JEFFERSON MATH PROJECT REGENTS BY TOPIC

NY Geometry Regents Exam Questions from Fall 2008 to August 2009 Sorted by Topic

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Dear Sir

I have to acknolege the reciept of your favor of May 14. in which you mention that you have finished the 6. first books of Euclid, plane trigonometry, surveying & algebra and ask whether I think a further pursuit of that branch of science would be useful to you. there are some propositions in the latter books of Euclid, & some of Archimedes, which are useful, & I have no doubt you have been made acquainted with them. trigonometry, so far as this, is most valuable to every man, there is scarcely a day in which he will not resort to it for some of the purposes of common life. the science of calculation also is indispensible as far as the extraction of the square & cube roots; Algebra as far as the quadratic equation & the use of logarithms are often of value in ordinary cases: but all beyond these is but a luxury; a delicious luxury indeed; but not to be indulged in by one who is to have a profession to follow for his subsistence. in this light I view the conic sections, curves of the higher orders, perhaps even spherical trigonometry, Algebraical operations beyond the 2d dimension, and fluxions.

Letter from Thomas Jefferson to William G. Munford, Monticello, June 18, 1799.

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Geometry Regents Exam Question by Topic

PARALLEL AND PERPENDICULAR LINES-GE

1. *080909ge, G.G.63*
   What is the equation of a line that is parallel to the line whose equation is $y = x + 2$?
   a. $x + y = 5$
   b. $2x + y = -2$
   c. $y - x = -1$
   d. $y - 2x = 3$

2. *fall0828ge, G.G.62*
   What is the slope of a line perpendicular to the line whose equation is $5x + 3y = 8$?
   a. $\frac{5}{3}$
   b. $\frac{3}{5}$
   c. $-\frac{3}{5}$
   d. $-\frac{5}{3}$

3. *080917ge, G.G.62*
   What is the slope of a line perpendicular to the line whose equation is $y = -\frac{2}{3}x - 5$?
   a. $-\frac{3}{2}$
   b. $-\frac{2}{3}$
   c. $\frac{2}{3}$
   d. $\frac{3}{2}$

4. *060926ge, G.G.63*
   Which equation represents a line perpendicular to the line whose equation is $2x + 3y = 12$?
   a. $6y = -4x + 12$
   b. $2y = 3x + 6$
   c. $2y = -3x + 6$
   d. $3y = -2x + 12$

5. *fall0812ge, G.G.65*
   What is the equation of a line that passes through the point $(-3,-11)$ and is parallel to the line whose equation is $2x - y = 4$?
   a. $y = 2x + 5$
   b. $y = 2x - 5$
   c. $y = \frac{1}{2}x + \frac{25}{2}$
   d. $y = -\frac{1}{2}x - \frac{25}{2}$

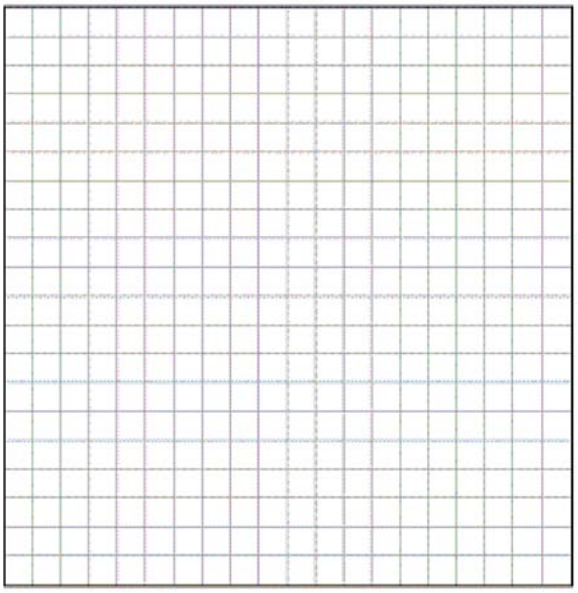
6. *080931ge, G.G.65*
   Write an equation of the line that passes through the point $(6,-5)$ and is parallel to the line whose equation is $2x - 3y = 11$.

7. *060931ge, G.G.65*
   Find an equation of the line passing through the point $(5,4)$ and parallel to the line whose equation is $2x + y = 3$.

8. *060907ge, G.G.64*
What is an equation of the line that passes through the point $(-2,5)$ and is perpendicular to the line whose equation is $y=\frac{1}{2}x+5$?
   a. $y=2x+1$
   b. $y=-2x+1$
   c. $y=2x+9$
   d. $y=-2x-9$

9. *fall0822ge, G.G.63*
The lines $3y+1=6x+4$ and $2y+1=x-9$ are
   a. parallel
   b. perpendicular
   c. the same line
   d. neither parallel nor perpendicular

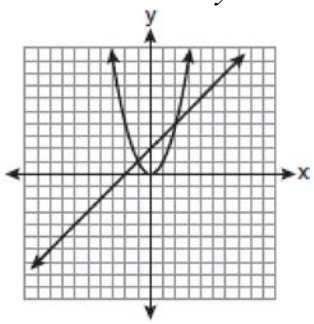
10. *080935ge, G.G.68*
Write an equation of the perpendicular bisector of the line segment whose endpoints are $(-1,1)$ and $(7,-5)$. [The use of the grid below is optional]

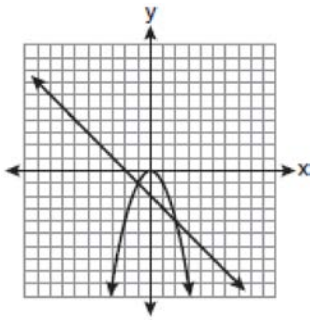


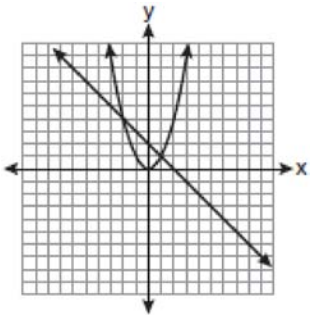
QUADRATIC-LINEAR SYSTEMS-GE

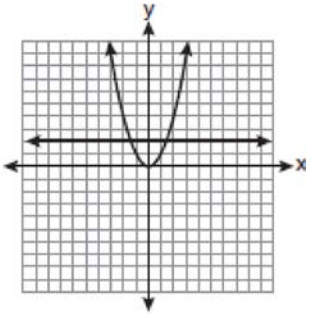
11. *fall0805ge, G.G.70*
Which graph could be used to find the solution to the following system of equations?

$$y=-x+2$$
$$y=x^2$$

a.


b.


c.


d.


12. *060923ge, G.G.70*
Given the system of equations:

$$y = x^2 - 4x$$

$$x = 4$$

The number of points of intersection is
a. 1
b. 2
c. 3
d. 0

13. *080912ge, G.G.70*
Given the equations: $y = x^2 - 6x + 10$

$$y + x = 4$$

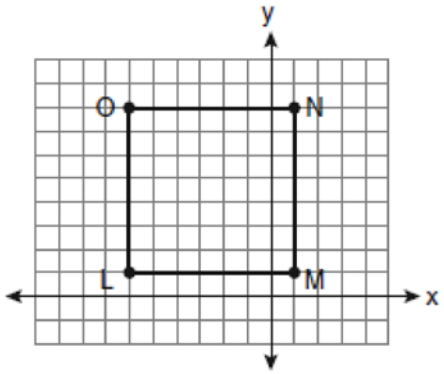
What is the solution to the given system of equations?
a. $(2,3)$
b. $(3,2)$
c. $(2,2)$ and $(1,3)$
d. $(2,2)$ and $(3,1)$

MIDPOINT

14. *080910ge, G.G.66*
The endpoints of $\overline{CD}$ are $C(-2,-4)$ and $D(6,2)$. What are the coordinates of the midpoint of $\overline{CD}$?
a. $(2,3)$
b. $(2,-1)$
c. $(4,-2)$
d. $(4,3)$

15. *fall0813ge, G.G.66*
Line segment AB has endpoints $A(2,-3)$ and $B(-4,6)$. What are the coordinates of the midpoint of $\overline{AB}$?
a. $(-2,3)$
b. $\left(-1,1\frac{1}{2}\right)$
c. $(-1,3)$
d. $\left(3,4\frac{1}{2}\right)$

16. *060919ge, G.G.66*
Square $LMNO$ is shown in the diagram below.



What are the coordinates of the midpoint of diagonal $\overline{LN}$?
a. $\left(4\frac{1}{2},-2\frac{1}{2}\right)$
b. $\left(-3\frac{1}{2},3\frac{1}{2}\right)$
c. $\left(-2\frac{1}{2},3\frac{1}{2}\right)$
d. $\left(-2\frac{1}{2},4\frac{1}{2}\right)$

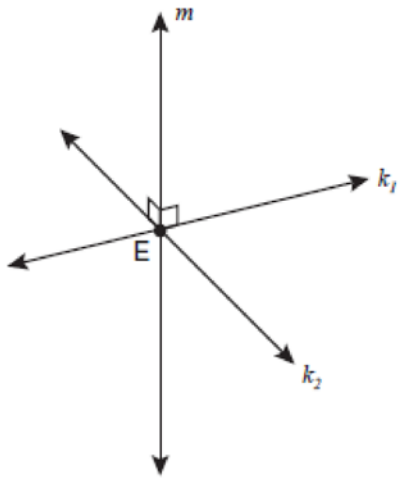
DISTANCE

17. *fall0831ge, G.G.67*
The endpoints of $\overline{PQ}$ are $P(-3,1)$ and $Q(4,25)$. Find the length of $\overline{PQ}$.

18. *080919ge, G.G.67*
If the endpoints of $\overline{AB}$ are $A(-4,5)$ and $B(2,-5)$, what is the length of $\overline{AB}$?
a. $2\sqrt{34}$
b. 2
c. $\sqrt{61}$
d. 8

PLANES

19. *fall0816ge, G.G.1*
Lines k_1 and k_2 intersect at point E. Line m is perpendicular to lines k_1 and k_2 at point E.

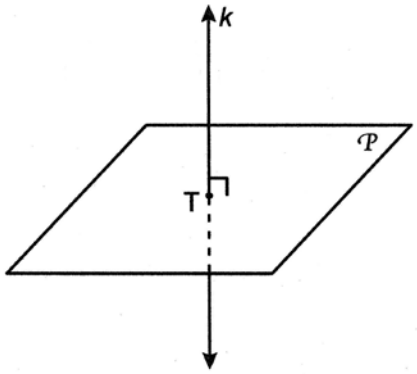


Which statement is always true?
a. Lines k_1 and k_2 are perpendicular.
b. Line m is parallel to the plane determined by lines k_1 and k_2.
c. Line m is perpendicular to the plane determined by lines k_1 and k_2.
d. Line m is coplanar with lines k_1 and k_2.

20. *060918ge, G.G.2*
Point P is on line m. What is the total number of planes that are perpendicular to line m and pass through point P?
a. 1
b. 2
c. 0
d. infinite

21. *080927ge, G.G.4*
If two different lines are perpendicular to the same plane, they are
a. collinear
b. coplanar
c. congruent
d. consecutive

22. *080914ge, G.G.7*
In the diagram below, line k is perpendicular to plane $\mathcal{P}$ at point T.



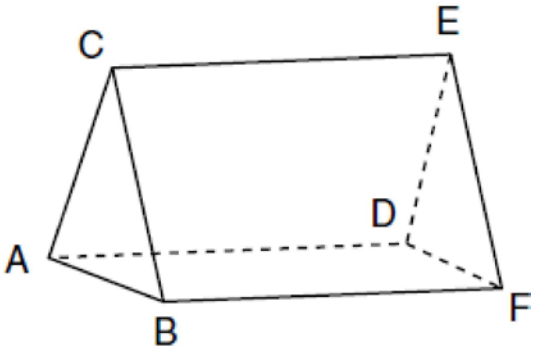
Which statement is true?
a. Any point in plane $\mathcal{P}$ also will be on line k.
b. Only one line in plane $\mathcal{P}$ will intersect line k.
c. All planes that intersect plane $\mathcal{P}$ will pass through T.
d. Any plane containing line k is perpendicular to plane $\mathcal{P}$.

23. *060928ge, G.G.8*
In three-dimensional space, two planes are parallel and a third plane intersects both of the parallel planes. The intersection of the planes is a
a. plane
b. point
c. pair of parallel lines
d. pair of intersecting lines

24. *fall0806ge, G.G.9*
Line k is drawn so that it is perpendicular to two distinct planes, P and R. What must be true about planes P and R?
a. Planes P and R are skew.
b. Planes P and R are parallel.
c. Planes P and R are perpendicular.
d. Plane P intersects plane R but is not perpendicular to plane R.

CLASSIFYING SOLIDS

25. *fall0808ge, G.G.10*
The figure in the diagram below is a triangular prism.

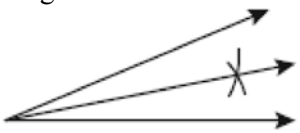


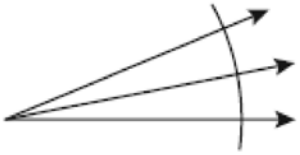
Which statement must be true?
a. $\overline{DE} \cong \overline{AB}$
b. $\overline{AD} \cong \overline{BC}$
c. $\overline{AD} \parallel \overline{CE}$
d. $\overline{DE} \parallel \overline{BC}$

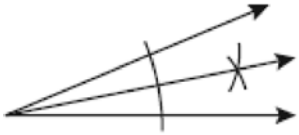
26. *060904ge, G.G.13*
The lateral faces of a regular pyramid are composed of
a. squares
b. rectangles
c. congruent right triangles
d. congruent isosceles triangles

CONSTRUCTIONS

27. *060925ge, G.G.17*
Which illustration shows the correct construction of an angle bisector?

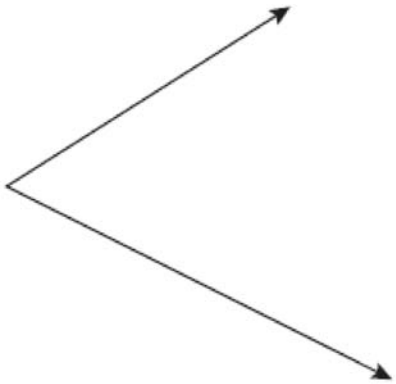
a. 

b. 

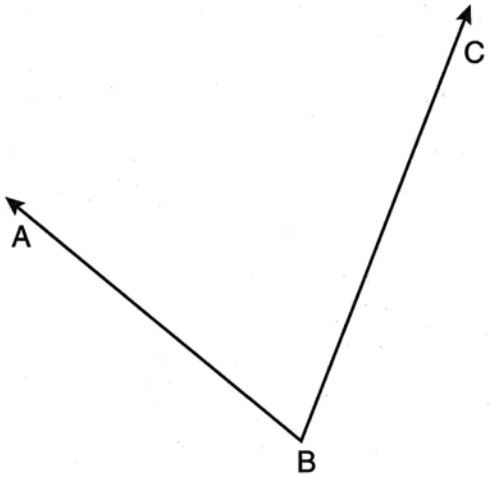
c. 

d. 

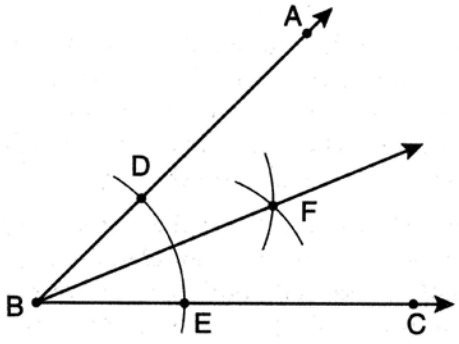
28. *fall0832ge, G.G.17*
Using a compass and straightedge, construct the bisector of the angle shown below. [*Leave all construction marks*.]



29. *080932ge, G.G.17*
Using a compass and straightedge, construct the angle bisector of $\angle ABC$ shown below. [Leave all construction marks.]



30. *080902ge, G.G.17*
The diagram below shows the construction of the bisector of $\angle ABC$.



Which statement is *not* true?

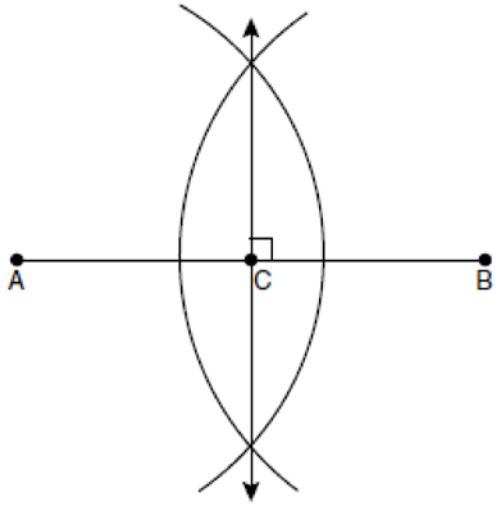
a. $\text{m}\angle EBF = \frac{1}{2}\text{m}\angle ABC$

b. $\text{m}\angle DBF = \frac{1}{2}\text{m}\angle ABC$

c. $\text{m}\angle EBF = \text{m}\angle ABC$

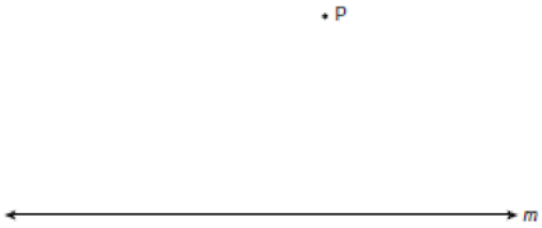
d. $\text{m}\angle DBF = \text{m}\angle EBF$

31. *fall0804ge, G.G.18*
The diagram below shows the construction of the perpendicular bisector of $\overline{AB}$.

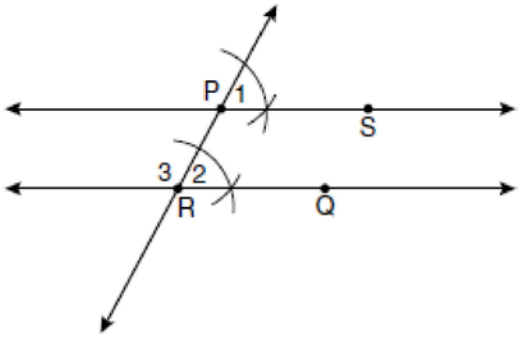


Which statement is *not* true?
a. $AC = CB$
b. $CB = \frac{1}{2}AB$
c. $AC = 2AB$
d. $AC + CB = AB$

32. *060930ge, G.G.19*
Using a compass and straightedge, construct a line that passes through point P and is perpendicular to line m. [Leave all construction marks.]



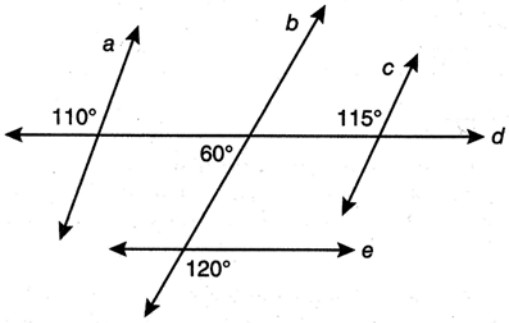
33. *fall0807ge, G.G.19*
The diagram below illustrates the construction of $\overleftrightarrow{PS}$ parallel to $\overleftrightarrow{RQ}$ through point P.



Which statement justifies this construction?
a. $m\angle 1 = m\angle 2$
b. $m\angle 1 = m\angle 3$
c. $\overline{PR} \cong \overline{RQ}$
d. $\overline{PS} \cong \overline{RQ}$

ANGLES INVOLVING PARALLEL LINES

34. *080901ge, G.G.35*
Based on the diagram below, which statement is true?



a. $a \parallel b$
b. $a \parallel c$
c. $b \parallel c$
d. $d \parallel e$

INTERIOR AND EXTERIOR ANGLES OF TRIANGLES

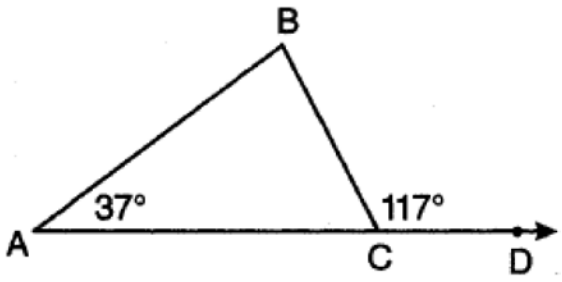
35. *060901ge, G.G.30*
Juliann plans on drawing $\triangle ABC$, where the measure of $\angle A$ can range from 50° to 60° and the measure of $\angle B$ can range from 90° to 100°. Given these conditions, what is the correct range of measures possible for $\angle C$?
a. 20° to 40°
b. 30° to 50°
c. 80° to 90°
d. 120° to 130°

36. *060909ge, G.G.30*
In an equilateral triangle, what is the difference between the sum of the exterior angles and the sum of the interior angles?
a. 180°
b. 120°
c. 90°
d. 60°

37. *080933ge, G.G.30*
The degree measures of the angles of $\triangle ABC$ are represented by x, $3x$, and $5x - 54$. Find the value of x.

38. *060911ge, G.G.34*
In $\triangle ABC$, $m\angle A = 95$, $m\angle B = 50$, and $m\angle C = 35$. Which expression correctly relates the lengths of the sides of this triangle?
a. $AB < BC < CA$
b. $AB < AC < BC$
c. $AC < BC < AB$
d. $BC < AC < AB$

39. *080934ge, G.G.34*
In the diagram below of $\triangle ABC$ with side $\overline{AC}$ extended through D, $m\angle A = 37$ and $m\angle BCD = 117$. Which side of $\triangle ABC$ is the longest side? Justify your answer.



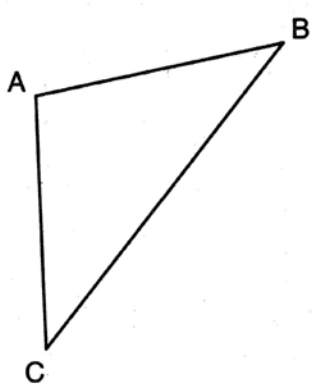
(Not drawn to scale)

CLASSIFYING TRIANGLES

40. *fall0809ge, G.G.31*
The vertices of $\triangle ABC$ are $A(-1,-2)$, $B(-1,2)$ and $C(6,0)$. Which conclusion can be made about the angles of $\triangle ABC$?
a. $m\angle A = m\angle B$
b. $m\angle A = m\angle C$
c. $m\angle ACB = 90$
d. $m\angle ABC = 60$

ISOSCELES TRIANGLES

41. *080903ge, G.G.31*
In the diagram of $\triangle ABC$ below, $\overline{AB} \cong \overline{AC}$. The measure of $\angle B$ is 40°.

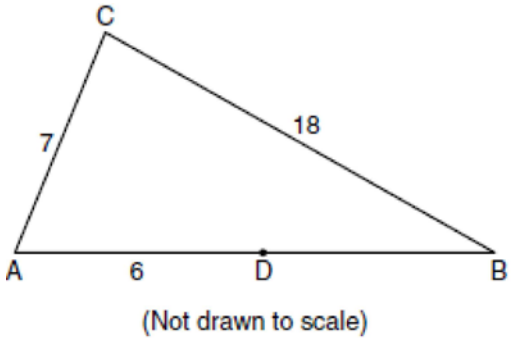


What is the measure of $\angle A$?
a. 40°
b. 50°
c. 70°
d. 100°

TRIANGLE INEQUALITIES

42. *080916ge, G.G.33*
Which set of numbers represents the lengths of the sides of a triangle?
a. $\{5, 18, 13\}$
b. $\{6, 17, 22\}$
c. $\{16, 24, 7\}$
d. $\{26, 8, 15\}$

43. *fall0819ge, G.G.33*
In the diagram below of $\triangle ABC$, D is a point on $\overline{AB}$, $AC = 7$, $AD = 6$, and $BC = 18$.

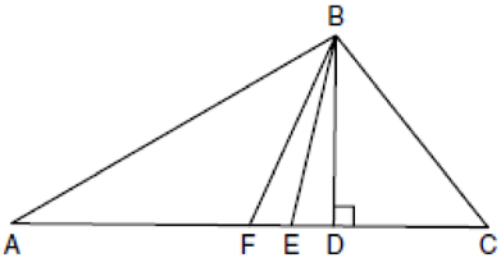


The length of $\overline{DB}$ could be
a. 5
b. 12
c. 19
d. 25

44. *060924ge, G.G.33*
Side $\overline{PQ}$ of $\triangle PQR$ is extended through Q to point T. Which statement is *not* always true?
a. $m\angle RQT > m\angle R$
b. $m\angle RQT > m\angle P$
c. $m\angle RQT = m\angle P + m\angle R$
d. $m\angle RQT > m\angle PQR$

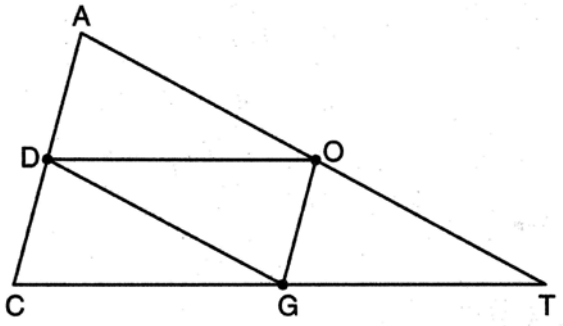
MEDIANS, ALTITUDES, BISECTORS AND MIDSEGMENTS

45. *fall0810ge, G.G.24*
Given $\triangle ABC$ with base $\overline{AFEDC}$, median $\overline{BF}$, altitude $\overline{BD}$, and $\overline{BE}$ bisects $\angle ABC$, which conclusion is valid?



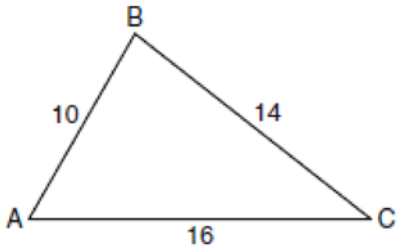
a. $\angle FAB \cong \angle ABF$
b. $\angle ABF \cong \angle CBD$
c. $\overline{CE} \cong \overline{EA}$
d. $\overline{CF} \cong \overline{FA}$

46. *080920ge, G.G.42*
In the diagram below of $\triangle ACT$, D is the midpoint of $\overline{AC}$, O is the midpoint of $\overline{AT}$, and G is the midpoint of $\overline{CT}$.

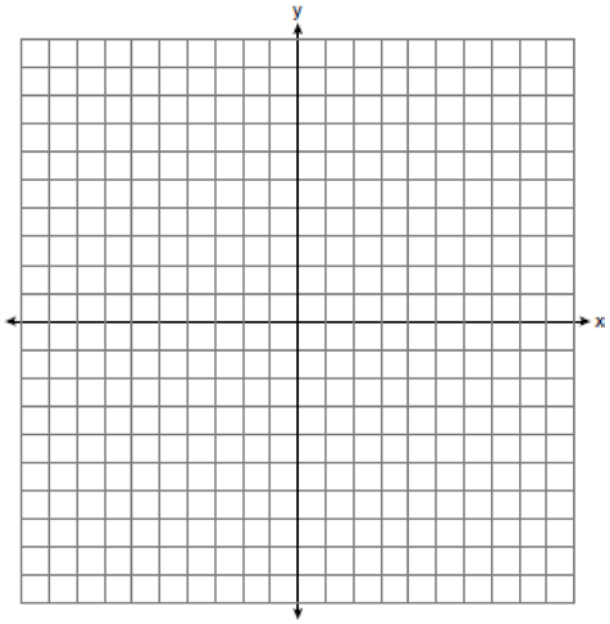


If $AC = 10$, $AT = 18$, and $CT = 22$, what is the perimeter of parallelogram $CDOG$?
a. 21
b. 25
c. 32
d. 40

47. *060929ge, G.G.42*
In the diagram of $\triangle ABC$ below, $AB = 10$, $BC = 14$, and $AC = 16$. Find the perimeter of the triangle formed by connecting the midpoints of the sides of $\triangle ABC$.

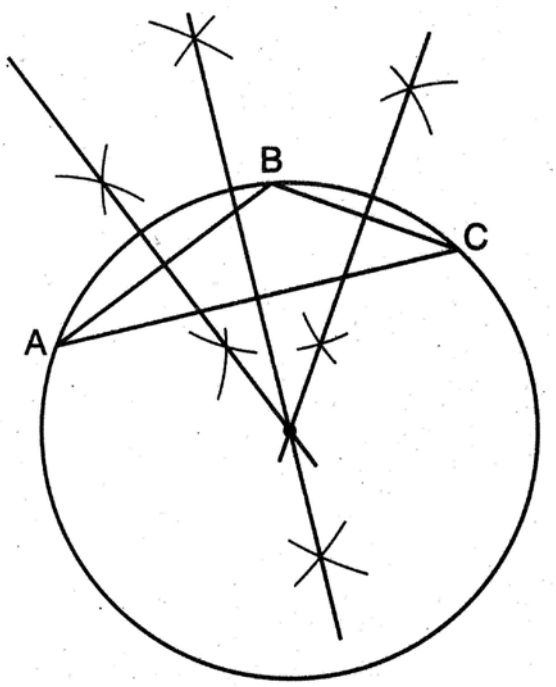


48. *fall0835ge, G.G.42*
On the set of axes below, graph and label $\triangle DEF$ with vertices at $D(-4,-4)$, $E(-2,2)$, and $F(8,-2)$. If G is the midpoint of $\overline{EF}$ and H is the midpoint of $\overline{DF}$, state the coordinates of G and H and label each point on your graph. Explain why $\overline{GH} \parallel \overline{DE}$.



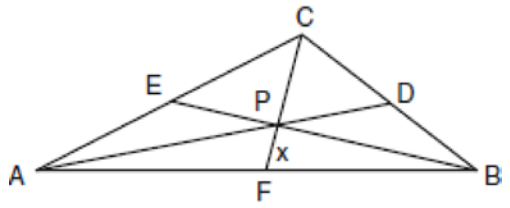
49. *fall0825ge, G.G.21*
In which triangle do the three altitudes intersect outside the triangle?
a. a right triangle
b. an acute triangle
c. an obtuse triangle
d. an equilateral triangle

50. *080925ge, G.G.21*
The diagram below shows the construction of the center of the circle circumscribed about $\triangle ABC$.



This construction represents how to find the intersection of
a. the angle bisectors of $\triangle ABC$
b. the medians to the sides of $\triangle ABC$
c. the altitudes to the sides of $\triangle ABC$
d. the perpendicular bisectors of the sides of $\triangle ABC$

51. *060914ge, G.G.43*
In the diagram of $\triangle ABC$ below, Jose found centroid P by constructing the three medians. He measured $\overline{CF}$ and found it to be 6 inches.



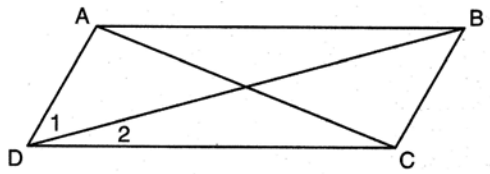
If $PF = x$, which equation can be used to find x?
a. $x + x = 6$
b. $2x + x = 6$
c. $3x + 2x = 6$
d. $x + \frac{2}{3}x = 6$

INTERIOR AND EXTERIOR ANGLES OF OTHER POLYGONS

52. *fall0827ge, G.G.37*
What is the measure of an interior angle of a regular octagon?
a. 45°
b. 60°
c. 120°
d. 135°

PARALLELOGRAMS AND RHOMBUSES

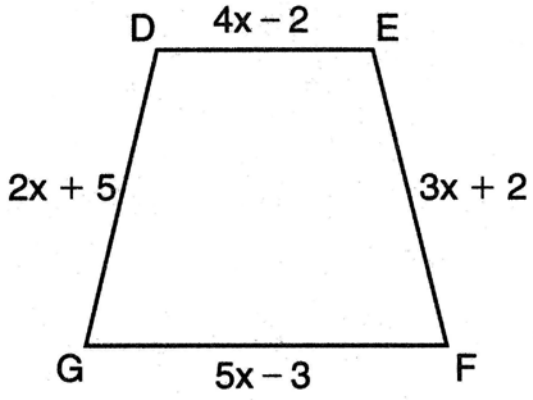
53. *080907ge, G.G.38*
In the diagram below of parallelogram $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$, $m\angle 1 = 45$ and $m\angle DCB = 120$.



What is the measure of $\angle 2$?
a. 15°
b. 30°
c. 45°
d. 60°

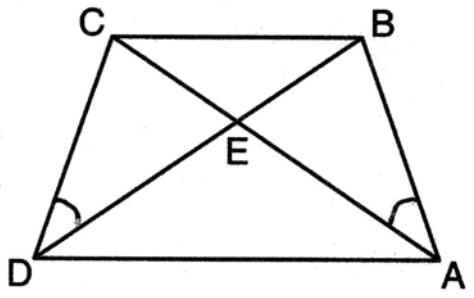
TRAPEZOIDS

54. *080929ge, G.G.40*
In the diagram below of isosceles trapezoid $DEFG$, $\overline{DE} \parallel \overline{GF}$, $DE = 4x - 2$, $EF = 3x + 2$, $FG = 5x - 3$, and $GD = 2x + 5$. Find the value of x.



55. *fall0801ge, G.G.40*
Isosceles trapezoid $ABCD$ has diagonals $\overline{AC}$ and $\overline{BD}$. If $AC = 5x + 13$ and $BD = 11x - 5$, what is the value of x?
a. 28
b. $10\frac{3}{4}$
c. 3
d. $\frac{1}{2}$

56. *080905ge, G.G.29*
In the diagram of trapezoid $ABCD$ below, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at E and $\triangle ABC \cong \triangle DCB$.



Which statement is true based on the given information?
a. $\overline{AC} \cong \overline{BC}$
b. $\overline{CD} \cong \overline{AD}$
c. $\angle CDE \cong \angle BAD$
d. $\angle CDB \cong \angle BAC$

SPECIAL QUADRILATERALS

57. *080918ge, G.G.41*
A quadrilateral whose diagonals bisect each other and are perpendicular is a
a. rhombus
b. rectangle
c. trapezoid
d. parallelogram

FINDING THE CENTER AND RADIUS OF CIRCLES

58. *fall0814ge, G.G.73*
What are the center and radius of a circle whose equation is $(x - A)^2 + (y - B)^2 = C$?
a. center = (A,B); radius = C
b. center = $(-A,-B)$; radius = C
c. center = (A,B); radius = $\sqrt{C}$
d. center = $(-A, -B)$; radius = $\sqrt{C}$

59. *080911ge, G.G.73*
What are the center and the radius of the circle whose equation is $(x - 3)^2 + (y + 3)^2 = 36$
a. center = $(3,-3)$; radius = 6
b. center = $(-3,3)$; radius = 6
c. center = $(3,-3)$; radius = 36
d. center = $(-3,3)$; radius = 36

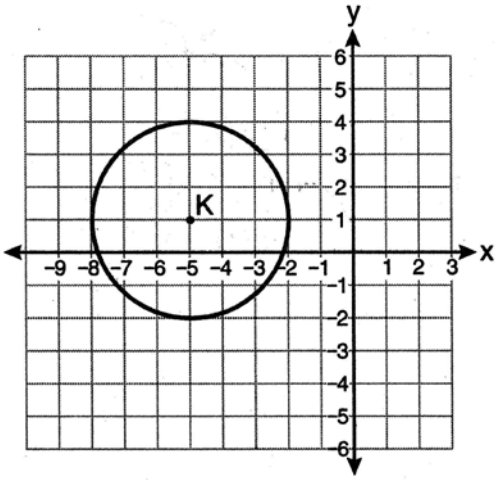
60. *060922ge, G.G.73*
A circle is represented by the equation $x^2 + (y+3)^2 = 13$. What are the coordinates of the center of the circle and the length of the radius?
a. $(0,3)$ and 13
b. $(0,3)$ and $\sqrt{13}$
c. $(0,-3)$ and 13
d. $(0,-3)$ and $\sqrt{13}$

WRITING EQUATIONS OF CIRCLES

61. *060910ge, G.G.71*
What is an equation of a circle with its center at $(-3,5)$ and a radius of 4?
a. $(x-3)^2 + (y+5)^2 = 16$
b. $(x+3)^2 + (y-5)^2 = 16$
c. $(x-3)^2 + (y+5)^2 = 4$
d. $(x+3)^2 + (y-5)^2 = 4$

62. *fall0820ge, G.G.71*
The diameter of a circle has endpoints at $(-2,3)$ and $(6,3)$. What is an equation of the circle?
a. $(x-2)^2 + (y-3)^2 = 16$
b. $(x-2)^2 + (y-3)^2 = 4$
c. $(x+2)^2 + (y+3)^2 = 16$
d. $(x+2)^2 + (y+3)^2 = 4$

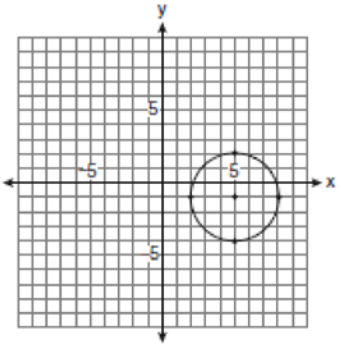
63. *080921ge, G.G.72*
Which equation represents circle *K* shown in the graph below?

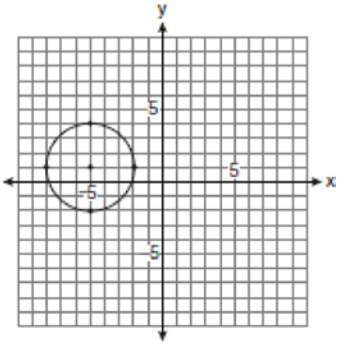


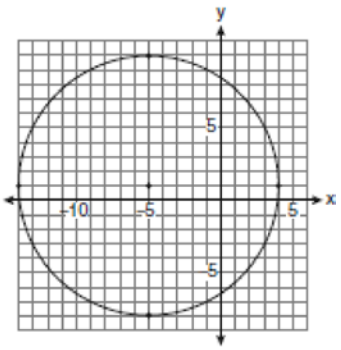
a. $(x+5)^2 + (y-1)^2 = 3$
b. $(x+5)^2 + (y-1)^2 = 9$
c. $(x-5)^2 + (y+1)^2 = 3$
d. $(x-5)^2 + (y+1)^2 = 9$

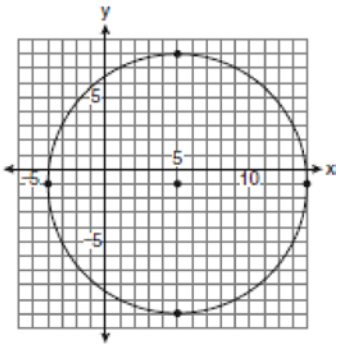
GRAPHING CIRCLES

64. *060920ge, G.G.74*
Which graph represents a circle with the equation $(x-5)^2+(y+1)^2=9$?

a. 

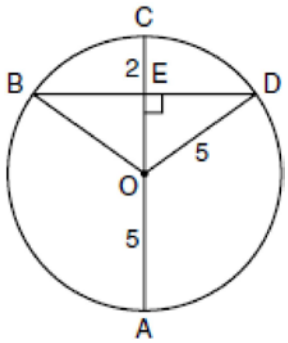
b. 

c. 

d. 

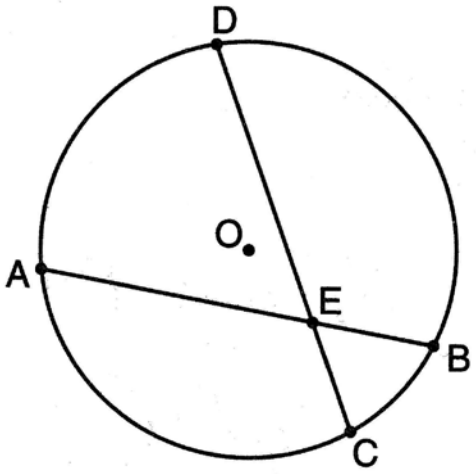
CHORDS

65. *fall0811ge, G.G.49*
In the diagram below, circle O has a radius of 5, and $CE=2$. Diameter $\overline{AC}$ is perpendicular to chord $\overline{BD}$ at E.



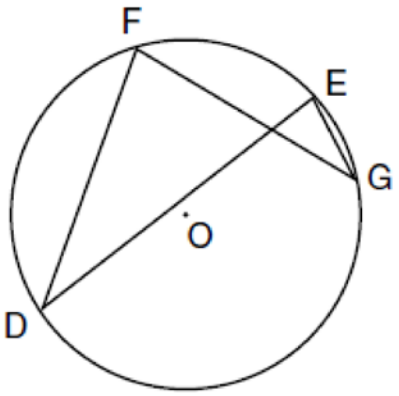
What is the length of $\overline{BD}$?
a. 12
b. 10
c. 8
d. 4

66. *080923ge, G.G.53*
In the diagram of circle O below, chord $\overline{AB}$ intersects chord $\overline{CD}$ at E, $DE = 2x + 8$, $EC = 3$, $AE = 4x - 3$, and $EB = 4$.

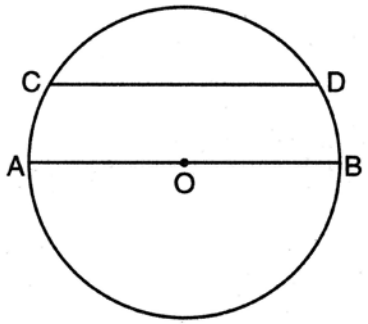


What is the value of x?
a. 1
b. 3.6
c. 5
d. 10.25

67. *fall0836ge, G.G.51*
In the diagram below of circle O, chords $\overline{DF}$, $\overline{DE}$, $\overline{FG}$, and $\overline{EG}$ are drawn such that $m\overset{\frown}{DF} : m\overset{\frown}{FE} : m\overset{\frown}{EG} : m\overset{\frown}{GD} = 5:2:1:7$. Identify one pair of inscribed angles that are congruent to each other and give their measure.

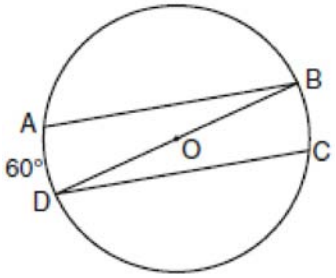


68. *080904ge, G.G.52*
In the diagram of circle O below, chord $\overline{CD}$ is parallel to diameter $\overline{AOB}$ and $m\overset{\frown}{AC} = 30$.



What is $m\overset{\frown}{CD}$?
a. 150
b. 120
c. 100
d. 60

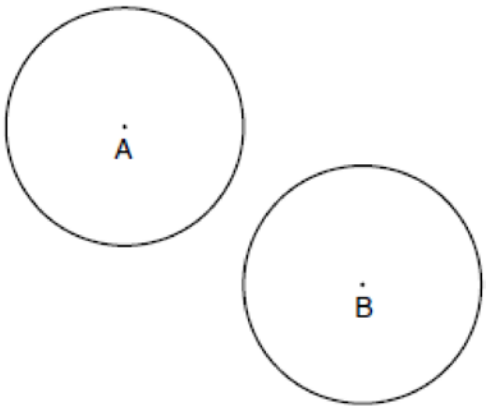
69. *060906ge, G.G.52*
In the diagram of circle O below, chords $\overline{AB}$ and $\overline{CD}$ are parallel, and $\overline{BD}$ is a diameter of the circle.



If $m\overset{\frown}{AD} = 60$, what is $m\angle CDB$?
a. 20
b. 30
c. 60
d. 120

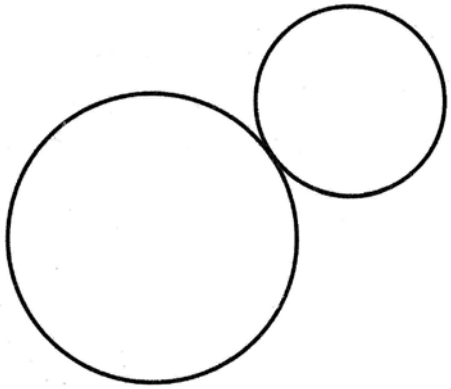
TANGENTS

70. *fall0824ge, G.G.50*
In the diagram below, circle A and circle B are shown.



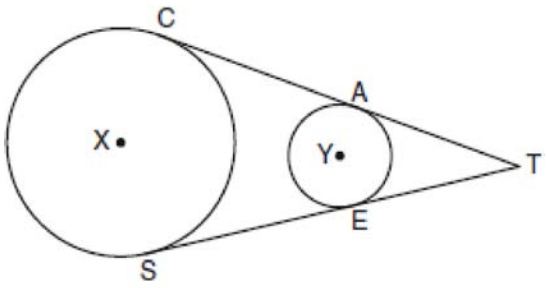
What is the total number of lines of tangency that are common to circle A and circle B?
a. 1
b. 2
c. 3
d. 4

71. *080928ge, G.G.50*
How many common tangent lines can be drawn to the two externally tangent circles shown below?



a. 1
b. 2
c. 3
d. 4

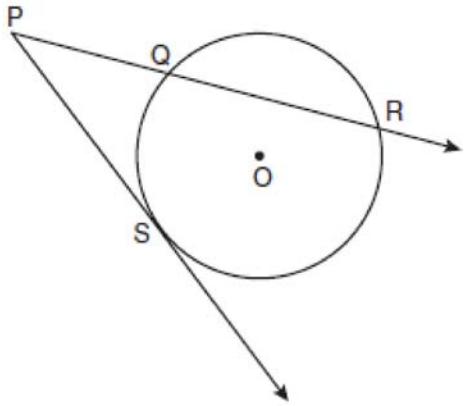
72. *060935ge, G.G.50*
In the diagram below, circles X and Y have two tangents drawn to them from external point T. The points of tangency are C, A, S, and E. The ratio of TA to AC is $1:3$. If $TS = 24$, find the length of $\overline{SE}$.



(Not drawn to scale)

CHORDS, SECANTS AND TANGENTS

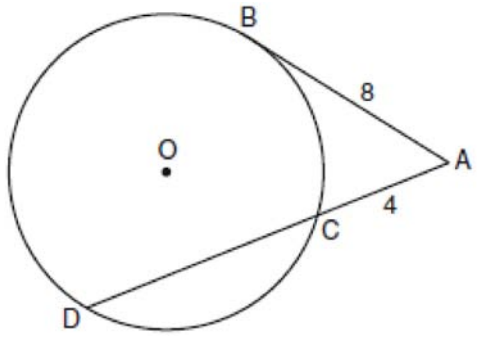
73. *fall0817ge, G.G.53*
In the diagram below, $\overline{PS}$ is a tangent to circle O at point S, $\overline{PQR}$ is a secant, $PS = x$, $PQ = 3$, and $PR = x + 18$.



(Not drawn to scale)

What is the length of $\overline{PS}$?
a. 6
b. 9
c. 3
d. 27

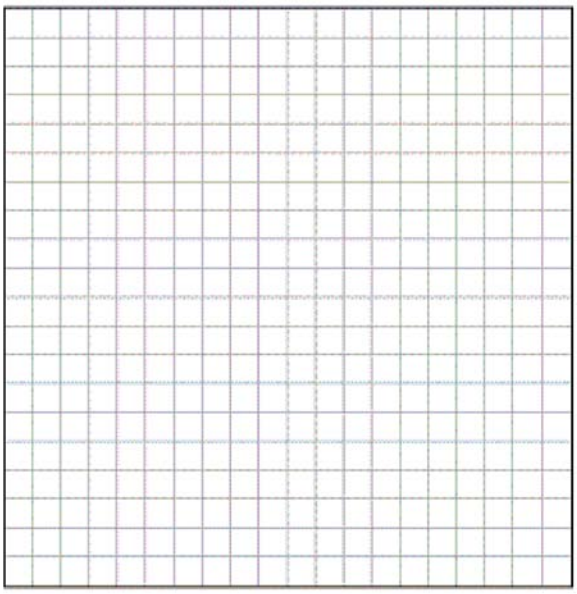
74. *060916ge, G.G.53*
In the diagram below, tangent $\overline{AB}$ and secant $\overline{ACD}$ are drawn to circle O from an external point A, $AB = 8$, and $AC = 4$.



What is the length of $\overline{CD}$?
a. 16
b. 13
c. 12
d. 10

PERIMETER

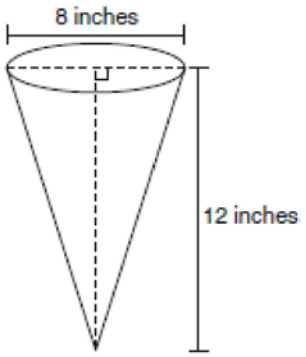
75. *060936ge, G.G.69*
Triangle ABC has coordinates $A(-6,2)$, $B(-3,6)$, and $C(5,0)$. Find the perimeter of the triangle. Express your answer in simplest radical form. [The use of the grid below is optional.]



VOLUME-GE

76. *fall0815ge, G.G.12*
A rectangular prism has a volume of $3x^2 + 18x + 24$. Its base has a length of $x + 2$ and a width of 3. Which expression represents the height of the prism?
a. $x + 4$
b. $x + 2$
c. 3
d. $x^2 + 6x + 8$

77. *060921ge, G.G.15*
In the diagram below, a right circular cone has a diameter of 8 inches and a height of 12 inches.

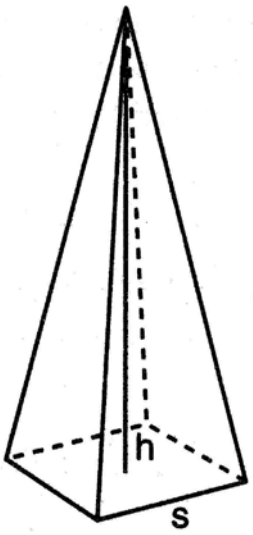


What is the volume of the cone to the *nearest cubic inch*?
a. 201
b. 481
c. 603
d. 804

78. *080926ge, G.G.14*
A right circular cylinder has a volume of 1,000 cubic inches and a height of 8 inches. What is the radius of the cylinder to the *nearest tenth of an inch*?
a. 6.3
b. 11.2
c. 19.8
d. 39.8

79. *fall0833ge, G.G.14*
The volume of a cylinder is 12,566.4 cm^3. The height of the cylinder is 8 cm. Find the radius of the cylinder to the *nearest tenth of a centimeter*.

80. *080930ge, G.G.13*
A regular pyramid with a square base is shown in the diagram below.

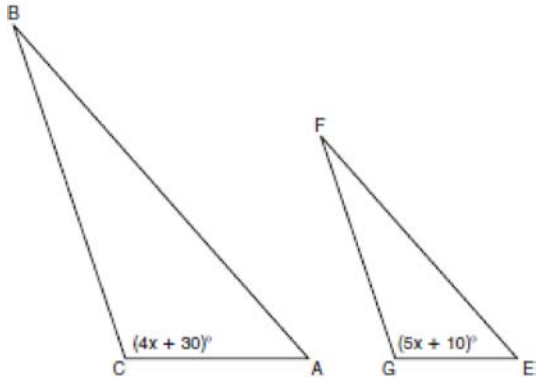


A side, *s*, of the base of the pyramid is 12 meters, and the height, *h*, is 42 meters. What is the volume of the pyramid in cubic meters?

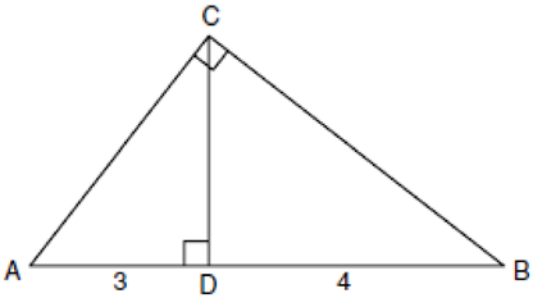
SIMILARITY

81. *060927ge, G.G.45*
In $\triangle ABC$, point D is on $\overline{AB}$, and point E is on $\overline{BC}$ such that $\overline{DE} \parallel \overline{AC}$. If $DB = 2$, $DA = 7$, and $DE = 3$, what is the length of $\overline{AC}$?
a. 8
b. 9
c. 10.5
d. 13.5

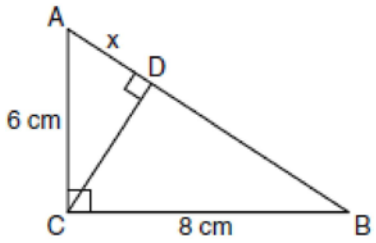
82. *060934ge, G.G.45*
In the diagram below, $\triangle ABC \sim \triangle EFG$, $m\angle C = 4x + 30$, and $m\angle G = 5x + 10$. Determine the value of x.



83. *fall0829ge, G.G.47*
In the diagram below of right triangle ACB, altitude $\overline{CD}$ intersects $\overline{AB}$ at D. If $AD = 3$ and $DB = 4$, find the length of $\overline{CD}$ in simplest radical form.

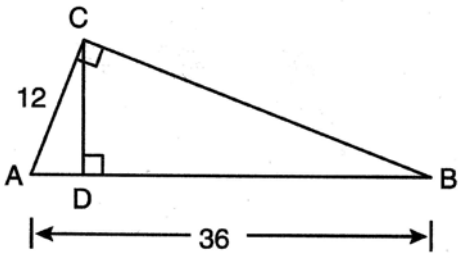


84. *060915ge, G.G.47*
In the diagram below, the length of the legs $\overline{AC}$ and $\overline{BC}$ of right triangle ABC are 6 cm and 8 cm, respectively. Altitude $\overline{CD}$ is drawn to the hypotenuse of $\triangle ABC$.



What is the length of $\overline{AD}$ to the *nearest tenth of a centimeter*?
a. 3.6
b. 6.0
c. 6.4
d. 4.0

85. *080922ge, G.G.47*
In the diagram below of right triangle ACB, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$.



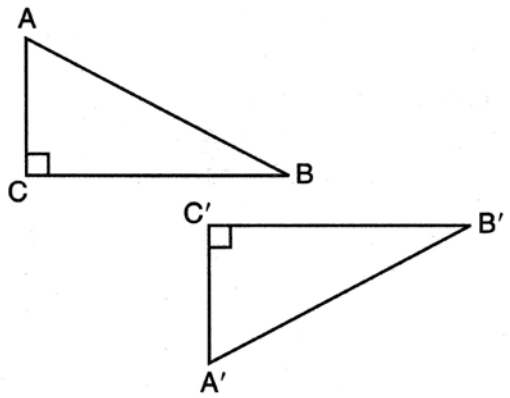
If $AB = 36$ and $AC = 12$, what is the length of $\overline{AD}$?
a. 32
b. 6
c. 3
d. 4

PERIMETER, AREA AND VOLUME OF SIMILAR FIGURES

86. *fall0826ge, G.G.45*
Two triangles are similar, and the ratio of each pair of corresponding sides is 2 : 1. Which statement regarding the two triangles is *not* true?
a. Their areas have a ratio of 4 : 1.
b. Their altitudes have a ratio of 2 : 1.
c. Their perimeters have a ratio of 2 : 1.
d. Their corresponding angles have a ratio of 2 : 1.

IDENTIFYING TRANSFORMATIONS

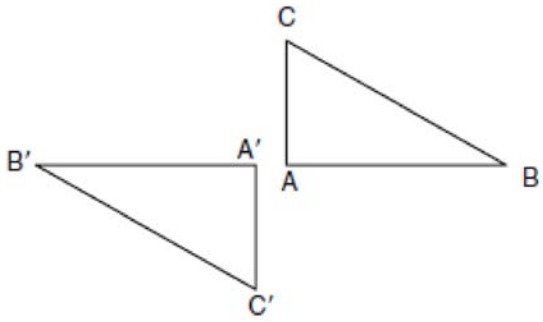
87. *080915ge, G.G.56*
In the diagram below, which transformation was used to map $\triangle ABC$ to $\triangle A'B'C'$?



a. dilation
b. rotation
c. reflection
d. glide reflection

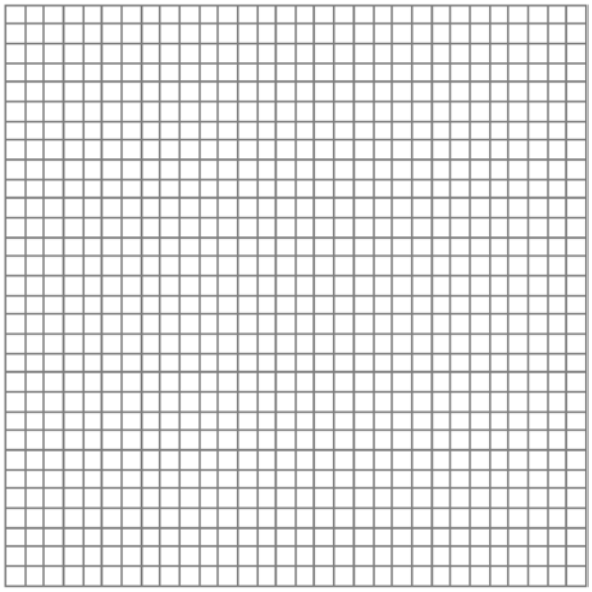
88. *080906ge, G.G.59*
Which transformation produces a figure similar but not congruent to the original figure?
a. $T_{1,3}$
b. $D\frac{1}{2}$
c. $R_{90°}$
d. $r_{y=x}$

89. *060903ge, G.G.56*
In the diagram below, under which transformation will $\triangle A'B'C'$ be the image of $\triangle ABC$?



a. rotation
b. dilation
c. translation
d. glide reflection

90. *fall0830ge, G.G.55*
The vertices of $\triangle ABC$ are $A(3,2)$, $B(6,1)$, and $C(4,6)$. Identify and graph a transformation of $\triangle ABC$ such that its image, $\triangle A'B'C'$, results in $\overline{AB} \parallel \overline{A'B'}$.



TRANSLATIONS

91. *fall0818ge, G.G.61*
A polygon is transformed according to the rule: $(x,y) \rightarrow (x+2,y)$. Every point of the polygon moves two units in which direction?
a. up
b. down
c. left
d. right

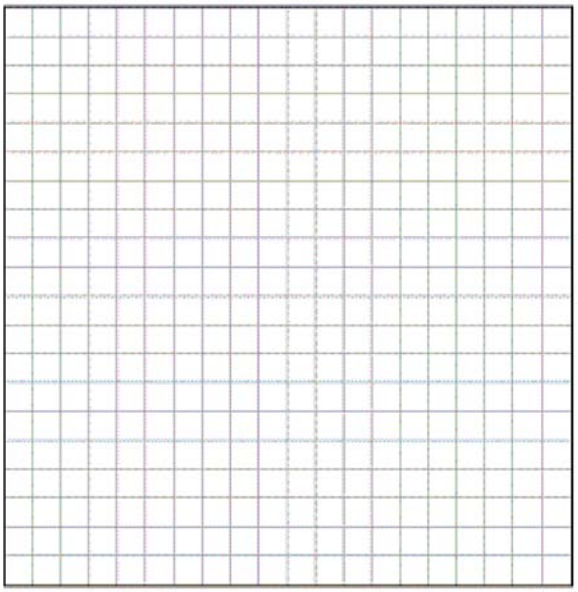
92. *fall0803ge, G.G.54*
Triangle ABC has vertices $A(1,3)$, $B(0,1)$, and $C(4,0)$. Under a translation, A', the image point of A, is located at $(4,4)$. Under this same translation, point C' is located at
a. $(7,1)$
b. $(5,3)$
c. $(3,2)$
d. $(1,-1)$

REFLECTIONS

93. *060905ge, G.G.54*
Point A is located at $(4,-7)$. The point is reflected in the x-axis. Its image is located at
a. $(-4,7)$
b. $(-4,-7)$
c. $(4,7)$
d. $(7,-4)$

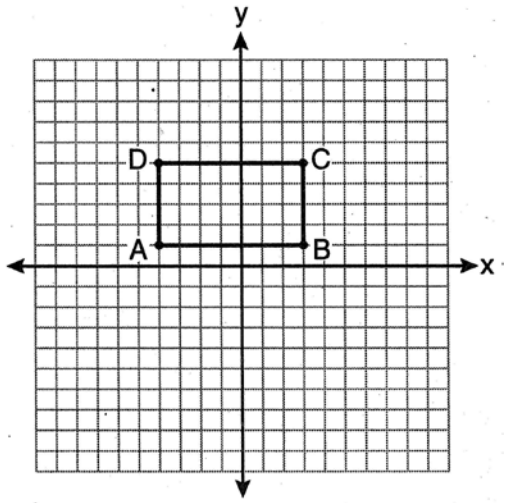
ROTATIONS

94. *080937ge, G.G.55*
Triangle *DEG* has the coordinates $D(1,1)$, $E(5,1)$, and $G(5,4)$. Triangle *DEG* is rotated 90° about the origin to form $\triangle D'E'G'$. On the grid below, graph and label $\triangle DEG$ and $\triangle D'E'G'$. State the coordinates of the vertices D', E', and G'. Justify that this transformation preserves distance.



COMPOSITIONS OF TRANSFORMATIONS

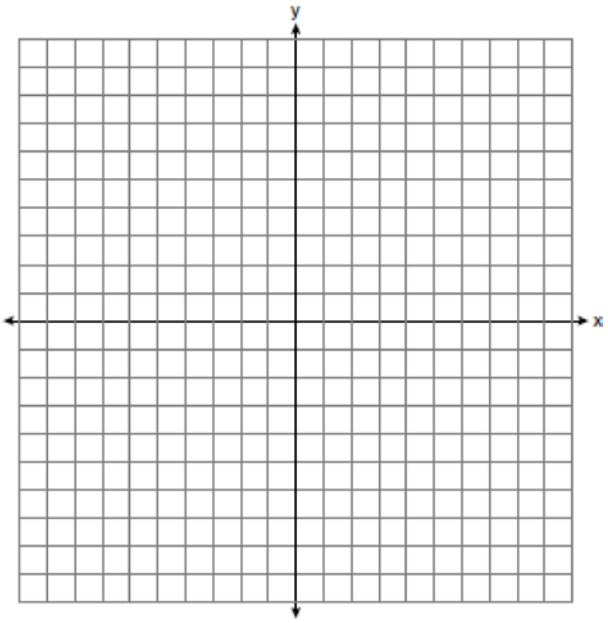
95. *080908ge, G.G.57*
On the set of axes below, Geoff drew rectangle *ABCD*. He will transform the rectangle by using the translation $(x,y) \rightarrow (x+2,y+1)$ and then will reflect the translated rectangle over the *x*-axis.



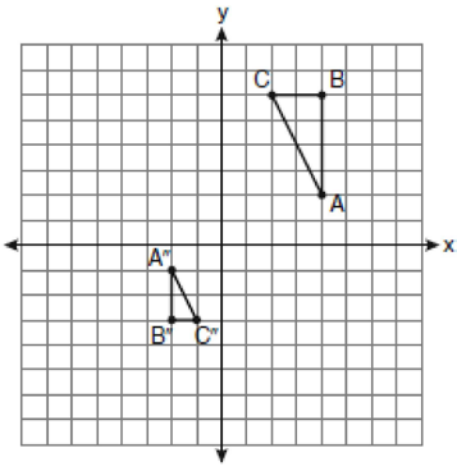
What will be the area of the rectangle after these transformations?

a. exactly 28 square units
b. less than 28 square units
c. greater than 28 square units
d. It cannot be determined from the information given.

96. *060937ge, G.G.58*
The coordinates of the vertices of parallelogram $ABCD$ are $A(-2,2)$, $B(3,5)$, $C(4,2)$, and $D(-1,-1)$. State the coordinates of the vertices of parallelogram $A''B''C''D''$ that result from the transformation $r_{y-\text{axis}} \circ T_{2,-3}$. [The use of the set of axes below is optional.]



97. *060908ge, G.G.60*
After a composition of transformations, the coordinates $A(4,2)$, $B(4,6)$, and $C(2,6)$ become $A''(-2,-1)$, $B''(-2,-3)$, and $C''(-1,-3)$, as shown on the set of axes below.



Which composition of transformations was used?
a. $R_{180^\circ} \circ D_2$
b. $R_{90^\circ} \circ D_2$
c. $D_{\frac{1}{2}} \circ R_{180^\circ}$
d. $D_{\frac{1}{2}} \circ R_{90^\circ}$

98. *fall0823ge, G.G.58*
The endpoints of $\overline{AB}$ are $A(3,2)$ and $B(7,1)$. If $\overline{A''B''}$ is the result of the transformation of $\overline{AB}$ under $D_2 \circ T_{-4,3}$ what are the coordinates of A'' and B''?
a. $A''(-2,10)$ and $B''(6,8)$
b. $A''(-1,5)$ and $B''(3,4)$
c. $A''(2,7)$ and $B''(10,5)$
d. $A''(14,-2)$ and $B''(22,-4)$

LOGICAL REASONING

99. *fall0802ge, G.G.24*
What is the negation of the statement "The Sun is shining"?
a. It is cloudy.
b. It is daytime.
c. It is not raining.
d. The Sun is not shining.

100. *080924ge, G.G.24*
What is the negation of the statement "Squares are parallelograms"?
a. Parallelograms are squares.
b. Parallelograms are not squares.
c. It is not the case that squares are parallelograms.
d. It is not the case that parallelograms are squares.

101. *060933ge, G.G.25*
Given: Two is an even integer or three is an even integer.
Determine the truth value of this disjunction.
Justify your answer.

CONTRAPOSITIVE

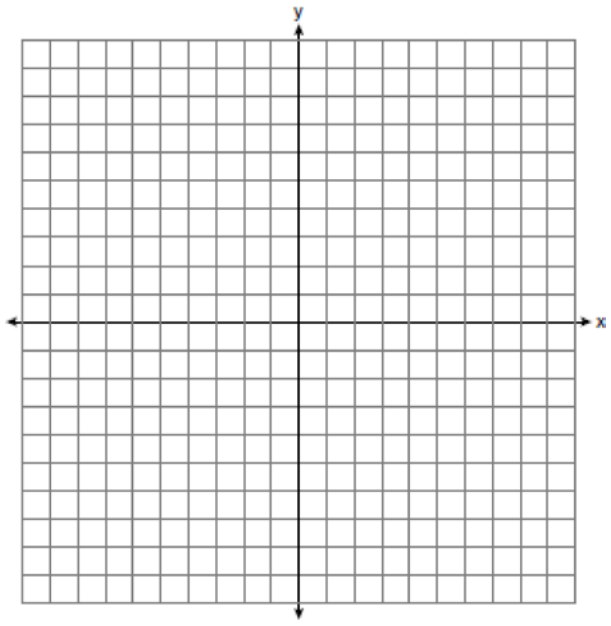
102. *060913ge, G.G.26*
What is the contrapositive of the statement, "If I am tall, then I will bump my head"?
a. If I bump my head, then I am tall.
b. If I do not bump my head, then I am tall.
c. If I am tall, then I will not bump my head.
d. If I do not bump my head, then I am not tall.

CONDITIONAL STATEMENTS

103. *fall0834ge, G.G.26*
Write a statement that is logically equivalent to the statement "If two sides of a triangle are congruent, the angles opposite those sides are congruent." Identify the new statement as the converse, inverse, or contrapositive of the original statement.

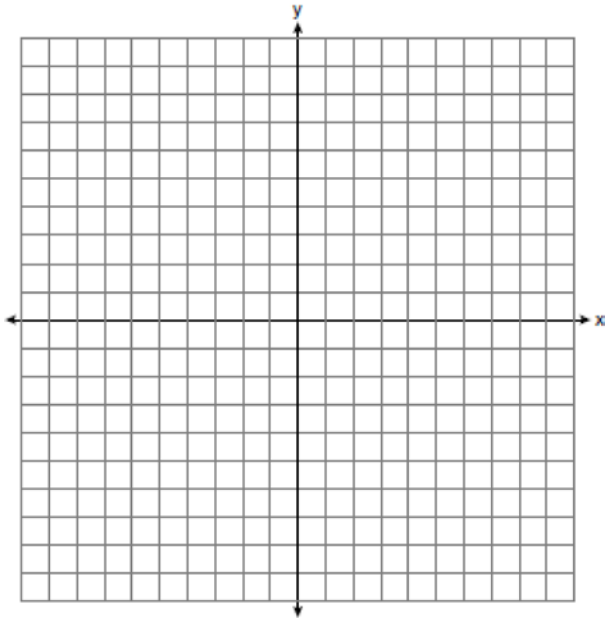
LOCUS-2

104. *080936ge, G.G.23*
On the set of axes below, sketch the points that are 5 units from the origin and sketch the points that are 2 units from the line $y = 3$. Label with an **X** all points that satisfy both conditions.



105. *fall0837ge, G.G.23*

A city is planning to build a new park. The park must be equidistant from school A at $(3,3)$ and school B at $(3,-5)$. The park also must be exactly 5 miles from the center of town, which is located at the origin on the coordinate graph. Each unit on the graph represents 1 mile. On the set of axes below, sketch the compound loci and label with an **X** all possible locations for the new park.

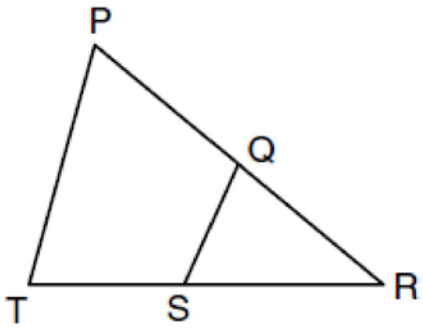


106. *060932ge, G.G.22*
The length of $\overline{AB}$ is 3 inches. On the diagram below, sketch the points that are equidistant from *A* and *B* and sketch the points that are 2 inches from A. Label with an **X** all points that satisfy both conditions.

107. *060912ge, G.G.22*
In a coordinate plane, how many points are both 5 units from the origin and 2 units from the *x*-axis?
a. 1
b. 2
c. 3
d. 4

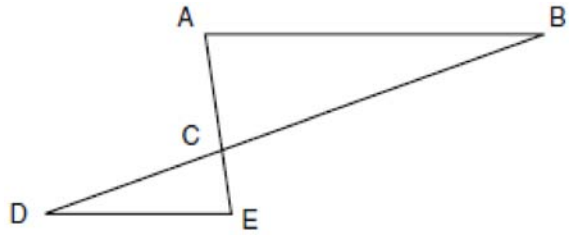
SIMILARITY PROOFS

108. *fall0821ge, G.G.44*
In the diagram below of $\triangle PRT$, Q is a point on $\overline{PR}$, S is a point on $\overline{TR}$, $\overline{QS}$ is drawn, and $\angle RPT \cong \angle RSQ$.



Which reason justifies the conclusion that $\triangle PRT \sim \triangle SRQ$?
a. AA
b. ASA
c. SAS
d. SSS

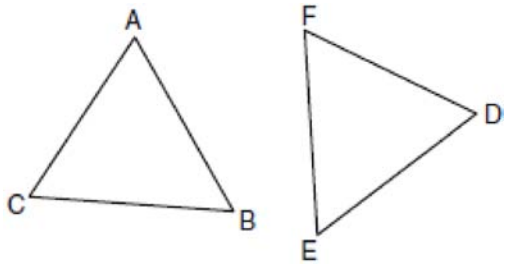
109. *060917ge, G.G.44*
In the diagram of $\triangle ABC$ and $\triangle EDC$ below, $\overline{AE}$ and $\overline{BD}$ intersect at C, and $\angle CAB \cong \angle CED$.



Which method can be used to show that $\triangle ABC$ must be similar to $\triangle EDC$?
a. SAS
b. AA
c. SSS
d. HL

CONGRUENCY PROOFS

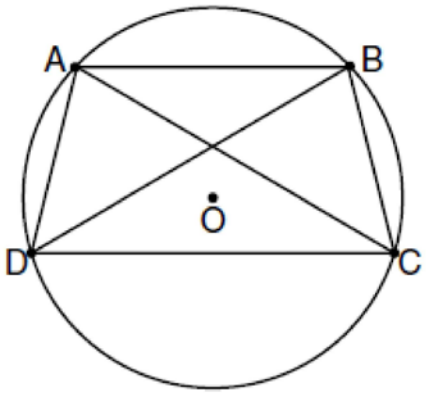
110. *060902ge, G.G.28*
In the diagram of $\triangle ABC$ and $\triangle DEF$ below, $\overline{AB} \cong \overline{DE}$, $\angle A \cong \angle D$, and $\angle B \cong \angle E$.



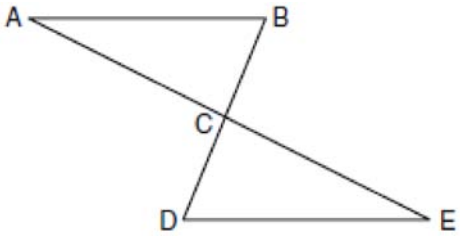
Which method can be used to prove $\triangle ABC \cong \triangle DEF$?
a. SSS
b. SAS
c. ASA
d. HL

111. *080913ge, G.G.28*
The diagonal $\overline{AC}$ is drawn in parallelogram $ABCD$. Which method can *not* be used to prove that $\triangle ABC \cong \triangle CDA$?
a. SSS
b. SAS
c. SSA
d. ASA

112. *fall0838ge, G.G.28*
In the diagram below, quadrilateral $ABCD$ is inscribed in circle O, $\overline{AB} \parallel \overline{DC}$, and diagonals $\overline{AC}$ and $\overline{BD}$ are drawn. Prove that $\triangle ACD \cong \triangle BDC$.



113. *060938ge, G.G.27*
Given: $\triangle ABC$ and $\triangle EDC$, C is the midpoint of $\overline{BD}$ and $\overline{AE}$
Prove: $\overline{AB} \parallel \overline{DE}$



QUADRILATERAL PROOFS

114. *080938ge, G.G.27*
Given: Quadrilateral $ABCD$, diagonal $\overline{AFEC}$, $\overline{AE} \cong \overline{FC}$, $\overline{BF} \perp \overline{AC}$, $\overline{DE} \perp \overline{AC}$, $\angle 1 \cong \angle 2$
Prove: $ABCD$ is a parallelogram.