$\triangle PAT$ is an isosceles triangle because sides $\overline{AP}$ and $\overline{AT}$ are congruent ($\sqrt{3^2+11^2}=\sqrt{7^2+9^2}=\sqrt{130}$).
$R(2,9)$. Quadrilateral *PART* is a parallelogram because the opposite sides are parallel since they have equal slopes
$(m_{\overline{AR}}=\dfrac{4}{6}=\dfrac{2}{3};\ m_{\overline{PT}}=\dfrac{4}{6}=\dfrac{2}{3};\ m_{\overline{PA}}=-\dfrac{11}{3};\ m_{\overline{RT}}=-\dfrac{11}{3})$



PTS: 6 REF: 011835geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

153 ANS:

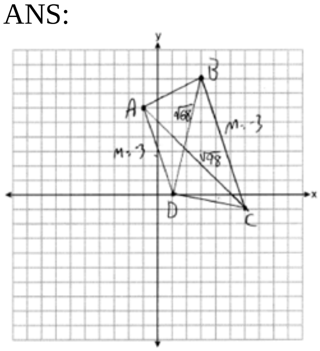


$m_{\overline{MH}} = \frac{6}{10} = \frac{3}{5}$, $m_{\overline{AT}} = \frac{6}{10} = \frac{3}{5}$, $m_{\overline{MA}} = -\frac{5}{3}$, $m_{\overline{HT}} = -\frac{5}{3}$; $\overline{MH} \parallel \overline{AT}$ and $\overline{MA} \parallel \overline{HT}$.

MATH is a parallelogram since both sides of opposite sides are parallel. $m_{\overline{MA}} = -\frac{5}{3}$, $m_{\overline{AT}} = \frac{3}{5}$. Since the slopes are negative reciprocals, $\overline{MA} \perp \overline{AT}$ and $\angle A$ is a right angle. *MATH* is a rectangle because it is a parallelogram with a right angle.

PTS: 6 REF: 081835geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

154 ANS:



$m_{\overline{AD}} = \frac{0-6}{1--1} = -3$ $\overline{AD} \parallel \overline{BC}$ because their slopes are equal. *ABCD* is a trapezoid

$m_{\overline{BC}} = \frac{-1-8}{6-3} = -3$

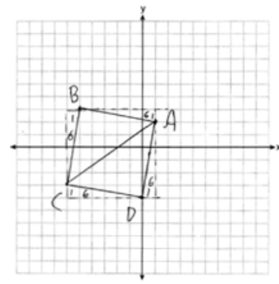
because it has a pair of parallel sides. $AC = \sqrt{(-1-6)^2 + (6--1)^2} = \sqrt{98}$ *ABCD* is not an isosceles trapezoid

$BD = \sqrt{(8-0)^2 + (3-1)^2} = \sqrt{68}$

because its diagonals are not congruent.

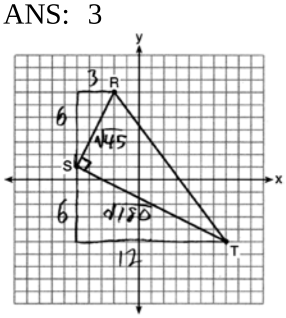
PTS: 4 REF: 061932geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

155 ANS:
$AB = \sqrt{(-5-1)^2 + (3-2)^2} = \sqrt{37}$, $BC = \sqrt{(-5--6)^2 + (3--3)^2} = \sqrt{37}$ (because $AB = BC$, $\triangle ABC$ is isosceles). $(0,-4)$. $AD = \sqrt{(1-0)^2 + (2--4)^2} = \sqrt{37}$, $CD = \sqrt{(-6-0)^2 + (-3--4)^2} = \sqrt{37}$,
$m_{\overline{AB}} = \frac{3-2}{-5-1} = -\frac{1}{6}$, $m_{\overline{CB}} = \frac{3--3}{-5--6} = 6$ ($ABCD$ is a square because all four sides are congruent, consecutive sides are perpendicular since slopes are opposite reciprocals and so $\angle B$ is a right angle).



PTS: 6 REF: 081935geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane
KEY: grids

156 ANS: 3

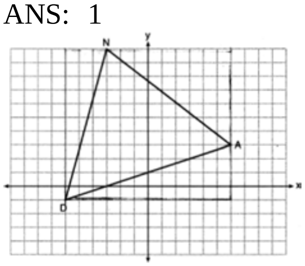


$\sqrt{45} = 3\sqrt{5}$ $\quad a = \frac{1}{2}\left(3\sqrt{5}\right)\left(6\sqrt{5}\right) = \frac{1}{2}(18)(5) = 45$
$\sqrt{180} = 6\sqrt{5}$

PTS: 2 REF: 061622geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

157 ANS: 3 PTS: 2 REF: 061702geo NAT: G.GPE.B.7
TOP: Polygons in the Coordinate Plane

158 ANS: 1



$(12 \cdot 11) - \left(\frac{1}{2}(12 \cdot 4) + \frac{1}{2}(7 \cdot 9) + \frac{1}{2}(11 \cdot 3)\right) = 60$

PTS: 2 REF: 061815geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

159 ANS: 2
$\sqrt{(-1-2)^2 + (4-3)^2} = \sqrt{10}$

PTS: 2 REF: 011615geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

160 ANS: 3

$4\sqrt{(-1--3)^2+(5-1)^2}=4\sqrt{20}$

PTS: 2 REF: 081703geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

161 ANS: 4

$4\sqrt{(-1-2)^2+(2-3)^2}=4\sqrt{10}$

PTS: 2 REF: 081808geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

162 ANS: 3

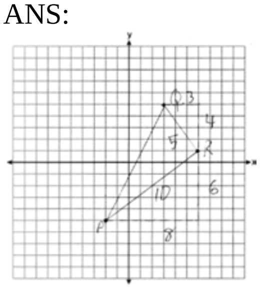
$A=\frac{1}{2}ab \quad 3-6=-3=x$

$24=\frac{1}{2}a(8) \quad \frac{4+12}{2}=8=y$

$a=6$

PTS: 2 REF: 081615geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

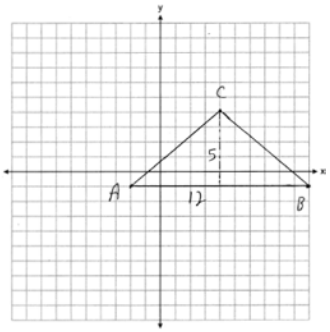
163 ANS:



$\frac{1}{2}(5)(10)=25$

PTS: 2 REF: 061926geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

164 ANS:



$\frac{1}{2}(5)(12)=30$

PTS: 2 REF: 081928geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

165 ANS: 3

$5\cdot\frac{10}{4}=\frac{50}{4}=12.5$

PTS: 2 REF: 081512geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: common tangents

166 ANS: 3 PTS: 2 REF: 011621geo NAT: G.C.A.2
TOP: Chords, Secants and Tangents KEY: inscribed

167 ANS: 4

$\frac{1}{2}(360-268)=46$

PTS: 2 REF: 061704geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: inscribed

168 ANS: 1

Parallel chords intercept congruent arcs. $\frac{180-130}{2}=25$

PTS: 2 REF: 081704geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: parallel lines

169 ANS: 2

$x^2=3\cdot 18$

$x=\sqrt{3\cdot 3\cdot 6}$

$x=3\sqrt{6}$

PTS: 2 REF: 081712geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, length

170 ANS: 3

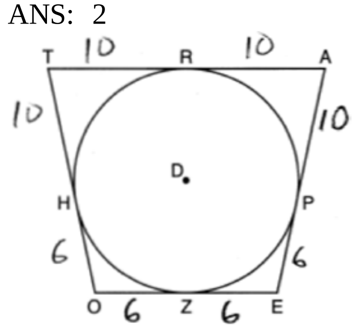
$\frac{x+72}{2}=58$

$x+72=116$

$x=44$

PTS: 2 REF: 061817geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: intersecting chords, angle

171 ANS: 2



PTS: 2 REF: 081814geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: tangents drawn from common point, length

172 ANS: 1 PTS: 2 REF: 061520geo NAT: G.C.A.2
TOP: Chords, Secants and Tangents KEY: mixed

173 ANS: 1 PTS: 2 REF: 061508geo NAT: G.C.A.2
TOP: Chords, Secants and Tangents KEY: inscribed

174 ANS: 2 PTS: 2 REF: 061610geo NAT: G.C.A.2
TOP: Chords, Secants and Tangents KEY: inscribed

175 ANS: 1
The other statements are true only if $\overline{AD} \perp \overline{BC}$.

PTS: 2 REF: 081623geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: inscribed

176 ANS: 4 PTS: 2 REF: 011816geo NAT: G.C.A.2
TOP: Chords, Secants and Tangents KEY: inscribed

177 ANS: 4 PTS: 2 REF: 011905geo NAT: G.C.A.2
TOP: Chords, Secants and Tangents KEY: inscribed

178 ANS: 3
$8 \cdot 15 = 16 \cdot 7.5$

PTS: 2 REF: 061913geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: intersecting chords, length

179 ANS: 4 PTS: 2 REF: 081922geo NAT: G.C.A.2
TOP: Chords, Secants and Tangents KEY: intersecting chords, length

180 ANS: 2

$$6 \cdot 6 = x(x-5)$$
$$36 = x^2 - 5x$$
$$0 = x^2 - 5x - 36$$
$$0 = (x-9)(x+4)$$
$$x = 9$$

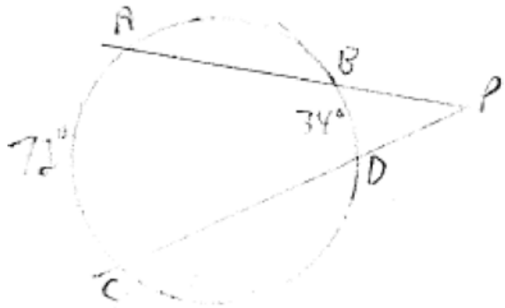
PTS: 2 REF: 061708geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: intersecting chords, length

181 ANS: 2

$$8(x+8) = 6(x+18)$$
$$8x + 64 = 6x + 108$$
$$2x = 44$$
$$x = 22$$

PTS: 2 REF: 011715geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, length

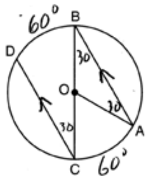
182 ANS: 1



$$\frac{72-34}{2}=19$$

PTS: 2 REF: 061918geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, angle

183 ANS:



$180-2(30)=120$

PTS: 2 REF: 011626geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: parallel lines

184 ANS:

$\frac{3}{8}\cdot 56=21$

PTS: 2 REF: 081625geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: common tangents

185 ANS:

$\frac{152-56}{2}=48$

PTS: 2 REF: 011728geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, angle

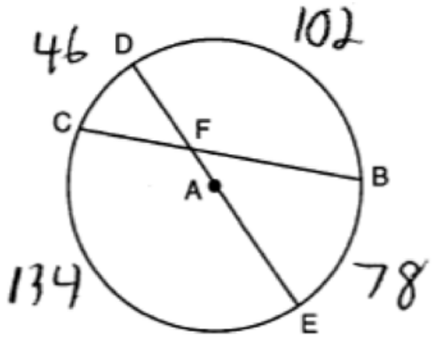
186 ANS:

$10\cdot 6=15x$

$x=4$

PTS: 2 REF: 061828geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, length

187 ANS:



$$\frac{134+102}{2}=118$$

PTS: 2 REF: 081827geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: intersecting chords, angle

188 ANS:

$$\frac{121-x}{2}=35$$

$$121-x=70$$

$$x=51$$

PTS: 2 REF: 011927geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, angle

189 ANS:

$$\frac{124-56}{2}=34$$

PTS: 2 REF: 081930geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, angle

190 ANS: 3 PTS: 2 REF: 081515geo NAT: G.C.A.3
TOP: Inscribed Quadrilaterals

191 ANS: 4
Opposite angles of an inscribed quadrilateral are supplementary.

PTS: 2 REF: 011821geo NAT: G.C.A.3 TOP: Inscribed Quadrilaterals

192 ANS: 2

$$s^2+s^2=7^2$$

$$2s^2=49$$

$$s^2=24.5$$

$$s\approx 4.9$$

PTS: 2 REF: 081511geo NAT: G.C.A.3 TOP: Inscribed Quadrilaterals

193 ANS: 2

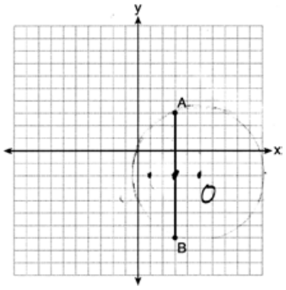
$$(x-5)^2+(y-2)^2=16$$

$$x^2-10x+25+y^2-4y+4=16$$

$$x^2-10x+y^2-4y=-13$$

PTS: 2 REF: 061820geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: write equation, given graph

194 ANS: 1



Since the midpoint of $\overline{AB}$ is $(3,-2)$, the center must be either $(5,-2)$ or $(1,-2)$.

$$r=\sqrt{2^2+5^2}=\sqrt{29}$$

PTS: 2 REF: 061623geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: other

195 ANS: 2

$$x^2+y^2+6y+9=7+9$$

$$x^2+(y+3)^2=16$$

PTS: 2 REF: 061514geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

196 ANS: 3

$$x^2+4x+4+y^2-6y+9=12+4+9$$

$$(x+2)^2+(y-3)^2=25$$

PTS: 2 REF: 081509geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

197 ANS: 4

$$x^2+6x+9+y^2-4y+4=23+9+4$$

$$(x+3)^2+(y-2)^2=36$$

PTS: 2 REF: 011617geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

198 ANS: 2 PTS: 2 REF: 061603geo NAT: G.GPE.A.1
TOP: Equations of Circles KEY: find center and radius | completing the square

199 ANS: 1

$$x^2 - 4x + 4 + y^2 + 8y + 16 = -11 + 4 + 16$$
$$(x-2)^2 + (y+4)^2 = 9$$

PTS: 2 REF: 081616geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

200 ANS: 1

$$x^2 + y^2 - 6y + 9 = -1 + 9$$
$$x^2 + (y-3)^2 = 8$$

PTS: 2 REF: 011718geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

201 ANS: 1

$$x^2 + y^2 - 12y + 36 = -20 + 36$$
$$x^2 + (y-6)^2 = 16$$

PTS: 2 REF: 061712geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

202 ANS: 2

$$x^2 + y^2 - 6x + 2y = 6$$
$$x^2 - 6x + 9 + y^2 + 2y + 1 = 6 + 9 + 1$$
$$(x-3)^2 + (y+1)^2 = 16$$

PTS: 2 REF: 011812geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

203 ANS: 1

$$(x-1)^2 + (y-4)^2 = \left(\frac{10}{2}\right)^2$$
$$x^2 - 2x + 1 + y^2 - 8y + 16 = 25$$
$$x^2 - 2x + y^2 - 8y = 8$$

PTS: 2 REF: 011920geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: write equation, given center and radius

204 ANS: 4

$$x^2 + 8x + 16 + y^2 - 12y + 36 = 144 + 16 + 36$$
$$(x+4)^2 + (y-6)^2 = 196$$

PTS: 2 REF: 061920geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

205 ANS: 4

$$x^2 - 8x + y^2 + 6y = 39$$

$$x^2 - 8x + 16 + y^2 + 6y + 9 = 39 + 16 + 9$$

$$(x-4)^2 + (y+3)^2 = 64$$

PTS: 2 REF: 081906geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

206 ANS: 4

$$x^2 + 4x + 4 + y^2 - 8y + 16 = -16 + 4 + 16$$

$$(x+2)^2 + (y-4)^2 = 4$$

PTS: 2 REF: 081821geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

207 ANS:

$$x^2 - 6x + 9 + y^2 + 8y + 16 = 56 + 9 + 16 \quad (3,-4);\ r = 9$$

$$(x-3)^2 + (y+4)^2 = 81$$

PTS: 2 REF: 081731geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

208 ANS: 3

$$r = \sqrt{(7-3)^2 + (1--2)^2} = \sqrt{16+9} = 5$$

PTS: 2 REF: 061503geo NAT: G.GPE.B.4 TOP: Circles in the Coordinate Plane

Geometry Regents Exam Questions by State Standard: Topic
Answer Section

209 ANS: 3

$\sqrt{(-5)^2+12^2}=\sqrt{169}$ $\sqrt{11^2+(2\sqrt{12})^2}=\sqrt{121+48}=\sqrt{169}$

PTS: 2 REF: 011722geo NAT: G.GPE.B.4 TOP: Circles in the Coordinate Plane

210 ANS:

Yes. $(x-1)^2+(y+2)^2=4^2$

$$(3.4-1)^2+(1.2+2)^2=16$$
$$5.76+10.24=16$$
$$16=16$$

PTS: 2 REF: 081630geo NAT: G.GPE.B.4 TOP: Circles in the Coordinate Plane

211 ANS: 1

$\frac{64}{4}=16$ $16^2=256$ $2w+2(w+2)=64$, $w=15$ $15\times17=255$ $2w+2(w+4)=64$, $w=14$ $14\times18=252$ $2w+2(w+6)=64$, $w=13$

$13\times19=247$

PTS: 2 REF: 011708geo NAT: G.MG.A.3 TOP: Area of Polygons

212 ANS:

$x^2+x^2=58^2$ $A=(\sqrt{1682}+8)^2\approx2402.2$

$$2x^2=3364$$
$$x=\sqrt{1682}$$

PTS: 4 REF: 081734geo NAT: G.MG.A.3 TOP: Area of Polygons

213 ANS: 2

$SA=6\cdot12^2=864$

$\frac{864}{450}=1.92$

PTS: 2 REF: 061519geo NAT: G.MG.A.3 TOP: Surface Area

214 ANS: 2

x is $\frac{1}{2}$ the circumference. $\frac{C}{2}=\frac{10\pi}{2}\approx16$

PTS: 2 REF: 061523geo NAT: G.GMD.A.1 TOP: Circumference

215 ANS: 1

$\frac{1000}{20\pi}\approx15.9$

PTS: 2 REF: 011623geo NAT: G.GMD.A.1 TOP: Circumference

216 ANS: 1 PTS: 2 REF: 011918geo NAT: G.MG.A.3
TOP: Compositions of Polygons and Circles KEY: area

217 ANS: 4

$$(8 \times 2) + (3 \times 2) - \left(\frac{18}{12} \times \frac{21}{12}\right) \approx 19$$

PTS: 2 REF: 081917geo NAT: G.MG.A.3 TOP: Compositions of Polygons and Circles
KEY: area

218 ANS:

$$2 \times (90 \times 10) + (\pi)(30^2) - (\pi)(20^2) \approx 3371$$

PTS: 2 REF: 011931geo NAT: G.MG.A.3 TOP: Compositions of Polygons and Circles
KEY: area

219 ANS: 4

$$C = 12\pi \quad \frac{120}{360}(12\pi) = \frac{1}{3}(12\pi)$$

PTS: 2 REF: 061822geo NAT: G.C.B.5 TOP: Arc Length
KEY: arc length

220 ANS: 3

$$\frac{s_L}{s_S} = \frac{6\theta}{4\theta} = 1.5$$

PTS: 2 REF: 011824geo NAT: G.C.B.5 TOP: Arc Length
KEY: arc length

221 ANS: 3

$$\theta = \frac{s}{r} = \frac{2\pi}{10} = \frac{\pi}{5}$$

PTS: 2 REF: fall1404geo NAT: G.C.B.5 TOP: Arc Length
KEY: angle

222 ANS:

$s = \theta \cdot r$ $\quad s = \theta \cdot r$ Yes, both angles are equal.

$\pi = A \cdot 4$ $\quad \frac{13\pi}{8} = B \cdot 6.5$

$\frac{\pi}{4} = A$ $\quad \frac{\pi}{4} = B$

PTS: 2 REF: 061629geo NAT: G.C.B.5 TOP: Arc Length
KEY: arc length

223 ANS: 3

$$\frac{60}{360} \cdot 6^2\pi = 6\pi$$

PTS: 2 REF: 081518geo NAT: G.C.B.5 TOP: Sectors

224 ANS: 3

$\frac{x}{360} \cdot 3^2 \pi = 2\pi$ $180 - 80 = 100$

$x = 80$ $\frac{180-100}{2} = 40$

PTS: 2 REF: 011612geo NAT: G.C.B.5 TOP: Sectors

225 ANS: 4

$\frac{300}{360} \cdot 8^2 \pi = \frac{160\pi}{3}$

PTS: 2 REF: 011721geo NAT: G.C.B.5 TOP: Sectors

226 ANS: 2

$\frac{30}{360}(5)^2(\pi) \approx 6.5$

PTS: 2 REF: 081818geo NAT: G.C.B.5 TOP: Sectors

227 ANS: 2 PTS: 2 REF: 081619geo NAT: G.C.B.5
TOP: Sectors

228 ANS: 4

$\left(\frac{360-120}{360}\right)(\pi)\left(9^2\right) = 54\pi$

PTS: 2 REF: 081912geo NAT: G.C.B.5 TOP: Sectors

229 ANS: 3

$\frac{60}{360} \cdot 8^2 \pi = \frac{1}{6} \cdot 64\pi = \frac{32\pi}{3}$

PTS: 2 REF: 061624geo NAT: G.C.B.5 TOP: Sectors

230 ANS: 2

$\frac{\frac{512\pi}{3}}{\left(\frac{32}{2}\right)^2 \pi} \cdot 2\pi = \frac{4\pi}{3}$

PTS: 2 REF: 081723geo NAT: G.C.B.5 TOP: Sectors

231 ANS: 2

$\frac{x}{360}(15)^2 \pi = 75\pi$

$x = 120$

PTS: 2 REF: 011914geo NAT: G.C.B.5 TOP: Sectors

232 ANS:

$$\frac{\left(\frac{180-20}{2}\right)}{360} \times \pi(6)^2 = \frac{80}{360} \times 36\pi = 8\pi$$

PTS: 4 REF: spr1410geo NAT: G.C.B.5 TOP: Sectors

233 ANS:

$$A = 6^2\pi = 36\pi \quad 36\pi \cdot \frac{x}{360} = 12\pi$$

$$x = 360 \cdot \frac{12}{36}$$

$$x = 120$$

PTS: 2 REF: 061529geo NAT: G.C.B.5 TOP: Sectors

234 ANS:

$$\frac{Q}{360}(\pi)\left(25^2\right) = (\pi)\left(25^2\right) - 500\pi$$

$$Q = \frac{125\pi(360)}{625\pi}$$

$$Q = 72$$

PTS: 2 REF: 011828geo NAT: G.C.B.5 TOP: Sectors

235 ANS:

$$\frac{72}{360}(\pi)\left(10^2\right) = 20\pi$$

PTS: 2 REF: 061928geo NAT: G.C.B.5 TOP: Sectors

236 ANS:

$$\frac{40}{360} \cdot \pi(4.5)^2 = 2.25\pi$$

PTS: 2 REF: 061726geo NAT: G.C.B.5 TOP: Sectors

237 ANS:

Each quarter in both stacks has the same base area. Therefore, each corresponding cross-section of the stacks will have the same area. Since the two stacks of quarters have the same height of 23 quarters, the two volumes must be the same.

PTS: 2 REF: spr1405geo NAT: G.GMD.A.1 TOP: Volume

238 ANS:

Each triangular prism has the same base area. Therefore, each corresponding cross-section of the prisms will have the same area. Since the two prisms have the same height of 14, the two volumes must be the same.

PTS: 2 REF: 061727geo NAT: G.GMD.A.1 TOP: Volume

239 ANS:
Yes. The bases of the cylinders have the same area and the cylinders have the same height.

PTS: 2 REF: 081725geo NAT: G.GMD.A.1 TOP: Volume

240 ANS: 2

$V = \frac{1}{3} \cdot 6^2 \cdot 12 = 144$

PTS: 2 REF: 011607geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

241 ANS: 2

$4 \times 4 \times 6 - \pi(1)^2(6) \approx 77$

PTS: 2 REF: 011711geo NAT: G.GMD.A.3 TOP: Volume
KEY: compositions

242 ANS: 1

$84 = \frac{1}{3} \cdot s^2 \cdot 7$

$6 = s$

PTS: 2 REF: 061716geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

243 ANS: 3

$2.5 \times 1.25 \times (27 \times 12) + \frac{1}{2}\pi(1.25)^2(27 \times 12) \approx 1808$

PTS: 2 REF: 061723geo NAT: G.GMD.A.3 TOP: Volume
KEY: compositions

244 ANS: 1

$20 \cdot 12 \cdot 45 + \frac{1}{2}\pi(10)^2(45) \approx 17869$

PTS: 2 REF: 061807geo NAT: G.GMD.A.3 TOP: Volume
KEY: compositions

245 ANS: 1

$h = \sqrt{6.5^2 - 2.5^2} = 6,\ V = \frac{1}{3}\pi(2.5)^2 6 = 12.5\pi$

PTS: 2 REF: 011923geo NAT: G.GMD.A.3 TOP: Volume
KEY: cones

246 ANS: 2

$8 \times 8 \times 9 + \frac{1}{3}(8 \times 8 \times 3) = 640$

PTS: 2 REF: 011909geo NAT: G.GMD.A.3 TOP: Volume
KEY: compositions

247 ANS: 4

$$2592276 = \frac{1}{3} \cdot s^2 \cdot 146.5$$

$$230 \approx s$$

PTS: 2 REF: 081521geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

248 ANS: 2

$$14 \times 16 \times 10 = 2240 \quad \frac{2240 - 1680}{2240} = 0.25$$

PTS: 2 REF: 011604geo NAT: G.GMD.A.3 TOP: Volume
KEY: prisms

249 ANS: 3

$$\frac{\frac{4}{3}\pi\left(\frac{9.5}{2}\right)^3}{\frac{4}{3}\pi\left(\frac{2.5}{2}\right)^3} \approx 55$$

PTS: 2 REF: 011614geo NAT: G.GMD.A.3 TOP: Volume
KEY: spheres

250 ANS: 4 PTS: 2 REF: 061606geo NAT: G.GMD.A.3
TOP: Volume KEY: compositions

251 ANS: 4

$$V = \pi\left(\frac{6.7}{2}\right)^2 (4 \cdot 6.7) \approx 945$$

PTS: 2 REF: 081620geo NAT: G.GMD.A.3 TOP: Volume
KEY: cylinders

252 ANS: 1

$$V = \frac{1}{3}\pi\left(\frac{1.5}{2}\right)^2\left(\frac{4}{2}\right) \approx 1.2$$

PTS: 2 REF: 011724geo NAT: G.GMD.A.3 TOP: Volume
KEY: cones

253 ANS: 3

$$V = \frac{1}{3}\pi r^2 h$$

$$54.45\pi = \frac{1}{3}\pi(3.3)^2 h$$

$$h = 15$$

PTS: 2 REF: 011807geo NAT: G.GMD.A.3 TOP: Volume
KEY: cones

254 ANS: 2

$$V = \frac{1}{3}\left(\frac{36}{4}\right)^2 \cdot 15 = 405$$

PTS: 2 REF: 011822geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

255 ANS: 1

$$82.8 = \frac{1}{3}(4.6)(9)h$$

$$h = 6$$

PTS: 2 REF: 061810geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

256 ANS: 2

$$V = \frac{1}{3}\left(\frac{60}{12}\right)^2\left(\frac{84}{12}\right) \approx 58$$

PTS: 2 REF: 081819geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

257 ANS: 2

$$V = \frac{1}{3}(8)^2 \cdot 6 = 128$$

PTS: 2 REF: 061906geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

258 ANS: 1

$$V = \frac{1}{2} \times \frac{4}{3}\pi r^3 = \frac{1}{2} \times \frac{4}{3}\pi \cdot \left(\frac{12.6}{2}\right)^3 \approx 523.7$$

PTS: 2 REF: 061910geo NAT: G.GMD.A.3 TOP: Volume
KEY: spheres

259 ANS: 3

$$\sqrt{40^2 - \left(\frac{64}{2}\right)^2} = 24 \quad V = \frac{1}{3}(64)^2 \cdot 24 = 32768$$

PTS: 2 REF: 081921geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

260 ANS:

$\tan 16.5 = \frac{x}{13.5}$

$x \approx 4$

$4 + 4.5 = 8.5$

$9 \times 16 \times 4.5 = 648$

$13.5 \times 16 \times 4.5 = 972$

$\frac{1}{2} \times 13.5 \times 16 \times 4 = 432$

$12.5 \times 16 \times 8.5 = \underline{1700}$

3752

$3752 - (35 \times 16 \times .5) = 3472$

$3472 \times 7.48 \approx 25971$

$\frac{25971}{10.5} \approx 2473.4$

$\frac{2473.4}{60} \approx 41$

PTS: 6 REF: 081736geo NAT: G.GMD.A.3 TOP: Volume
KEY: compositions

261 ANS:

$C = 2\pi r$

$31.416 = 2\pi r$

$5 \approx r$

$V = \frac{1}{3}\pi \cdot 5^2 \cdot 13 \approx 340$

PTS: 4 REF: 011734geo NAT: G.GMD.A.3 TOP: Volume
KEY: cones

262 ANS:

$20000 \text{ g}\left(\frac{1 \text{ ft}^3}{7.48 \text{ g}}\right) = 2673.8 \text{ ft}^3$

$2673.8 = \pi r^2(34.5)$

$r \approx 4.967$

$d \approx 9.9$

$9.9 + 1 = 10.9$

PTS: 4 REF: 061734geo NAT: G.GMD.A.3 TOP: Volume
KEY: cylinders

263 ANS:

Similar triangles are required to model and solve a proportion.

$\frac{x+5}{1.5} = \frac{x}{1}$

$x + 5 = 1.5x$

$5 = .5x$

$10 = x$

$10 + 5 = 15$

$\frac{1}{3}\pi(1.5)^2(15) - \frac{1}{3}\pi(1)^2(10) \approx 24.9$

PTS: 6 REF: 061636geo NAT: G.GMD.A.3 TOP: Volume
KEY: cones

264 ANS:

$2\left(\frac{36}{12} \times \frac{36}{12} \times \frac{4}{12}\right) \times 3.25 = 19.50$

PTS: 2 REF: 081831geo NAT: G.GMD.A.3 TOP: Volume
KEY: prisms

265 ANS:

$$V=(\pi)(4^2)(9)+\left(\frac{1}{2}\right)\left(\frac{4}{3}\right)(\pi)\left(4^3\right)\approx 586$$

PTS: 4 REF: 011833geo NAT: G.GMD.A.3 TOP: Volume
KEY: compositions

266 ANS:

$$\left((10\times 6)+\sqrt{7(7-6)(7-4)(7-4)}\right)(6.5)\approx 442$$

PTS: 4 REF: 081934geo NAT: G.GMD.A.3 TOP: Volume
KEY: compositions

267 ANS:

Theresa. $(30\times 15\times(4-0.5))\text{ ft}^3\times\frac{7.48\text{ g}}{1\text{ ft}^3}\times\frac{\$3.95}{100\text{ g}}=\$465.35$, $(\pi\times 12^2\times(4-0.5))\text{ ft}^3\times\frac{7.48\text{ g}}{1\text{ ft}^3}\times\frac{\$200}{6000\text{ g}}=\$394.79$

PTS: 4 REF: 011933geo NAT: G.GMD.A.3 TOP: Volume
KEY: cylinders

268 ANS:

$$V=\frac{2}{3}\pi\left(\frac{6.5}{2}\right)^2(1)\approx 22\quad 22\cdot 7.48\approx 165$$

PTS: 4 REF: 061933geo NAT: G.GMD.A.3 TOP: Volume
KEY: cylinders

269 ANS:

$$\sqrt[3]{\frac{3V_f}{4\pi}}-\sqrt[3]{\frac{3V_p}{4\pi}}=\sqrt[3]{\frac{3(294)}{4\pi}}-\sqrt[3]{\frac{3(180)}{4\pi}}\approx 0.6$$

PTS: 2 REF: 061728geo NAT: G.GMD.A.3 TOP: Volume
KEY: spheres

270 ANS:

$$\frac{\pi\cdot 11.25^2\cdot 33.5}{231}\approx 57.7$$

PTS: 4 REF: 061632geo NAT: G.GMD.A.3 TOP: Volume
KEY: cylinders

271 ANS:

$$\left(\frac{2.5}{3}\right)(\pi)\left(\frac{8.25}{2}\right)^2(3)\approx 134$$

PTS: 2 REF: 081931geo NAT: G.GMD.A.3 TOP: Volume
KEY: cylinders

272 ANS:

$29.5 = 2\pi r \quad V = \frac{4}{3}\pi \cdot \left(\frac{29.5}{2\pi}\right)^3 \approx 434$

$r = \frac{29.5}{2\pi}$

PTS: 2 REF: 061831geo NAT: G.GMD.A.3 TOP: Volume
KEY: spheres

273 ANS: 1

Illinois: $\frac{12830632}{231.1} \approx 55520$ Florida: $\frac{18801310}{350.6} \approx 53626$ New York: $\frac{19378102}{411.2} \approx 47126$ Pennsylvania: $\frac{12702379}{283.9} \approx 44742$

PTS: 2 REF: 081720geo NAT: G.MG.A.2 TOP: Density

274 ANS: 3

Broome: $\frac{200536}{706.82} \approx 284$ Dutchess: $\frac{280150}{801.59} \approx 349$ Niagara: $\frac{219846}{522.95} \approx 420$ Saratoga: $\frac{200635}{811.84} \approx 247$

PTS: 2 REF: 061902geo NAT: G.MG.A.2 TOP: Density

275 ANS: 3

$V = 12 \cdot 8.5 \cdot 4 = 408$

$W = 408 \cdot 0.25 = 102$

PTS: 2 REF: 061507geo NAT: G.MG.A.2 TOP: Density

276 ANS: 1

$V = \frac{\frac{4}{3}\pi\left(\frac{10}{2}\right)^3}{2} \approx 261.8 \cdot 62.4 = 16,336$

PTS: 2 REF: 081516geo NAT: G.MG.A.2 TOP: Density

277 ANS: 2

$\frac{4}{3}\pi \cdot 4^3 + 0.075 \approx 20$

PTS: 2 REF: 011619geo NAT: G.MG.A.2 TOP: Density

278 ANS: 2

$\frac{1\text{ l}}{1.2\text{ oz}}\left(\frac{16\text{ oz}}{1\text{ lb}}\right) = \frac{13.\bar{3}\text{ l}}{\text{lb}} \quad \frac{13.\bar{3}\text{ l}}{\text{lb}}\left(\frac{1\text{ g}}{3.785\text{ l}}\right) \approx \frac{3.5\text{ g}}{1\text{ lb}}$

PTS: 2 REF: 061618geo NAT: G.MG.A.2 TOP: Density

279 ANS: 1

$$\frac{1}{2}\left(\frac{4}{3}\right)\pi \cdot 5^3 \cdot 62.4 \approx 16,336$$

PTS: 2 REF: 061620geo NAT: G.MG.A.2 TOP: Density

280 ANS: 2

$$C = \pi d \quad V = \pi\left(\frac{2.25}{\pi}\right)^2 \cdot 8 \approx 12.8916 \quad W = 12.8916 \cdot 752 \approx 9694$$

$$4.5 = \pi d$$

$$\frac{4.5}{\pi} = d$$

$$\frac{2.25}{\pi} = r$$

PTS: 2 REF: 081617geo NAT: G.MG.A.2 TOP: Density

281 ANS: 2

$$\frac{4}{3}\pi \times \left(\frac{1.68}{2}\right)^3 \times 0.6523 \approx 1.62$$

PTS: 2 REF: 081914geo NAT: G.MG.A.2 TOP: Density

282 ANS:

$\frac{137.8}{6^3} \approx 0.638$ Ash

PTS: 2 REF: 081525geo NAT: G.MG.A.2 TOP: Density

283 ANS:

$\tan 47 = \frac{x}{8.5}$ Cone: $V = \frac{1}{3}\pi(8.5)^2(9.115) \approx 689.6$ Cylinder: $V = \pi(8.5)^2(25) \approx 5674.5$ Hemisphere:

$x \approx 9.115$

$V = \frac{1}{2}\left(\frac{4}{3}\pi(8.5)^3\right) \approx 1286.3$ $689.6 + 5674.5 + 1286.3 \approx 7650$ No, because $7650 \cdot 62.4 = 477,360$

$477,360 \cdot .85 = 405,756$, which is greater than 400,000.

PTS: 6 REF: 061535geo NAT: G.MG.A.2 TOP: Density

284 ANS:

$$V = \frac{1}{3}\pi\left(\frac{3}{2}\right)^2 \cdot 8 \approx 18.85 \cdot 100 = 1885 \quad 1885 \cdot 0.52 \cdot 0.10 = 98.02 \quad 1.95(100) - (37.83 + 98.02) = 59.15$$

PTS: 6 REF: 081536geo NAT: G.MG.A.2 TOP: Density

285 ANS:

$$V=\pi(10)^2(18)=1800\pi\ \text{in}^3\quad 1800\pi\ \text{in}^3\left(\frac{1\ \text{ft}^3}{12^3\ \text{in}^3}\right)=\frac{25}{24}\pi\ \text{ft}^3\quad \frac{25}{24}\pi(95.46)(0.85)\approx 266\quad 266+270=536$$

PTS: 4 REF: 061834geo NAT: G.MG.A.2 TOP: Density

286 ANS:

$$V=\frac{1}{3}\pi\left(\frac{8.3}{2}\right)^2(10.2)+\frac{1}{2}\cdot\frac{4}{3}\pi\left(\frac{8.3}{2}\right)^3\approx 183.961+149.693\approx 333.65\ \text{cm}^3\quad 333.65\times 50=16682.7\ \text{cm}^3$$

$16682.7\times 0.697=11627.8\ \text{g}\quad 11.6278\times 3.83=\$44.53$

PTS: 6 REF: 081636geo NAT: G.MG.A.2 TOP: Density

287 ANS:

$$\frac{40000}{\pi\left(\frac{51}{2}\right)^2}\approx 19.6\quad \frac{72000}{\pi\left(\frac{75}{2}\right)^2}\approx 16.3\ \ \text{Dish } A$$

PTS: 2 REF: 011630geo NAT: G.MG.A.2 TOP: Density

288 ANS:

$$r=25\ \text{cm}\left(\frac{1\ \text{m}}{100\ \text{cm}}\right)=0.25\ \text{m}\quad V=\pi(0.25\ \text{m})^2(10\ \text{m})=0.625\pi\ \text{m}^3\quad W=0.625\pi\ \text{m}^3\left(\frac{380\ \text{K}}{1\ \text{m}^3}\right)\approx 746.1\ K$$

$$n=\frac{\$50,000}{\left(\frac{\$4.75}{\text{K}}\right)(746.1\ \text{K})}=14.1\quad 15\ \text{trees}$$

PTS: 4 REF: spr1412geo NAT: G.MG.A.2 TOP: Density

289 ANS:

No, the weight of the bricks is greater than 900 kg. $500\times(5.1\ \text{cm}\times 10.2\ \text{cm}\times 20.3\ \text{cm})=528,003\ \text{cm}^3$.

$$528,003\ \text{cm}^3\times\frac{1\ \text{m}^3}{1000000\ \text{cm}^3}=0.528003\ \text{m}^3.\quad \frac{1920\ \text{kg}}{\text{m}^3}\times 0.528003\ \text{m}^3\approx 1013\ \text{kg}.$$

PTS: 2 REF: fall1406geo NAT: G.MG.A.2 TOP: Density

290 ANS:

C: $V=\pi(26.7)^2(750)-\pi(24.2)^2(750)=95,437.5\pi$

$$95,437.5\pi\ \text{cm}^3\left(\frac{2.7\ \text{g}}{\text{cm}^3}\right)\left(\frac{1\ \text{kg}}{1000\ \text{g}}\right)\left(\frac{\$0.38}{\text{kg}}\right)=\$307.62$$

P: $V=40^2(750)-35^2(750)=281,250$ $\quad\quad \$307.62-288.56=\$19.06$

$$281,250\ \text{cm}^3\left(\frac{2.7\ \text{g}}{\text{cm}^3}\right)\left(\frac{1\ \text{kg}}{1000\ \text{g}}\right)\left(\frac{\$0.38}{\text{kg}}\right)=\$288.56$$

PTS: 6 REF: 011736geo NAT: G.MG.A.2 TOP: Density

291 ANS:
$500 \times 1015\ \text{cc} \times \frac{\$0.29}{\text{kg}} \times \frac{7.95\ \text{g}}{\text{cc}} \times \frac{1\ \text{kg}}{1000\ \text{g}} = \$1170$

PTS: 2 REF: 011829geo NAT: G.MG.A.2 TOP: Density

292 ANS:
$\frac{4\pi}{3}(2^3 - 1.5^3) \approx 19.4 \quad 19.4 \cdot 1.308 \cdot 8 \approx 203$

PTS: 4 REF: 081834geo NAT: G.MG.A.2 TOP: Density

293 ANS: 1 PTS: 2 REF: 061518geo NAT: G.SRT.A.1
TOP: Line Dilations

294 ANS: 2 PTS: 2 REF: 081901geo NAT: G.SRT.A.1
TOP: Line Dilations

295 ANS: 1
B: $(4-3, 3-4) \rightarrow (1,-1) \rightarrow (2,-2) \rightarrow (2+3, -2+4)$

C: $(2-3, 1-4) \rightarrow (-1,-3) \rightarrow (-2,-6) \rightarrow (-2+3, -6+4)$

PTS: 2 REF: 011713geo NAT: G.SRT.A.1 TOP: Line Dilations

296 ANS: 2
The given line h, $2x + y = 1$, does not pass through the center of dilation, the origin, because the y-intercept is at $(0,1)$. The slope of the dilated line, m, will remain the same as the slope of line h, -2. All points on line h, such as $(0,1)$, the y-intercept, are dilated by a scale factor of 4; therefore, the y-intercept of the dilated line is $(0,4)$ because the center of dilation is the origin, resulting in the dilated line represented by the equation $y = -2x + 4$.

PTS: 2 REF: spr1403geo NAT: G.SRT.A.1 TOP: Line Dilations

297 ANS: 2
The line $y = 2x - 4$ does not pass through the center of dilation, so the dilated line will be distinct from $y = 2x - 4$. Since a dilation preserves parallelism, the line $y = 2x - 4$ and its image will be parallel, with slopes of 2. To obtain the y-intercept of the dilated line, the scale factor of the dilation, $\frac{3}{2}$, can be applied to the y-intercept, $(0,-4)$. Therefore, $\left(0 \cdot \frac{3}{2}, -4 \cdot \frac{3}{2}\right) \rightarrow (0,-6)$. So the equation of the dilated line is $y = 2x - 6$.

PTS: 2 REF: fall1403geo NAT: G.SRT.A.1 TOP: Line Dilations

298 ANS: 4
The line $y = 3x - 1$ passes through the center of dilation, so the dilated line is not distinct.

PTS: 2 REF: 081524geo NAT: G.SRT.A.1 TOP: Line Dilations

299 ANS: 4
$3 \times 6 = 18$

PTS: 2 REF: 061602geo NAT: G.SRT.A.1 TOP: Line Dilations

300 ANS: 4

$\sqrt{(32-8)^2+(28--4)^2}=\sqrt{576+1024}=\sqrt{1600}=40$

PTS: 2 REF: 081621geo NAT: G.SRT.A.1 TOP: Line Dilations

301 ANS: 2

The line $y=-3x+6$ passes through the center of dilation, so the dilated line is not distinct.

PTS: 2 REF: 061824geo NAT: G.SRT.A.1 TOP: Line Dilations

302 ANS: 4

$\frac{18}{4.5}=4$

PTS: 2 REF: 011901geo NAT: G.SRT.A.1 TOP: Line Dilations

303 ANS: 4

The line $y=\frac{3}{2}x-4$ does not pass through the center of dilation, so the dilated line will be distinct from $y=\frac{3}{2}x-4$. Since a dilation preserves parallelism, the line $y=\frac{3}{2}x-4$ and its image will be parallel, with slopes of $\frac{3}{2}$. To obtain the y-intercept of the dilated line, the scale factor of the dilation, $\frac{3}{4}$, can be applied to the y-intercept, $(0,-4)$. Therefore, $\left(0\cdot\frac{3}{4},-4\cdot\frac{3}{4}\right)\rightarrow(0,-3)$. So the equation of the dilated line is $y=\frac{3}{2}x-3$.

PTS: 2 REF: 011924geo NAT: G.SRT.A.1 TOP: Line Dilations

304 ANS: 1

$\frac{9}{6}=\frac{3}{2}$

PTS: 2 REF: 061905geo NAT: G.SRT.A.1 TOP: Line Dilations

305 ANS: 1

The line $3y=-2x+8$ does not pass through the center of dilation, so the dilated line will be distinct from $3y=-2x+8$. Since a dilation preserves parallelism, the line $3y=-2x+8$ and its image $2x+3y=5$ are parallel, with slopes of $-\frac{2}{3}$.

PTS: 2 REF: 061522geo NAT: G.SRT.A.1 TOP: Line Dilations

306 ANS: 2 PTS: 2 REF: 011610geo NAT: G.SRT.A.1 TOP: Line Dilations

307 ANS: 3 PTS: 2 REF: 061706geo NAT: G.SRT.A.1 TOP: Line Dilations

308 ANS: 1

Since a dilation preserves parallelism, the line $4y=3x+7$ and its image $3x-4y=9$ are parallel, with slopes of $\frac{3}{4}$.

PTS: 2 REF: 081710geo NAT: G.SRT.A.1 TOP: Line Dilations

309 ANS: 1 PTS: 2 REF: 011814geo NAT: G.SRT.A.1
TOP: Line Dilations

310 ANS: 2

The slope of $-3x+4y=8$ is $\frac{3}{4}$.

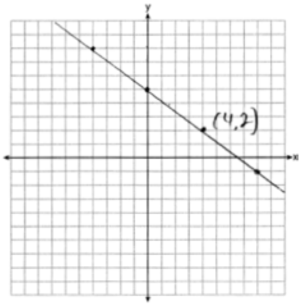
PTS: 2 REF: 061907geo NAT: G.SRT.A.1 TOP: Line Dilations

311 ANS: 1

A dilation by a scale factor of 4 centered at the origin preserves parallelism and $(0,-2) \rightarrow (0,-8)$.

PTS: 2 REF: 081910geo NAT: G.SRT.A.1 TOP: Line Dilations

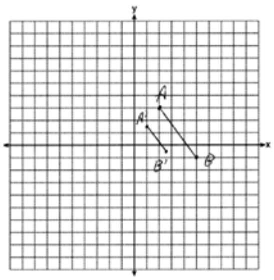
312 ANS:



The line is on the center of dilation, so the line does not change. $p: 3x+4y=20$

PTS: 2 REF: 061731geo NAT: G.SRT.A.1 TOP: Line Dilations

313 ANS:



$\sqrt{(2.5-1)^2+(-.5-1.5)^2} = \sqrt{2.25+4} = 2.5$

PTS: 2 REF: 081729geo NAT: G.SRT.A.1 TOP: Line Dilations

314 ANS:

No, The line $4x+3y=24$ passes through the center of dilation, so the dilated line is not distinct.

$$4x+3y=24$$
$$3y=-4x+24$$
$$y=-\frac{4}{3}x+8$$

PTS: 2 REF: 081830geo NAT: G.SRT.A.1 TOP: Line Dilations

315 ANS:

$\ell: y = 3x - 4$

$m: y = 3x - 8$

PTS: 2 REF: 011631geo NAT: G.SRT.A.1 TOP: Line Dilations

316 ANS: 1 PTS: 2 REF: 081605geo NAT: G.CO.A.5
TOP: Rotations KEY: grids

317 ANS:

$ABC -$ point of reflection $\rightarrow (-y,x) +$ point of reflection

$A(2,-3) - (2,-3) = (0,0) \rightarrow (0,0) + (2,-3) = A'(2,-3)$

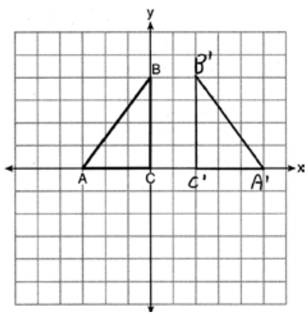
$B(6,-8) - (2,-3) = (4,-5) \rightarrow (5,4) + (2,-3) = B'(7,1)$

$C(2,-9) - (2,-3) = (0,-6) \rightarrow (6,0) + (2,-3) = C'(8,-3)$

$\triangle DEF \cong \triangle A'B'C'$ because $\triangle DEF$ is a reflection of $\triangle A'B'C'$ and reflections preserve distance.

PTS: 4 REF: 081633geo NAT: G.CO.A.5 TOP: Rotations
KEY: grids

318 ANS:



PTS: 2 REF: 011625geo NAT: G.CO.A.5 TOP: Reflections
KEY: grids

319 ANS: 4 PTS: 2 REF: 081506geo NAT: G.SRT.A.2
TOP: Dilations

320 ANS: 1

$\frac{4}{6} = \frac{3}{4.5} = \frac{2}{3}$

PTS: 2 REF: 081523geo NAT: G.SRT.A.2 TOP: Dilations

321 ANS: 4

$9 \cdot 3 = 27,\ 27 \cdot 4 = 108$

PTS: 2 REF: 061805geo NAT: G.SRT.A.2 TOP: Dilations

322 ANS: 3

$6 \cdot 3^2 = 54 \quad 12 \cdot 3 = 36$

PTS: 2 REF: 081823geo NAT: G.SRT.A.2 TOP: Dilations

323 ANS: 2 PTS: 2 REF: 061516geo NAT: G.SRT.A.2
TOP: Dilations

324 ANS: 1
$3^2 = 9$

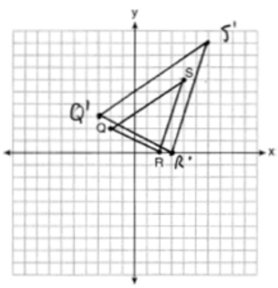
PTS: 2 REF: 081520geo NAT: G.SRT.A.2 TOP: Dilations

325 ANS: 1 PTS: 2 REF: 011811geo NAT: G.SRT.A.2
TOP: Dilations

326 ANS:
A dilation of 3 centered at *A*. A dilation preserves angle measure, so the triangles are similar.

PTS: 4 REF: 011832geo NAT: G.SRT.A.2 TOP: Dilations

327 ANS:



A dilation preserves slope, so the slopes of $\overline{QR}$ and $\overline{Q'R'}$ are equal. Because the slopes are equal, $Q'R' \parallel QR$.

PTS: 4 REF: 011732geo NAT: G.SRT.A.2 TOP: Dilations
KEY: grids

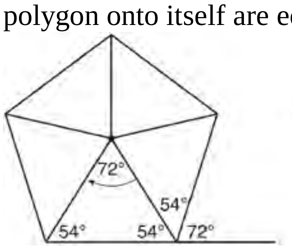
328 ANS:
$A(-2,1) \rightarrow (-3,-1) \rightarrow (-6,-2) \rightarrow (-5,0)$, $B(0,5) \rightarrow (-1,3) \rightarrow (-2,6) \rightarrow (-1,8)$,
$C(4,-1) \rightarrow (3,-3) \rightarrow (6,-6) \rightarrow (7,-4)$

PTS: 2 REF: 061826geo NAT: G.SRT.A.2 TOP: Dilations

329 ANS:
No, because dilations do not preserve distance.

PTS: 2 REF: 061925geo NAT: G.SRT.A.2 TOP: Dilations

330 ANS: 2
Segments drawn from the center of the regular pentagon bisect each angle of the pentagon, and create five isosceles triangles as shown in the diagram below. Since each exterior angle equals the angles formed by the segments drawn from the center of the regular pentagon, the minimum degrees necessary to carry a regular polygon onto itself are equal to the measure of an exterior angle of the regular polygon.



$\frac{360}{5} = 72.$

PTS: 2 REF: spr1402geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

331 ANS: 1 PTS: 2 REF: 081505geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

332 ANS: 3
The x-axis and line $x = 4$ are lines of symmetry and (4,0) is a point of symmetry.

PTS: 2 REF: 081706geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

333 ANS: 3
$\frac{360°}{5} = 72°$ 216° is a multiple of 72°

PTS: 2 REF: 061819geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

334 ANS: 3 PTS: 2 REF: 011904geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

335 ANS: 4 PTS: 2 REF: 061904geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

336 ANS: 3 PTS: 2 REF: 081817geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

337 ANS: 4 PTS: 2 REF: 081923geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

338 ANS: 1
$\frac{360°}{45°} = 8$

PTS: 2 REF: 061510geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

339 ANS: 4
$\frac{360°}{10} = 36°$ 252° is a multiple of 36°

PTS: 2 REF: 011717geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

340 ANS: 1 PTS: 2 REF: 061707geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

341 ANS: 4
$\frac{360°}{10} = 36°$ 252° is a multiple of 36°

PTS: 2 REF: 081722geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

342 ANS: 3 PTS: 2 REF: 011815geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

343 ANS:
$\frac{360}{6} = 60$

PTS: 2 REF: 081627geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

344 ANS: 4 PTS: 2 REF: 061504geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

345 ANS: 1 PTS: 2 REF: 081507geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

346 ANS: 1 PTS: 2 REF: 011608geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

347 ANS: 3 PTS: 2 REF: 011710geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

348 ANS: 2 PTS: 2 REF: 061701geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

349 ANS: 3 PTS: 2 REF: 011903geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

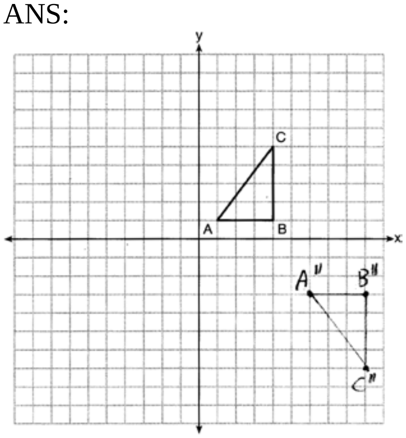
350 ANS: 4 PTS: 2 REF: 061901geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

351 ANS: 2 PTS: 2 REF: 081909geo NAT: G.CO.A.5
TOP: Compositions of Transformations KEY: identify

352 ANS:
$T_{6,0} \circ r_{x\text{-axis}}$

PTS: 2 REF: 061625geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

353 ANS:



PTS: 2 REF: 081626geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: grids

354 ANS:
$T_{0,-2} \circ r_{y\text{-axis}}$

PTS: 2 REF: 011726geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

355 ANS:
Rotate $\triangle ABC$ clockwise about point C until $\overline{DF} \parallel \overline{AC}$. Translate $\triangle ABC$ along $\overline{CF}$ so that C maps onto F.

PTS: 2 REF: 061730geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

356 ANS:
R_{180° about $\left(-\frac{1}{2},\frac{1}{2}\right)$

PTS: 2 REF: 081727geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

357 ANS:
Reflection across the *y*-axis, then translation up 5.

PTS: 2 REF: 061827geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

358 ANS:
rotation 180º about the origin, translation 2 units down; rotation 180º about *B*, translation 6 units down and 6 units left; or reflection over *x*-axis, translation 2 units down, reflection over *y*-axis

PTS: 2 REF: 081828geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

359 ANS:
$R_{(-5,2),90^\circ} \circ T_{-3,1} \circ r_{\text{x-axis}}$

PTS: 2 REF: 011928geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

360 ANS:
R_{90° or $T_{2,-6} \circ R_{(-4,2),90^\circ}$ or $R_{270^\circ} \circ r_{\text{x-axis}} \circ r_{y\text{-axis}}$

PTS: 2 REF: 061929geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

361 ANS:
$r_{y=2} \circ r_{y\text{-axis}}$

PTS: 2 REF: 081927geo NAT: G.CO.A.5 TOP: Compositions of Transformations
KEY: identify

362 ANS: 4 PTS: 2 REF: 061608geo NAT: G.SRT.A.2
TOP: Compositions of Transformations KEY: grids

363 ANS: 4 PTS: 2 REF: 081514geo NAT: G.SRT.A.2
TOP: Compositions of Transformations KEY: grids

364 ANS: 4 PTS: 2 REF: 081609geo NAT: G.SRT.A.2
TOP: Compositions of Transformations KEY: grids

365 ANS: 2 PTS: 2 REF: 011702geo NAT: G.SRT.A.2
TOP: Compositions of Transformations KEY: grids

366 ANS: 1
NYSED accepts either (1) or (3) as a correct answer. Statement III is not true if *A*, *B*, *A'* and *B'* are collinear.

PTS: 2 REF: 061714geo NAT: G.SRT.A.2 TOP: Compositions of Transformations
KEY: basic

367 ANS: 1 PTS: 2 REF: 081804geo NAT: G.SRT.A.2
TOP: Compositions of Transformations KEY: grids

368 ANS:
Triangle $X'Y'Z'$ is the image of $\triangle XYZ$ after a rotation about point Z such that $\overline{ZX}$ coincides with $\overline{ZU}$. Since rotations preserve angle measure, $\overline{ZY}$ coincides with $\overline{ZV}$, and corresponding angles X and Y, after the rotation, remain congruent, so $\overline{XY} \parallel \overline{UV}$. Then, dilate $\triangle X'Y'Z'$ by a scale factor of $\frac{ZU}{ZX}$ with its center at point Z. Since dilations preserve parallelism, $\overline{XY}$ maps onto $\overline{UV}$. Therefore, $\triangle XYZ \sim \triangle UVZ$.

PTS: 2 REF: spr1406geo NAT: G.SRT.A.2 TOP: Compositions of Transformations
KEY: grids

369 ANS: 4
$2x - 1 = 16$

$x = 8.5$

PTS: 2 REF: 011902geo NAT: G.CO.B.6 TOP: Properties of Transformations
KEY: graphics

370 ANS: 4
The measures of the angles of a triangle remain the same after all rotations because rotations are rigid motions which preserve angle measure.

PTS: 2 REF: fall1402geo NAT: G.CO.B.6 TOP: Properties of Transformations
KEY: graphics

371 ANS: 1
$360 - (82 + 104 + 121) = 53$

PTS: 2 REF: 011801geo NAT: G.CO.B.6 TOP: Properties of Transformations
KEY: graph

372 ANS: 4 PTS: 2 REF: 011611geo NAT: G.CO.B.6
TOP: Properties of Transformations KEY: graphics

373 ANS: 1 PTS: 2 REF: 061801geo NAT: G.CO.B.6
TOP: Properties of Transformations KEY: graphics

374 ANS: 1
Distance and angle measure are preserved after a reflection and translation.

PTS: 2 REF: 081802geo NAT: G.CO.B.6 TOP: Properties of Transformations
KEY: basic

375 ANS:
$M = 180 - (47 + 57) = 76$ Rotations do not change angle measurements.

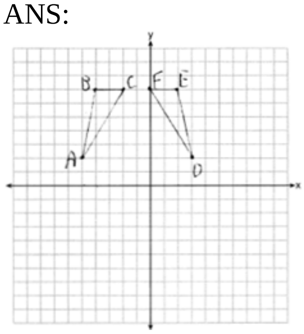
PTS: 2 REF: 081629geo NAT: G.CO.B.6 TOP: Properties of Transformations

376 ANS:
Yes, as translations do not change angle measurements.

PTS: 2 REF: 061825geo NAT: G.CO.B.6 TOP: Properties of Transformations
KEY: basic

377 ANS: 2 PTS: 2 REF: 081513geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: graphics

378 ANS: 1 PTS: 2 REF: 061604geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: graphics
379 ANS: 3 PTS: 2 REF: 061616geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: graphics
380 ANS: 4 PTS: 2 REF: 061803geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: graphics
381 ANS: 4 PTS: 2 REF: 011803geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: graphics
382 ANS: 4 PTS: 2 REF: 061502geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: basic
383 ANS: 2 PTS: 2 REF: 081602geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: basic
384 ANS: 3 PTS: 2 REF: 081502geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: basic
385 ANS: 4 PTS: 2 REF: 011706geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: basic
386 ANS: 4 PTS: 2 REF: 081702geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: basic
387 ANS:



$r_{x=-1}$ Reflections are rigid motions that preserve distance, so $\triangle ABC \cong \triangle DEF$.

PTS: 4 REF: 061732geo NAT: G.CO.A.2 TOP: Identifying Transformations
KEY: graphics
388 ANS: 3 PTS: 2 REF: 011605geo NAT: G.CO.A.2
TOP: Analytical Representations of Transformations KEY: basic
389 ANS: 4 PTS: 2 REF: 011808geo NAT: G.CO.A.2
TOP: Analytical Representations of Transformations KEY: basic
390 ANS: 4

$\frac{7}{12} \cdot 30 = 17.5$

PTS: 2 REF: 061521geo NAT: G.SRT.B.5 TOP: Similarity
KEY: perimeter and area
391 ANS: 1

$\frac{6}{8} = \frac{9}{12}$

PTS: 2 REF: 011613geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

392 ANS: 3

$12^2 = 9 \cdot GM$ $IM^2 = 16 \cdot 25$

$GM = 16$ $IM = 20$

PTS: 2 REF: 011910geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

393 ANS: 3

$\frac{12}{4} = \frac{x}{5}$ $15 - 4 = 11$

$x = 15$

PTS: 2 REF: 011624geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

394 ANS: 2

$h^2 = 30 \cdot 12$

$h^2 = 360$

$h = 6\sqrt{10}$

PTS: 2 REF: 061613geo NAT: G.SRT.B.5 TOP: Similarity
KEY: altitude

395 ANS: 2

$x^2 = 4 \cdot 10$

$x = \sqrt{40}$

$x = 2\sqrt{10}$

PTS: 2 REF: 081610geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

396 ANS: 3

$\frac{x}{10} = \frac{6}{4}$ $\overline{CD} = 15 - 4 = 11$

$x = 15$

PTS: 2 REF: 081612geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

397 ANS: 4

$\frac{6.6}{x} = \frac{4.2}{5.25}$

$4.2x = 34.65$

$x = 8.25$

PTS: 2 REF: 081705geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

398 ANS: 2

$$x^2 = 12(12-8)$$
$$x^2 = 48$$
$$x = 4\sqrt{3}$$

PTS: 2 REF: 011823geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

399 ANS: 3

$\triangle CFB \sim \triangle CAD$ $\quad \dfrac{CB}{CF} = \dfrac{CD}{CA}$

$$\frac{x}{21.6} = \frac{7.2}{9.6}$$
$$x = 16.2$$

PTS: 2 REF: 061804geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

400 ANS: 3

$$x(x-6) = 4^2$$
$$x^2 - 6x - 16 = 0$$
$$(x-8)(x+2) = 0$$
$$x = 8$$

PTS: 2 REF: 081807geo NAT: G.SRT.B.5 TOP: Similarity
KEY: altitude

401 ANS: 2

$$\frac{4}{x} = \frac{6}{9}$$
$$x = 6$$

PTS: 2 REF: 061915geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

402 ANS: 3

$$\frac{10}{x} = \frac{15}{12}$$
$$x = 8$$

PTS: 2 REF: 081918geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

403 ANS: 3

$$\frac{AB}{BC}=\frac{DE}{EF}$$

$$\frac{9}{15}=\frac{6}{10}$$

$$90=90$$

PTS: 2 REF: 061515geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

404 ANS: 2 PTS: 2 REF: 081519geo NAT: G.SRT.B.5
TOP: Similarity KEY: basic

405 ANS: 2

$$\sqrt{3\cdot 21}=\sqrt{63}=3\sqrt{7}$$

PTS: 2 REF: 011622geo NAT: G.SRT.B.5 TOP: Similarity
KEY: altitude

406 ANS: 3

1) $\frac{12}{9}=\frac{4}{3}$ 2) AA 3) $\frac{32}{16}\neq\frac{8}{2}$ 4) SAS

PTS: 2 REF: 061605geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

407 ANS: 2

(1) AA; (3) SAS; (4) SSS. NYSED has stated that all students should be awarded credit regardless of their answer to this question.

PTS: 2 REF: 061724geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

408 ANS: 2

$$12^2=9\cdot 16$$

$$144=144$$

PTS: 2 REF: 081718geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

409 ANS: 4 PTS: 2 REF: 011817geo NAT: G.SRT.B.5
TOP: Similarity KEY: basic

410 ANS: 2

$\triangle ACB\sim\triangle AED$

PTS: 2 REF: 061811geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

411 ANS: 2

$\overline{AB} = 10$ since $\triangle ABC$ is a 6-8-10 triangle. $6^2 = 10x$

$3.6 = x$

PTS: 2 REF: 081820geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

412 ANS: 1 PTS: 2 REF: 081916geo NAT: G.SRT.B.5
TOP: Similarity KEY: leg

413 ANS: 1

$\triangle ABC \sim \triangle RST$

PTS: 2 REF: 011908geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

414 ANS: 4

$\frac{1}{2} = \frac{x+3}{3x-1}$ $GR = 3(7) - 1 = 20$

$3x - 1 = 2x + 6$

$x = 7$

PTS: 2 REF: 011620geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

415 ANS: 1

$24x = 10^2$

$24x = 100$

$x \approx 4.2$

PTS: 2 REF: 061823geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

416 ANS: 2

$18^2 = 12(x + 12)$

$324 = 12(x + 12)$

$27 = x + 12$

$x = 15$

PTS: 2 REF: 081920geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

417 ANS:

$x = \sqrt{.55^2 - .25^2} \cong 0.49$ No, $.49^2 = .25y$ $.9604 + .25 < 1.5$

$.9604 = y$

PTS: 4 REF: 061534geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

418 ANS:

$$\frac{120}{230} = \frac{x}{315}$$

$$x = 164$$

PTS: 2 REF: 081527geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

419 ANS:

$$\frac{6}{14} = \frac{9}{21} \quad \text{SAS}$$

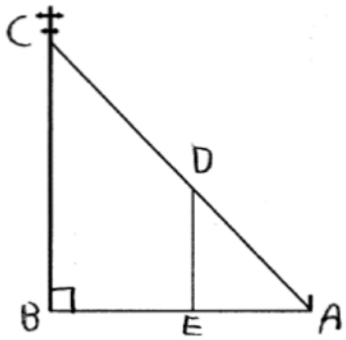
$$126 = 126$$

PTS: 2 REF: 081529geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

420 ANS:
If an altitude is drawn to the hypotenuse of a triangle, it divides the triangle into two right triangles similar to each other and the original triangle.

PTS: 2 REF: 061729geo NAT: G.SRT.B.5 TOP: Similarity
KEY: altitude

421 ANS:



$\triangle ABC \sim \triangle AED$ by AA. $\angle DAE \cong \angle CAB$ because they are the same $\angle$. $\angle DEA \cong \angle CBA$ because they are both right $\angle$s.

PTS: 2 REF: 081829geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

422 ANS:

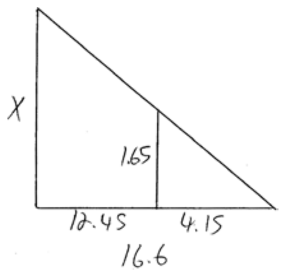
$$17x = 15^2$$

$$17x = 225$$

$$x \approx 13.2$$

PTS: 2 REF: 061930geo NAT: G.SRT.B.5 TOP: Similarity
KEY: leg

423 ANS:



$$\frac{1.65}{4.15} = \frac{x}{16.6}$$
$$4.15x = 27.39$$
$$x = 6.6$$

PTS: 2 REF: 061531geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

424 ANS:

$$\frac{16}{9} = \frac{x}{20.6} \quad D = \sqrt{36.6^2 + 20.6^2} \approx 42$$
$$x \approx 36.6$$

PTS: 4 REF: 011632geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

425 ANS: 4 PTS: 2 REF: 061615geo NAT: G.SRT.C.6
TOP: Trigonometric Ratios

Geometry Regents Exam Questions by State Standard: Topic
Answer Section

426 ANS: 3 PTS: 2 REF: 011714geo NAT: G.SRT.C.6
TOP: Trigonometric Ratios
427 ANS: 4 PTS: 2 REF: 061512geo NAT: G.SRT.C.7
TOP: Cofunctions
428 ANS: 1 PTS: 2 REF: 081919geo NAT: G.SRT.C.7
TOP: Cofunctions
429 ANS: 1 PTS: 2 REF: 081606geo NAT: G.SRT.C.7
TOP: Cofunctions
430 ANS: 4

$$\begin{aligned} 40 - x + 3x &= 90 \\ 2x &= 50 \\ x &= 25 \end{aligned}$$

PTS: 2 REF: 081721geo NAT: G.SRT.C.7 TOP: Cofunctions
431 ANS: 1

$$\begin{aligned} 2x + 4 + 46 &= 90 \\ 2x &= 40 \\ x &= 20 \end{aligned}$$

PTS: 2 REF: 061808geo NAT: G.SRT.C.7 TOP: Cofunctions
432 ANS: 2

$$\begin{aligned} 2x + 7 + 4x - 7 &= 90 \\ 6x &= 90 \\ x &= 15 \end{aligned}$$

PTS: 2 REF: 081824geo NAT: G.SRT.C.7 TOP: Cofunctions
433 ANS: 1 PTS: 2 REF: 081504geo NAT: G.SRT.C.7
TOP: Cofunctions
434 ANS: 4 PTS: 2 REF: 011609geo NAT: G.SRT.C.7
TOP: Cofunctions
435 ANS: 3 PTS: 2 REF: 061703geo NAT: G.SRT.C.7
TOP: Cofunctions
436 ANS: 1 PTS: 2 REF: 011922geo NAT: G.SRT.C.7
TOP: Cofunctions
437 ANS: 2

$$90 - 57 = 33$$

PTS: 2 REF: 061909geo NAT: G.SRT.C.7 TOP: Cofunctions

438 ANS:
Yes, because 28º and 62º angles are complementary. The sine of an angle equals the cosine of its complement.

PTS: 2 REF: 011727geo NAT: G.SRT.C.7 TOP: Cofunctions

439 ANS:
The acute angles in a right triangle are always complementary. The sine of any acute angle is equal to the cosine of its complement.

PTS: 2 REF: spr1407geo NAT: G.SRT.C.7 TOP: Cofunctions

440 ANS:
$4x - .07 = 2x + .01$ Sin$A$ is the ratio of the opposite side and the hypotenuse while $\cos B$ is the ratio of the adjacent

$2x = 0.8$

$x = 0.4$

side and the hypotenuse. The side opposite angle A is the same side as the side adjacent to angle B. Therefore, $\sin A = \cos B$.

PTS: 2 REF: fall1407geo NAT: G.SRT.C.7 TOP: Cofunctions

441 ANS:
$73 + R = 90$ Equal cofunctions are complementary.

$R = 17$

PTS: 2 REF: 061628geo NAT: G.SRT.C.7 TOP: Cofunctions

442 ANS:
$\cos B$ increases because $\angle A$ and $\angle B$ are complementary and $\sin A = \cos B$.

PTS: 2 REF: 011827geo NAT: G.SRT.C.7 TOP: Cofunctions

443 ANS: 2

$$\tan\theta = \frac{2.4}{x}$$

$$\frac{3}{7} = \frac{2.4}{x}$$

$$x = 5.6$$

PTS: 2 REF: 011707geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

444 ANS: 3

$$\cos 40 = \frac{14}{x}$$

$$x \approx 18$$

PTS: 2 REF: 011712geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

445 ANS: 3

$\tan 34 = \frac{T}{20}$

$T \approx 13.5$

PTS: 2 REF: 061505geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: graphics

446 ANS: 1

$\sin 32 = \frac{O}{129.5}$

$O \approx 68.6$

PTS: 2 REF: 011804geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

447 ANS: 4

$\sin 16.5 = \frac{8}{x}$

$x \approx 28.2$

PTS: 2 REF: 081806ai NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

448 ANS: 4

$\sin 70 = \frac{x}{20}$

$x \approx 18.8$

PTS: 2 REF: 061611geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: without graphics

449 ANS: 4

$\sin 71 = \frac{x}{20}$

$x = 20\sin 71 \approx 19$

PTS: 2 REF: 061721geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: without graphics

450 ANS: 1

$\sin 32 = \frac{x}{6.2}$

$x \approx 3.3$

PTS: 2 REF: 081719geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

451 ANS: 2

$\tan 11.87 = \dfrac{x}{0.5(5280)}$

$x \approx 555$

PTS: 2 REF: 011913geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

452 ANS: 2

$\tan 36 = \dfrac{x}{8}$ $5.8 + 1.5 \approx 7$

$x \approx 5.8$

PTS: 2 REF: 081915geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

453 ANS: 1

$\cos 65 = \dfrac{x}{15}$

$x \approx 6.3$

PTS: 2 REF: 081924geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

454 ANS:

x represents the distance between the lighthouse and the canoe at 5:00; *y* represents the distance between the lighthouse and the canoe at 5:05. $\tan 6 = \dfrac{112 - 1.5}{x}$ $\tan(49 + 6) = \dfrac{112 - 1.5}{y}$ $\dfrac{1051.3 - 77.4}{5} \approx 195$

$x \approx 1051.3$ $y \approx 77.4$

PTS: 4 REF: spr1409geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

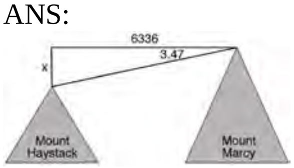
455 ANS:

$\sin 4.76 = \dfrac{1.5}{x}$ $\tan 4.76 = \dfrac{1.5}{x}$ $18 - \dfrac{16}{12} \approx 16.7$

$x \approx 18.1$ $x \approx 18$

PTS: 4 REF: 011934geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

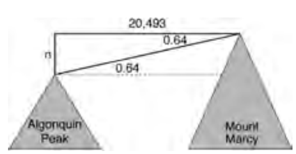
456 ANS:



$\tan 3.47 = \dfrac{M}{6336}$

$M \approx 384$

$4960 + 384 = 5344$



$\tan 0.64 = \dfrac{A}{20,493}$

$A \approx 229$

$5344 - 229 = 5115$

PTS: 6 REF: fall1413geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

457 ANS:

$\tan 7 = \frac{125}{x}$ $\tan 16 = \frac{125}{y}$ $1018 - 436 \approx 582$

$x \approx 1018$ $y \approx 436$

PTS: 4 REF: 081532geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

458 ANS:

$\sin 70 = \frac{30}{L}$

$L \approx 32$

PTS: 2 REF: 011629geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: graphics

459 ANS:

$\tan 52.8 = \frac{h}{x}$

$h = x\tan 52.8$

$\tan 34.9 = \frac{h}{x+8}$

$h = (x+8)\tan 34.9$

$x\tan 52.8 = x\tan 34.9 + 8\tan 34.9$

$x\tan 52.8 - x\tan 34.9 = 8\tan 34.9$

$x(\tan 52.8 - \tan 34.9) = 8\tan 34.9$

$x = \frac{8\tan 34.9}{\tan 52.8 - \tan 34.9}$

$x \approx 9$

$\tan 52.8 \approx \frac{h}{9}$

$x \approx 11.86$

$11.86 + 1.7 \approx 13.6$

PTS: 6 REF: 011636geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

460 ANS:

$\sin 75 = \frac{15}{x}$

$x = \frac{15}{\sin 75}$

$x \approx 15.5$

PTS: 2 REF: 081631geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: graphics

461 ANS:

$\cos 54 = \frac{4.5}{m}$ $\tan 54 = \frac{h}{4.5}$

$m \approx 7.7$ $h \approx 6.2$

PTS: 4 REF: 011834geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

462 ANS:

$$\tan 30 = \frac{y}{440} \quad \tan 38.8 = \frac{h}{440} \quad 353.8 - 254 \approx 100$$

$$y \approx 254 \qquad h \approx 353.8$$

PTS: 4 REF: 061934geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

463 ANS:

$$\tan 72 = \frac{x}{400} \qquad \sin 55 = \frac{400\tan 72}{y}$$

$$x = 400\tan 72 \qquad y = \frac{400\tan 72}{\sin 55} \approx 1503$$

PTS: 4 REF: 061833geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

464 ANS:

$$\tan 36 = \frac{x}{10} \quad \cos 36 = \frac{10}{y} \quad 12.3607 \times 3 \approx 37$$

$$x \approx 7.3 \quad y \approx 12.3607$$

PTS: 4 REF: 081833geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

465 ANS:

$$\tan 15 = \frac{6250}{x} \qquad \tan 52 = \frac{6250}{y} \quad 23325.3 - 4883 = 18442 \quad \frac{18442 \text{ ft}}{1 \text{ min}}\left(\frac{1 \text{ mi}}{5280 \text{ ft}}\right)\left(\frac{60 \text{ min}}{1 \text{ h}}\right) \approx 210$$

$$x \approx 23325.3 \qquad y \approx 4883$$

PTS: 6 REF: 061736geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side
KEY: advanced

466 ANS:

$$\cos 68 = \frac{10}{x}$$

$$x \approx 27$$

PTS: 2 REF: 061927geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

467 ANS: 3

$$\cos A = \frac{9}{14}$$

$$A \approx 50°$$

PTS: 2 REF: 011616geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

468 ANS: 1

$\cos S = \frac{60}{65}$

$S \approx 23$

PTS: 2 REF: 061713geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

469 ANS: 1

$\tan x = \frac{1}{12}$

$x \approx 4.76$

PTS: 2 REF: 081715geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

470 ANS: 1

$\cos x = \frac{12}{13}$

$x \approx 23$

PTS: 2 REF: 081809ai NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

471 ANS: 4

$\tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{15}{8}$

PTS: 2 REF: 011917geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

472 ANS: 1

The man’s height, 69 inches, is opposite to the angle of elevation, and the shadow length, 102 inches, is adjacent to the angle of elevation. Therefore, tangent must be used to find the angle of elevation. $\tan x = \frac{69}{102}$

$x \approx 34.1$

PTS: 2 REF: fall1401geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

473 ANS: 2

$\cos B = \frac{17.6}{26}$

$B \approx 47$

PTS: 2 REF: 061806geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

474 ANS: 4

$\sin x = \frac{10}{12}$

$x \approx 56$

PTS: 2 REF: 061922geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

475 ANS:

$\sin x = \frac{4.5}{11.75}$

$x \approx 23$

PTS: 2 REF: 061528geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

476 ANS:

$\sin^{-1}\left(\frac{5}{25}\right) \approx 11.5$

PTS: 2 REF: 081926geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

477 ANS:

$\tan x = \frac{12}{75}$ $\tan y = \frac{72}{75}$ $43.83 - 9.09 \approx 34.7$

$x \approx 9.09$ $y \approx 43.83$

PTS: 4 REF: 081634geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

478 ANS:

$\cos W = \frac{6}{18}$

$W \approx 71$

PTS: 2 REF: 011831geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

479 ANS:

$\tan x = \frac{10}{4}$

$x \approx 68$

PTS: 2 REF: 061630geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

480 ANS: 3 PTS: 2 REF: 061524geo NAT: G.CO.B.7
TOP: Triangle Congruency

481 ANS: 3
NYSED has stated that all students should be awarded credit regardless of their answer to this question.

PTS: 2 REF: 061722geo NAT: G.CO.B.7 TOP: Triangle Congruency

482 ANS: 4
d) is SSA

PTS: 2 REF: 061914geo NAT: G.CO.B.7 TOP: Triangle Congruency

483 ANS:

It is given that point D is the image of point A after a reflection in line CH. It is given that $\overleftrightarrow{CH}$ is the perpendicular bisector of $\overline{BCE}$ at point C. Since a bisector divides a segment into two congruent segments at its midpoint, $\overline{BC} \cong \overline{EC}$. Point E is the image of point B after a reflection over the line CH, since points B and E are equidistant from point C and it is given that $\overleftrightarrow{CH}$ is perpendicular to $\overline{BE}$. Point C is on $\overleftrightarrow{CH}$, and therefore, point C maps to itself after the reflection over $\overleftrightarrow{CH}$. Since all three vertices of triangle ABC map to all three vertices of triangle DEC under the same line reflection, then $\triangle ABC \cong \triangle DEC$ because a line reflection is a rigid motion and triangles are congruent when one can be mapped onto the other using a sequence of rigid motions.

PTS: 6 REF: spr1414geo NAT: G.CO.B.7 TOP: Triangle Congruency

484 ANS:

The transformation is a rotation, which is a rigid motion.

PTS: 2 REF: 081530geo NAT: G.CO.B.7 TOP: Triangle Congruency

485 ANS:

Translate $\triangle ABC$ along $\overline{CF}$ such that point C maps onto point F, resulting in image $\triangle A'B'C'$. Then reflect $\triangle A'B'C'$ over $\overline{DF}$ such that $\triangle A'B'C'$ maps onto $\triangle DEF$.

or

Reflect $\triangle ABC$ over the perpendicular bisector of $\overline{EB}$ such that $\triangle ABC$ maps onto $\triangle DEF$.

PTS: 2 REF: fall1408geo NAT: G.CO.B.7 TOP: Triangle Congruency

486 ANS:

Yes. $\angle A \cong \angle X$, $\angle C \cong \angle Z$, $\overline{AC} \cong \overline{XZ}$ after a sequence of rigid motions which preserve distance and angle measure, so $\triangle ABC \cong \triangle XYZ$ by ASA. $\overline{BC} \cong \overline{YZ}$ by CPCTC.

PTS: 2 REF: 081730geo NAT: G.CO.B.7 TOP: Triangle Congruency

487 ANS:

Translations preserve distance. If point D is mapped onto point A, point F would map onto point C. $\triangle DEF \cong \triangle ABC$ as $\overline{AC} \cong \overline{DF}$ and points are collinear on line ℓ and a reflection preserves distance.

PTS: 4 REF: 081534geo NAT: G.CO.B.7 TOP: Triangle Congruency

488 ANS:

Yes. The sequence of transformations consists of a reflection and a translation, which are isometries which preserve distance and congruency.

PTS: 2 REF: 011628geo NAT: G.CO.B.7 TOP: Triangle Congruency

489 ANS:

No. Since $\overline{BC} = 5$ and $\overline{ST} = \sqrt{18}$ are not congruent, the two triangles are not congruent. Since rigid motions preserve distance, there is no rigid motion that maps $\triangle ABC$ onto $\triangle RST$.

PTS: 2 REF: 011830geo NAT: G.CO.B.7 TOP: Triangle Congruency

490 ANS:

Reflections are rigid motions that preserve distance.

PTS: 2 REF: 061530geo NAT: G.CO.B.7 TOP: Triangle Congruency

491 ANS:
$\overline{LA} \cong \overline{DN}$, $\overline{CA} \cong \overline{CN}$, and $\overline{DAC} \perp \overline{LCN}$ (Given). $\angle LCA$ and $\angle DCN$ are right angles (Definition of perpendicular lines). $\triangle LAC$ and $\triangle DNC$ are right triangles (Definition of a right triangle). $\triangle LAC \cong \triangle DNC$ (HL). $\triangle LAC$ will map onto $\triangle DNC$ after rotating $\triangle LAC$ counterclockwise 90º about point C such that point L maps onto point D.

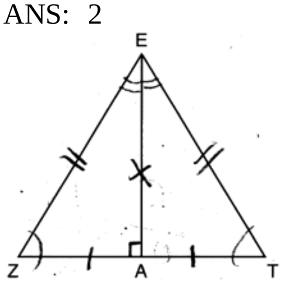
PTS: 4 REF: spr1408geo NAT: G.CO.B.8 TOP: Triangle Congruency

492 ANS: 1 PTS: 2 REF: 011703geo NAT: G.SRT.B.5
TOP: Triangle Congruency

493 ANS:
Yes. The triangles are congruent because of SSS $\left(5^2 + 12^2 = 13^2\right)$. All congruent triangles are similar.

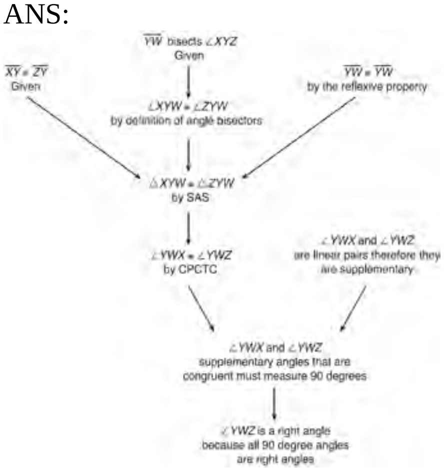
PTS: 2 REF: 061830geo NAT: G.SRT.B.5 TOP: Triangle Congruency

494 ANS: 2



PTS: 2 REF: 061619geo NAT: G.CO.C.10 TOP: Triangle Proofs

495 ANS:



$\triangle XYZ$, $\overline{XY} \cong \overline{ZY}$, and $\overline{YW}$ bisects $\angle XYZ$ (Given). $\triangle XYZ$ is isosceles (Definition of isosceles triangle). $\overline{YW}$ is an altitude of $\triangle XYZ$ (The angle bisector of the vertex of an isosceles triangle is also the altitude of that triangle). $\overline{YW} \perp \overline{XZ}$ (Definition of altitude). $\angle YWZ$ is a right angle (Definition of perpendicular lines).

PTS: 4 REF: spr1411geo NAT: G.CO.C.10 TOP: Triangle Proofs

496 ANS:
As the sum of the measures of the angles of a triangle is 180°, $m\angle ABC + m\angle BCA + m\angle CAB = 180°$. Each interior angle of the triangle and its exterior angle form a linear pair. Linear pairs are supplementary, so $m\angle ABC + m\angle FBC = 180°$, $m\angle BCA + m\angle DCA = 180°$, and $m\angle CAB + m\angle EAB = 180°$. By addition, the sum of these linear pairs is 540°. When the angle measures of the triangle are subtracted from this sum, the result is 360°, the sum of the exterior angles of the triangle.

PTS: 4 REF: fall1410geo NAT: G.CO.C.10 TOP: Triangle Proofs

497 ANS:
(2) Euclid's Parallel Postulate; (3) Alternate interior angles formed by parallel lines and a transversal are congruent; (4) Angles forming a line are supplementary; (5) Substitution

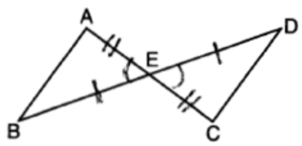
PTS: 4 REF: 011633geo NAT: G.CO.C.10 TOP: Triangle Proofs

498 ANS: 3 PTS: 2 REF: 081622geo NAT: G.SRT.B.5
TOP: Triangle Proofs KEY: statements

499 ANS: 2 PTS: 2 REF: 061709geo NAT: G.SRT.B.5
TOP: Triangle Proofs KEY: statements

500 ANS: 4 PTS: 2 REF: 081810geo NAT: G.SRT.B.5
TOP: Triangle Proofs KEY: statements

501 ANS: 4



PTS: 2 REF: 061908geo NAT: G.SRT.B.5 TOP: Triangle Proofs
KEY: statements

502 ANS: 3
1) only proves AA; 2) need congruent legs for HL; 3) SAS; 4) only proves product of altitude and base is equal

PTS: 2 REF: 061607geo NAT: G.SRT.B.5 TOP: Triangle Proofs
KEY: statements

503 ANS:
$\overline{RS}$ and $\overline{TV}$ bisect each other at point X; $\overline{TR}$ and $\overline{SV}$ are drawn (given); $\overline{TX} \cong \overline{XV}$ and $\overline{RX} \cong \overline{XS}$ (segment bisectors create two congruent segments); $\angle TXR \cong \angle VXS$ (vertical angles are congruent); $\triangle TXR \cong \triangle VXS$ (SAS); $\angle T \cong \angle V$ (CPCTC); $\overline{TR} \parallel \overline{SV}$ (a transversal that creates congruent alternate interior angles cuts parallel lines).

PTS: 4 REF: 061733geo NAT: G.SRT.B.5 TOP: Triangle Proofs
KEY: proof

504 ANS:
2 Reflexive; 4 $\angle BDA \cong \angle BDC$; 6 CPCTC; 7 If points B and D are equidistant from the endpoints of $\overline{AC}$, then B and D are on the perpendicular bisector of $\overline{AC}$.

PTS: 4 REF: 081832geo NAT: G.SRT.B.5 TOP: Triangle Proofs
KEY: proof

505 ANS:
$\triangle ABE \cong \triangle CBD$ (given); $\angle A \cong \angle C$ (CPCTC); $\angle AFD \cong \angle CFE$ (vertical angles are congruent); $\overline{AB} \cong \overline{CB}$, $\overline{DB} \cong \overline{EB}$ (CPCTC); $\overline{AD} \cong \overline{CE}$ (segment subtraction); $\triangle AFD \cong \triangle CFE$ (AAS)

PTS: 4 REF: 081933geo NAT: G.SRT.B.5 TOP: Triangle Proofs
KEY: proof

506 ANS:
Parallelogram $ABCD$, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at E (given). $\overline{DC} \parallel \overline{AB}$; $\overline{DA} \parallel \overline{CB}$ (opposite sides of a parallelogram are parallel). $\angle ACD \cong \angle CAB$ (alternate interior angles formed by parallel lines and a transversal are congruent).

PTS: 2 REF: 081528geo NAT: G.CO.C.11 TOP: Quadrilateral Proofs

507 ANS:
Parallelogram $ABCD$, $\overline{BF} \perp \overline{AFD}$, and $\overline{DE} \perp \overline{BEC}$ (given); $\overline{BC} \parallel \overline{AD}$ (opposite sides of a ▱ are ∥); $\overline{BE} \parallel \overline{FD}$ (parts of ∥ lines are ∥); $\overline{BF} \parallel \overline{DE}$ (two lines ⊥ to the same line are ∥); $BEDF$ is ▱ (a quadrilateral with both pairs of opposite sides ∥ is a ▱); $\angle DEB$ is a right ∠ (⊥ lines form right ∠s); $BEDF$ is a rectangle (a ▱ with one right ∠ is a rectangle).

PTS: 6 REF: 061835geo NAT: G.CO.C.11 TOP: Quadrilateral Proofs

508 ANS:
Quadrilateral $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$ that bisect each other, and $\angle 1 \cong \angle 2$ (given); quadrilateral $ABCD$ is a parallelogram (the diagonals of a parallelogram bisect each other); $\overline{AB} \parallel \overline{CD}$ (opposite sides of a parallelogram are parallel); $\angle 1 \cong \angle 3$ and $\angle 2 \cong \angle 4$ (alternate interior angles are congruent); $\angle 2 \cong \angle 3$ and $\angle 3 \cong \angle 4$ (substitution); $\triangle ACD$ is an isosceles triangle (the base angles of an isosceles triangle are congruent); $\overline{AD} \cong \overline{DC}$ (the sides of an isosceles triangle are congruent); quadrilateral $ABCD$ is a rhombus (a rhombus has consecutive congruent sides); $\overline{AE} \perp \overline{BE}$ (the diagonals of a rhombus are perpendicular); $\angle BEA$ is a right angle (perpendicular lines form a right angle); $\triangle AEB$ is a right triangle (a right triangle has a right angle).

PTS: 6 REF: 061635geo NAT: G.CO.C.11 TOP: Quadrilateral Proofs

509 ANS:
Quadrilateral $ABCD$ is a parallelogram with diagonals $\overline{AC}$ and $\overline{BD}$ intersecting at E (Given). $\overline{AD} \cong \overline{BC}$ (Opposite sides of a parallelogram are congruent). $\angle AED \cong \angle CEB$ (Vertical angles are congruent). $\overline{BC} \parallel \overline{DA}$ (Definition of parallelogram). $\angle DBC \cong \angle BDA$ (Alternate interior angles are congruent). $\triangle AED \cong \triangle CEB$ (AAS). 180° rotation of $\triangle AED$ around point E.

PTS: 4 REF: 061533geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

510 ANS:
Parallelogram $ABCD$, $\overline{BE} \perp \overline{CED}$, $\overline{DF} \perp \overline{BFC}$, $\overline{CE} \cong \overline{CF}$ (given). $\angle BEC \cong \angle DFC$ (perpendicular lines form right angles, which are congruent). $\angle FCD \cong \angle BCE$ (reflexive property). $\triangle BEC \cong \triangle DFC$ (ASA). $\overline{BC} \cong \overline{CD}$ (CPCTC). $ABCD$ is a rhombus (a parallelogram with consecutive congruent sides is a rhombus).

PTS: 6 REF: 081535geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

511 ANS:
Parallelogram *ANDR* with $\overline{AW}$ and $\overline{DE}$ bisecting $\overline{NWD}$ and $\overline{REA}$ at points *W* and *E* (Given). $\overline{AN} \cong \overline{RD}$, $\overline{AR} \cong \overline{DN}$ (Opposite sides of a parallelogram are congruent). $AE = \frac{1}{2}AR$, $WD = \frac{1}{2}DN$, so $\overline{AE} \cong \overline{WD}$ (Definition of bisect and division property of equality). $\overline{AR} \parallel \overline{DN}$ (Opposite sides of a parallelogram are parallel). *AWDE* is a parallelogram (Definition of parallelogram). $RE = \frac{1}{2}AR$, $NW = \frac{1}{2}DN$, so $\overline{RE} \cong \overline{NW}$ (Definition of bisect and division property of equality). $\overline{ED} \cong \overline{AW}$ (Opposite sides of a parallelogram are congruent). $\triangle ANW \cong \triangle DRE$ (SSS).

PTS: 6 REF: 011635geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

512 ANS:
Quadrilateral *ABCD*, $\overline{AB} \cong \overline{CD}$, $\overline{AB} \parallel \overline{CD}$, and $\overline{BF}$ and $\overline{DE}$ are perpendicular to diagonal $\overline{AC}$ at points *F* and *E* (given). $\angle AED$ and $\angle CFB$ are right angles (perpendicular lines form right angles). $\angle AED \cong \angle CFB$ (All right angles are congruent). *ABCD* is a parallelogram (A quadrilateral with one pair of sides congruent and parallel is a parallelogram). $\overline{AD} \parallel \overline{BC}$ (Opposite sides of a parallelogram are parallel). $\angle DAE \cong \angle BCF$ (Parallel lines cut by a transversal form congruent alternate interior angles). $\overline{DA} \cong \overline{BC}$ (Opposite sides of a parallelogram are congruent). $\triangle ADE \cong \triangle CBF$ (AAS). $\overline{AE} \cong \overline{CF}$ (CPCTC).

PTS: 6 REF: 011735geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

513 ANS:
Isosceles trapezoid *ABCD*, $\angle CDE \cong \angle DCE$, $\overline{AE} \perp \overline{DE}$, and $\overline{BE} \perp \overline{CE}$ (given); $\overline{AD} \cong \overline{BC}$ (congruent legs of isosceles trapezoid); $\angle DEA$ and $\angle CEB$ are right angles (perpendicular lines form right angles); $\angle DEA \cong \angle CEB$ (all right angles are congruent); $\angle CDA \cong \angle DCB$ (base angles of an isosceles trapezoid are congruent); $\angle CDA - \angle CDE \cong \angle DCB - \angle DCE$ (subtraction postulate); $\triangle ADE \cong \triangle BCE$ (AAS); $\overline{EA} \cong \overline{EB}$ (CPCTC);

$\angle EDA \cong \angle ECB$

$\triangle AEB$ is an isosceles triangle (an isosceles triangle has two congruent sides).

PTS: 6 REF: 081735geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

514 ANS:
Parallelogram *ABCD* with diagonal $\overline{AC}$ drawn (given). $\overline{AC} \cong \overline{AC}$ (reflexive property). $\overline{AD} \cong \overline{CB}$ and $\overline{BA} \cong \overline{DC}$ (opposite sides of a parallelogram are congruent). $\triangle ABC \cong \triangle CDA$ (SSS).

PTS: 2 REF: 011825geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

515 ANS:
Quadrilateral *ABCD* with diagonal $\overline{AC}$, segments *GH* and *EF*, $\overline{AE} \cong \overline{CG}$, $\overline{BE} \cong \overline{DG}$, $\overline{AH} \cong \overline{CF}$, and $\overline{AD} \cong \overline{CB}$ (given); $\overline{HF} \cong \overline{HF}$, $\overline{AC} \cong \overline{AC}$ (reflexive property); $\overline{AH} + \overline{HF} \cong \overline{CF} + \overline{HF}$, $\overline{AE} + \overline{BE} \cong \overline{CG} + \overline{DG}$ (segment

$\overline{AF} \cong \overline{CH}$ $\overline{AB} \cong \overline{CD}$

addition); $\triangle ABC \cong \triangle CDA$ (SSS); $\angle EAF \cong \angle GCH$ (CPCTC); $\triangle AEF \cong \triangle CGH$ (SAS); $\overline{EF} \cong \overline{GH}$ (CPCTC).

PTS: 6 REF: 011935geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

516 ANS:

Quadrilateral $MATH$, $\overline{HM} \cong \overline{AT}$, $\overline{HT} \cong \overline{AM}$, $\overline{HE} \perp \overline{MEA}$, and $\overline{HA} \perp \overline{AT}$ (given); $\angle HEA$ and $\angle TAH$ are right angles (perpendicular lines form right angles); $\angle HEA \cong \angle TAH$ (all right angles are congruent); $MATH$ is a parallelogram (a quadrilateral with two pairs of congruent opposite sides is a parallelogram); $\overline{MA} \parallel \overline{TH}$ (opposite sides of a parallelogram are parallel); $\angle THA \cong \angle EAH$ (alternate interior angles of parallel lines and a transversal are congruent); $\triangle HEA \sim \triangle TAH$ (AA); $\frac{HA}{TH} = \frac{HE}{TA}$ (corresponding sides of similar triangles are in proportion); $TA \bullet HA = HE \bullet TH$ (product of means equals product of extremes).

PTS: 6 REF: 061935geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

517 ANS:

Circle O, secant $\overline{ACD}$, tangent $\overline{AB}$ (Given). Chords $\overline{BC}$ and $\overline{BD}$ are drawn (Auxiliary lines). $\angle A \cong \angle A$, $\overparen{BC} \cong \overparen{BC}$ (Reflexive property). $m\angle BDC = \frac{1}{2} m\overparen{BC}$ (The measure of an inscribed angle is half the measure of the intercepted arc). $m\angle CBA = \frac{1}{2} m\overparen{BC}$ (The measure of an angle formed by a tangent and a chord is half the measure of the intercepted arc). $\angle BDC \cong \angle CBA$ (Angles equal to half of the same arc are congruent). $\triangle ABC \sim \triangle ADB$ (AA). $\frac{AB}{AC} = \frac{AD}{AB}$ (Corresponding sides of similar triangles are proportional). $AC \cdot AD = AB^2$ (In a proportion, the product of the means equals the product of the extremes).

PTS: 6 REF: spr1413geo NAT: G.SRT.B.5 TOP: Circle Proofs

518 ANS:

Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E (Given); Chords $\overline{CB}$ and $\overline{AD}$ are drawn (auxiliary lines drawn); $\angle CEB \cong \angle AED$ (vertical angles); $\angle C \cong \angle A$ (Inscribed angles that intercept the same arc are congruent); $\triangle BCE \sim \triangle DAE$ (AA); $\frac{AE}{CE} = \frac{ED}{EB}$ (Corresponding sides of similar triangles are proportional); $AE \cdot EB = CE \cdot ED$ (The product of the means equals the product of the extremes).

PTS: 6 REF: 081635geo NAT: G.SRT.B.5 TOP: Circle Proofs

519 ANS:

Circle O, tangent $\overline{EC}$ to diameter $\overline{AC}$, chord $\overline{BC} \parallel$ secant $\overline{ADE}$, and chord $\overline{AB}$ (given); $\angle B$ is a right angle (an angle inscribed in a semi-circle is a right angle); $\overleftrightarrow{EC} \perp \overline{OC}$ (a radius drawn to a point of tangency is perpendicular to the tangent); $\angle ECA$ is a right angle (perpendicular lines form right angles); $\angle B \cong \angle ECA$ (all right angles are congruent); $\angle BCA \cong \angle CAE$ (the transversal of parallel lines creates congruent alternate interior angles); $\triangle ABC \sim \triangle ECA$ (AA); $\frac{BC}{CA} = \frac{AB}{EC}$ (Corresponding sides of similar triangles are in proportion).

PTS: 4 REF: 081733geo NAT: G.SRT.B.5 TOP: Circle Proofs

520 ANS: 4

$\frac{36}{45} \neq \frac{15}{18}$

$\frac{4}{5} \neq \frac{5}{6}$

PTS: 2 REF: 081709geo NAT: G.SRT.A.3 TOP: Similarity Proofs

521 ANS: 4
AA

PTS: 2 REF: 061809geo NAT: G.SRT.A.3 TOP: Similarity Proofs

522 ANS:
Parallelogram *ABCD*, $\overline{EFG}$, and diagonal $\overline{DFB}$ (given); $\angle DFE \cong \angle BFG$ (vertical angles); $\overline{AD} \parallel \overline{CB}$ (opposite sides of a parallelogram are parallel); $\angle EDF \cong \angle GBF$ (alternate interior angles are congruent); $\triangle DEF \sim \triangle BGF$ (AA).

PTS: 4 REF: 061633geo NAT: G.SRT.A.3 TOP: Similarity Proofs

523 ANS:
A dilation of $\frac{5}{2}$ about the origin. Dilations preserve angle measure, so the triangles are similar by AA.

PTS: 4 REF: 061634geo NAT: G.SRT.A.3 TOP: Similarity Proofs

524 ANS:
$\overline{GI}$ is parallel to $\overline{NT}$, and $\overline{IN}$ intersects at *A* (given); $\angle I \cong \angle N$, $\angle G \cong \angle T$ (paralleling lines cut by a transversal form congruent alternate interior angles); $\triangle GIA \sim \triangle TNA$ (AA).

PTS: 2 REF: 011729geo NAT: G.SRT.A.3 TOP: Similarity Proofs

525 ANS:
Circle *A* can be mapped onto circle *B* by first translating circle *A* along vector $\overline{AB}$ such that *A* maps onto *B*, and then dilating circle *A*, centered at *A*, by a scale factor of $\frac{5}{3}$. Since there exists a sequence of transformations that maps circle *A* onto circle *B*, circle *A* is similar to circle *B*.

PTS: 2 REF: spr1404geo NAT: G.C.A.1 TOP: Similarity Proofs