JEFFERSON MATH PROJECT REGENTS AT RANDOM

The NY Geometry Regents Exams
Fall 2008-August 2011
(Answer Key)

www.jmap.org

Dear Sir

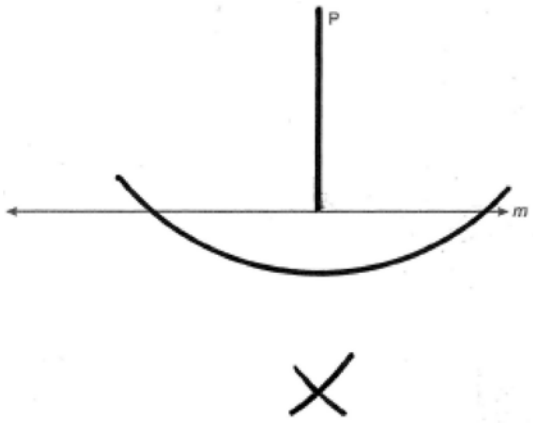
I have to acknolege the reciept of your favor of May 14. in which you mention that you have finished the 6. first books of Euclid, plane trigonometry, surveying & algebra and ask whether I think a further pursuit of that branch of science would be useful to you. there are some propositions in the latter 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.

Geometry Regents at Random

Answer Section

1 ANS:



PTS: 2 REF: 060930ge STA: G.G.19 TOP: Constructions

2 ANS: 1 PTS: 2 REF: 061125ge STA: G.G.39
TOP: Special Parallelograms

3 ANS: 2 PTS: 2 REF: 061002ge STA: G.G.24
TOP: Negations

4 ANS: 2 PTS: 2 REF: 061126ge STA: G.G.59
TOP: Properties of Transformations

5 ANS: 1

$x + 2x + 2 + 3x + 4 = 180$

$6x + 6 = 180$

$x = 29$

PTS: 2 REF: 011002ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

6 ANS: 4 PTS: 2 REF: 011124ge STA: G.G.51
TOP: Arcs Determined by Angles KEY: inscribed

7 ANS:
4. $l_1 w_1 h_1 = l_2 w_2 h_2$

$10 \times 2 \times h = 5 \times w_2 \times h$

$20 = 5w_2$

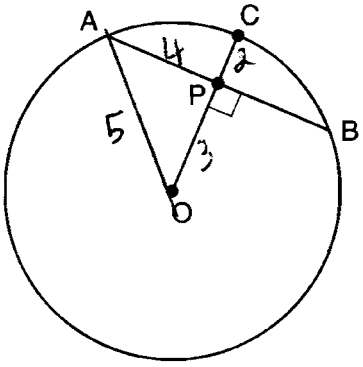
$w_2 = 4$

PTS: 2 REF: 011030ge STA: G.G.11 TOP: Volume

8 ANS: 4
$d = \sqrt{(-3-1)^2 + (2-0)^2} = \sqrt{16+4} = \sqrt{20} = \sqrt{4} \cdot \sqrt{5} = 2\sqrt{5}$

PTS: 2 REF: 011017ge STA: G.G.67 TOP: Distance
KEY: general

9 ANS: 3



PTS: 2 REF: 011112ge STA: G.G.49 TOP: Chords

10 ANS: 4
$\overline{BG}$ is also an angle bisector since it intersects the concurrence of $\overline{CD}$ and $\overline{AE}$

PTS: 2 REF: 061025ge STA: G.G.21
KEY: Centroid, Orthocenter, Incenter and Circumcenter

11 ANS: 3 PTS: 2 REF: 011010ge STA: G.G.71
TOP: Equations of Circles

12 ANS: 2
$M_x = \frac{7+(-3)}{2} = 2.$ $M_Y = \frac{-1+3}{2} = 1.$

PTS: 2 REF: 011106ge STA: G.G.66 TOP: Midpoint

13 ANS: 3 PTS: 2 REF: 061017ge STA: G.G.1
TOP: Planes

14 ANS:

67. $\frac{180-46}{2}=67$

PTS: 2 REF: 011029ge STA: G.G.31 TOP: Isosceles Triangle Theorem

15 ANS: 2

$V=\frac{4}{3}\pi r^3=\frac{4}{3}\pi\cdot 3^3=36\pi$

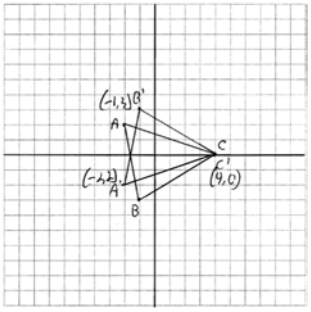
PTS: 2 REF: 061112ge STA: G.G.16 TOP: Volume and Surface Area

16 ANS:

$\overline{JK}\cong\overline{LM}$ because opposite sides of a parallelogram are congruent. $\overline{LM}\cong\overline{LN}$ because of the Isosceles Triangle Theorem. $\overline{LM}\cong\overline{JM}$ because of the transitive property. *JKLM* is a rhombus because all sides are congruent.

PTS: 4 REF: 011036ge STA: G.G.41 TOP: Special Quadrilaterals

17 ANS:



PTS: 2 REF: 011130ge STA: G.G.54 TOP: Reflections
KEY: grids

18 ANS: 1 PTS: 2 REF: 060918ge STA: G.G.2
TOP: Planes

19 ANS:

$(5-2)180=540$. $\frac{540}{5}=108$ interior. $180-108=72$ exterior

PTS: 2 REF: 011131ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

20 ANS: 2 PTS: 2 REF: 011020ge STA: G.G.74
TOP: Graphing Circles

21 ANS: 2

$(d+4)4=12(6)$

$4d+16=72$

$d=14$

$r=7$

PTS: 2 REF: 061023ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two secants

22 ANS: 3

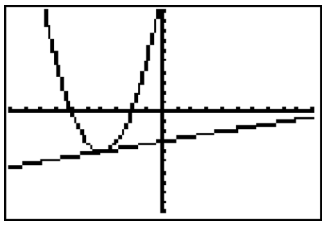
$m = \frac{-A}{B} = -\frac{3}{4}$

PTS: 2 REF: 011025ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

23 ANS: 4 PTS: 2 REF: 061008ge STA: G.G.40
TOP: Trapezoids

24 ANS: 4 PTS: 2 REF: 011009ge STA: G.G.19
TOP: Constructions

25 ANS: 3



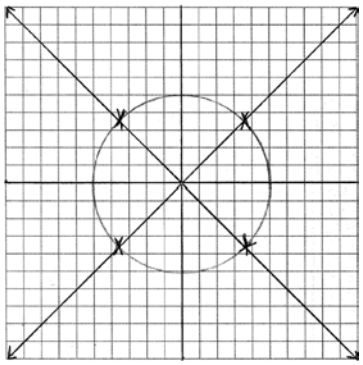
PTS: 2 REF: 061011ge STA: G.G.70 TOP: Quadratic-Linear Systems

26 ANS: 3

$(3,-2) \rightarrow (2,3) \rightarrow (8,12)$

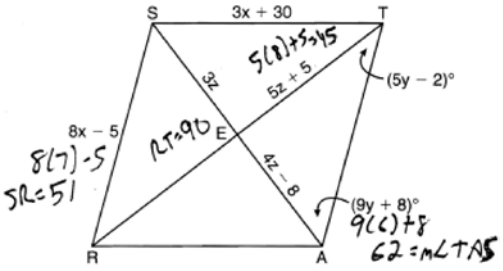
PTS: 2 REF: 011126ge STA: G.G.54 TOP: Compositions of Transformations
KEY: basic

27 ANS:



PTS: 4 REF: 011037ge STA: G.G.23 TOP: Locus

28 ANS:



$8x - 5 = 3x + 30$. $4z - 8 = 3z$. $9y + 8 + 5y - 2 = 90$.

$5x = 35$ $z = 8$ $14y + 6 = 90$

$x = 7$ $14y = 84$

$y = 6$

PTS: 6 REF: 061038ge STA: G.G.39 TOP: Special Parallelograms

29 ANS: 3 PTS: 2 REF: 060905ge STA: G.G.54
TOP: Reflections KEY: basic

30 ANS: 4

$d = \sqrt{(146 - (-4))^2 + (52 - 2)^2} = \sqrt{25{,}000} \approx 158.1$

PTS: 2 REF: 061021ge STA: G.G.67 TOP: Distance
KEY: general

31 ANS: 4

$\triangle ABC \sim \triangle DBE$. $\frac{\overline{AB}}{\overline{DB}} = \frac{\overline{AC}}{\overline{DE}}$

$\frac{9}{2} = \frac{x}{3}$

$x = 13.5$

PTS: 2 REF: 060927ge STA: G.G.46 TOP: Side Splitter Theorem

32 ANS:
The medians of a triangle are not concurrent. False.

PTS: 2 REF: 061129ge STA: G.G.24 TOP: Negations

33 ANS:

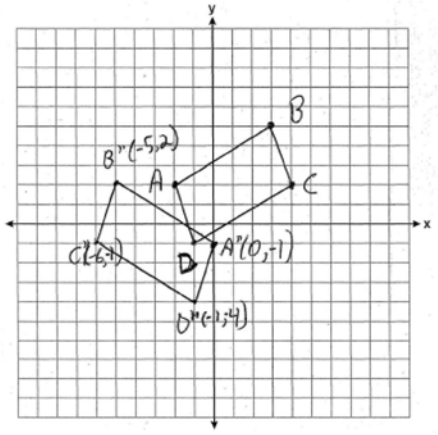
$y = -2x + 14$. The slope of $2x + y = 3$ is $\frac{-A}{B} = \frac{-2}{1} = -2$. $y = mx + b$.

$4 = (-2)(5) + b$

$b = 14$

PTS: 2 REF: 060931ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

34 ANS:



PTS: 4 REF: 060937ge STA: G.G.54 TOP: Compositions of Transformations
KEY: grids

35 ANS: 4

$y = mx + b$

$3 = \frac{3}{2}(-2) + b$

$3 = -3 + b$

$6 = b$

PTS: 2 REF: 011114ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

36 ANS:

6. The centroid divides each median into segments whose lengths are in the ratio 2 : 1. $\overline{TD} = 6$ and $\overline{DB} = 3$

PTS: 2 REF: 011034ge STA: G.G.43 TOP: Centroid

37 ANS: 2 PTS: 2 REF: 061020ge STA: G.G.19
TOP: Constructions

38 ANS: 4

The radius is 4. $r^2 = 16$.

PTS: 2 REF: 061014ge STA: G.G.72 TOP: Equations of Circles

39 ANS: 1 PTS: 2 REF: 011112ge STA: G.G.39
TOP: Special Parallelograms

40 ANS: 1

$A'(2,4)$

PTS: 2 REF: 011023ge STA: G.G.54 TOP: Compositions of Transformations
KEY: basic

41 ANS: 2

Adjacent sides of a rectangle are perpendicular and have opposite and reciprocal slopes.

PTS: 2 REF: 061028ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

42 ANS: 3

$m = \frac{-A}{B} = \frac{5}{2}$. $m = \frac{-A}{B} = \frac{10}{4} = \frac{5}{2}$

PTS: 2 REF: 011014ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

43 ANS: 1 PTS: 2 REF: 061010ge STA: G.G.34
TOP: Angle Side Relationship

44 ANS: 3

$x + 2x + 15 = 5x + 15$ $2(5) + 15 = 25$

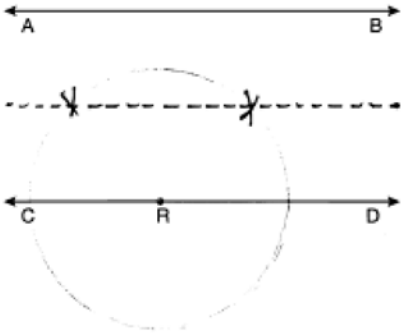
$3x + 15 = 5x + 5$

$10 = 2x$

$5 = x$

PTS: 2 REF: 011127ge STA: G.G.32 TOP: Exterior Angle Theorem

45 ANS:



PTS: 2 REF: 061033ge STA: G.G.22 TOP: Locus

46 ANS: 1 PTS: 2 REF: 060920ge STA: G.G.74
TOP: Graphing Circles

47 ANS: 3 PTS: 2 REF: 061122ge STA: G.G.56
TOP: Identifying Transformations

48 ANS: 3

$8^2 + 24^2 \neq 25^2$

PTS: 2 REF: 011111ge STA: G.G.48 TOP: Pythagorean Theorem

49 ANS:

452. $SA = 4\pi r^2 = 4\pi \cdot 6^2 = 144\pi \approx 452$

PTS: 2 REF: 061029ge STA: G.G.16 TOP: Surface Area

50 ANS: 1

Parallel lines intercept congruent arcs.

PTS: 2 REF: 061001ge STA: G.G.52 TOP: Chords

51 ANS:

$y = \frac{2}{3}x + 1$. $2y + 3x = 6$. $y = mx + b$

$2y = -3x + 6$ $5 = \frac{2}{3}(6) + b$

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

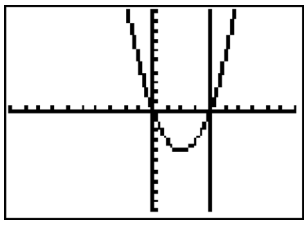
$m = -\frac{3}{2}$ $1 = b$

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

$m_{\perp} = \frac{2}{3}$

PTS: 4 REF: 061036ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

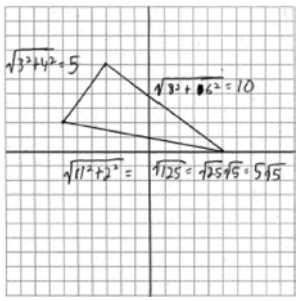
52 ANS: 1



$y = x^2 - 4x = (4)^2 - 4(4) = 0$. $(4,0)$ is the only intersection.

PTS: 2 REF: 060923ge STA: G.G.70 TOP: Quadratic-Linear Systems

53 ANS:



$15 + 5\sqrt{5}$.

PTS: 4 REF: 060936ge STA: G.G.69 TOP: Triangles in the Coordinate Plane

54 ANS:

$\overline{OA} \cong \overline{OB}$ because all radii are equal. $\overline{OP} \cong \overline{OP}$ because of the reflexive property. $\overline{OA} \perp \overline{PA}$ and $\overline{OB} \perp \overline{PB}$ because tangents to a circle are perpendicular to a radius at a point on a circle. $\angle PAO$ and $\angle PBO$ are right angles because of the definition of perpendicular. $\angle PAO \cong \angle PBO$ because all right angles are congruent. $\triangle AOP \cong \triangle BOP$ because of HL. $\angle AOP \cong \angle BOP$ because of CPCTC.

PTS: 5 REF: 061138ge STA: G.G.27 TOP: Circle Proofs

55 ANS: 1

Opposite sides of a parallelogram are congruent. $4x - 3 = x + 3$. $SV = (2) + 3 = 5$.

$3x = 6$

$x = 2$

PTS: 2 REF: 011013ge STA: G.G.38 TOP: Parallelograms

56 ANS: 2

Parallel chords intercept congruent arcs. $\text{m}\overset{\frown}{AD} = \text{m}\overset{\frown}{BC} = 60$. $\text{m}\angle CDB = \frac{1}{2}\text{m}\overset{\frown}{BC} = 30$.

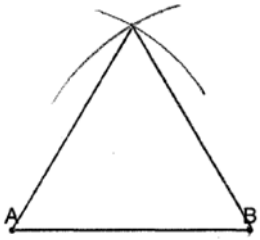
PTS: 2 REF: 060906ge STA: G.G.52 TOP: Chords

57 ANS: 1 PTS: 2 REF: 061104ge STA: G.G.43
TOP: Centroid

58 ANS: 3 PTS: 2 REF: 011110ge STA: G.G.21
KEY: Centroid, Orthocenter, Incenter and Circumcenter

59 ANS: 3 PTS: 2 REF: 060908ge STA: G.G.60
TOP: Identifying Transformations

60 ANS:



PTS: 2 REF: 011032ge STA: G.G.20 TOP: Constructions

61 ANS: 2 PTS: 2 REF: 061107ge STA: G.G.32
TOP: Exterior Angle Theorem

62 ANS: 2

$\frac{4x+10}{2} = 2x+5$

PTS: 2 REF: 011103ge STA: G.G.42 TOP: Midsegments

63 ANS:

Midpoint: $\left(\frac{-4+4}{2}, \frac{2+(-4)}{2}\right) = (0,-1)$. Distance: $d = \sqrt{(-4-4)^2 + (2-(-4))^2} = \sqrt{100} = 10$

$r = 5$

$r^2 = 25$

$x^2 + (y+1)^2 = 25$

PTS: 2 REF: 061037ge STA: G.G.71 TOP: Equations of Circles

64 ANS:

Yes. A reflection is an isometry.

PTS: 2 REF: 061132ge STA: G.G.56 TOP: Identifying Transformations

65 ANS: 1 PTS: 2 REF: 011128ge STA: G.G.2
TOP: Planes

66 ANS: 4 PTS: 2 REF: 061118ge STA: G.G.1
TOP: Planes

67 ANS: 4
$L = 2\pi rh = 2\pi \cdot 5 \cdot 11 \approx 345.6$

PTS: 2 REF: 061006ge STA: G.G.14 TOP: Volume
68 ANS: 1 PTS: 2 REF: 011024ge STA: G.G.3
TOP: Planes
69 ANS:
34. $2x - 12 + x + 90 = 180$

$3x + 78 = 90$

$3x = 102$

$x = 34$

PTS: 2 REF: 061031ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles
70 ANS:
9.1. $(11)(8)h = 800$

$h \approx 9.1$

PTS: 2 REF: 061131ge STA: G.G.12 TOP: Volume
71 ANS: 3 PTS: 2 REF: 061102ge STA: G.G.29
TOP: Triangle Congruency
72 ANS: 3 PTS: 2 REF: 011007ge STA: G.G.31
TOP: Isosceles Triangle Theorem
73 ANS: 4
$d = \sqrt{(-5-3)^2 + (4-(-6))^2} = \sqrt{64+100} = \sqrt{164} = \sqrt{4}\sqrt{41} = 2\sqrt{41}$

PTS: 2 REF: 011121ge STA: G.G.67 TOP: Distance
KEY: general
74 ANS: 3 PTS: 2 REF: 061004ge STA: G.G.31
TOP: Isosceles Triangle Theorem
75 ANS: 1
$x^2 = 7(16-7)$

$x^2 = 63$

$x = \sqrt{9}\sqrt{7}$

$x = 3\sqrt{7}$

PTS: 2 REF: 061128ge STA: G.G.47 TOP: Similarity
KEY: altitude
76 ANS:
37. Since $\overline{DE}$ is a midsegment, $AC = 14$. $10 + 13 + 14 = 37$

PTS: 2 REF: 061030ge STA: G.G.42 TOP: Midsegments
77 ANS: 1 PTS: 2 REF: 061108ge STA: G.G.9
TOP: Planes

78 ANS: 2 PTS: 2 REF: 061007ge STA: G.G.35
TOP: Parallel Lines and Transversals

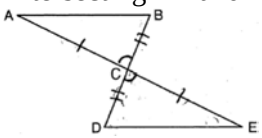
79 ANS: 2

$d = \sqrt{(-1-7)^2 + (9-4)^2} = \sqrt{64+25} = \sqrt{89}$

PTS: 2 REF: 061109ge STA: G.G.67 TOP: Distance
KEY: general

80 ANS:

$\overline{AC} \cong \overline{EC}$ and $\overline{DC} \cong \overline{BC}$ because of the definition of midpoint. $\angle ACB \cong \angle ECD$ because of vertical angles. $\triangle ABC \cong \triangle EDC$ because of SAS. $\angle CDE \cong \angle CBA$ because of CPCTC. $\overline{BD}$ is a transversal intersecting $\overline{AB}$ and $\overline{ED}$. Therefore $\overline{AB} \parallel \overline{DE}$ because $\angle CDE$ and $\angle CBA$ are congruent alternate interior angles.



PTS: 6 REF: 060938ge STA: G.G.27 TOP: Triangle Proofs

81 ANS: 1

$-2\left(-\frac{1}{2}y = 6x + 10\right)$

$y = -12x - 20$

PTS: 2 REF: 061027ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

82 ANS: 1

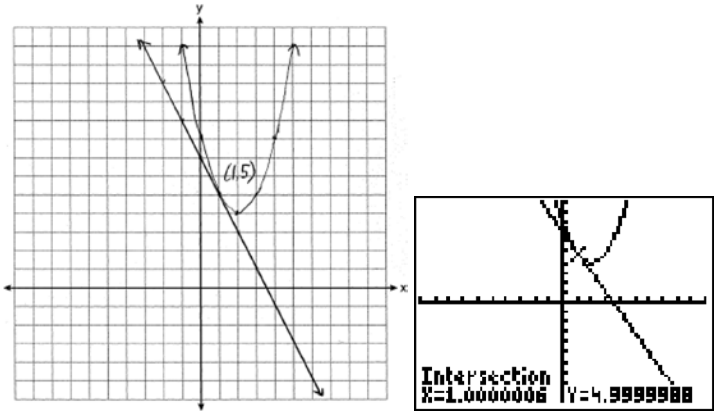
$3x + 5 + 4x - 15 + 2x + 10 = 180$. $m\angle D = 3(20) + 5 = 65$. $m\angle E = 4(20) - 15 = 65$.

$9x = 180$

$x = 20$

PTS: 2 REF: 061119ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

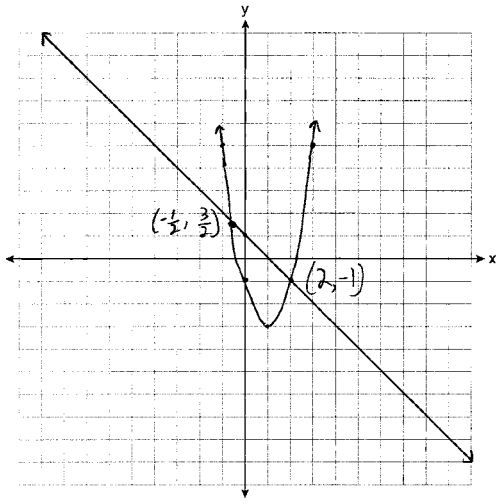
83 ANS:



PTS: 6 REF: 011038ge STA: G.G.70 TOP: Quadratic-Linear Systems

84 ANS: 3 PTS: 2 REF: 011104ge STA: G.G.38
TOP: Parallelograms

85 ANS:



PTS: 4 REF: 061137ge STA: G.G.70 TOP: Quadratic-Linear Systems

86 ANS: 2 PTS: 2 REF: 061022ge STA: G.G.62
TOP: Parallel and Perpendicular Lines

87 ANS: 4 PTS: 2 REF: 061018ge STA: G.G.56
TOP: Identifying Transformations

88 ANS: 2 PTS: 2 REF: 011109ge STA: G.G.9
TOP: Planes

89 ANS: 2

$$x^2 + (x+7)^2 = 13^2$$

$$x^2 + x^2 + 7x + 7x + 49 = 169$$

$$2x^2 + 14x - 120 = 0$$

$$x^2 + 7x - 60 = 0$$

$$(x+12)(x-5) = 0$$

$$x = 5$$

$$2x = 10$$

PTS: 2 REF: 061024ge STA: G.G.48 TOP: Pythagorean Theorem

90 ANS: 1 PTS: 2 REF: 061005ge STA: G.G.55
TOP: Properties of Transformations

91 ANS: 4

The slope of $y = -3x + 2$ is -3. The perpendicular slope is $\frac{1}{3}$. $-1 = \frac{1}{3}(3) + b$

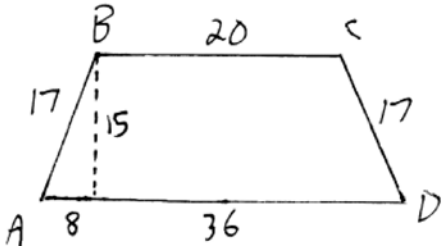
$$-1 = 1 + b$$

$$b = -2$$

PTS: 2 REF: 011018ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

92 ANS: 4 PTS: 2 REF: 011019ge STA: G.G.44
TOP: Similarity Proofs

93 ANS: 3



$\frac{36-20}{2} = 8.\ \sqrt{17^2 - 8^2} = 15$

PTS: 2 REF: 061016ge STA: G.G.40 TOP: Trapezoids

94 ANS: 2 PTS: 2 REF: 011011ge STA: G.G.22
TOP: Locus

95 ANS:

18. $V = \frac{1}{3}Bh = \frac{1}{3}lwh$

$288 = \frac{1}{3} \cdot 8 \cdot 6 \cdot h$

$288 = 16h$

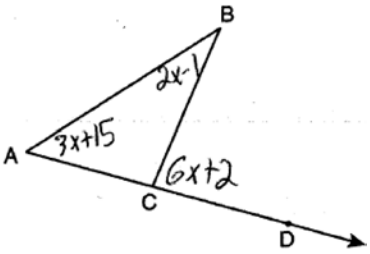
$18 = h$

PTS: 2 REF: 061034ge STA: G.G.13 TOP: Volume

96 ANS: 2
The centroid divides each median into segments whose lengths are in the ratio 2 : 1.

PTS: 2 REF: 060914ge STA: G.G.43 TOP: Centroid

97 ANS: 1



$3x + 15 + 2x - 1 = 6x + 2$

$5x + 14 = 6x + 2$

$x = 12$

PTS: 2 REF: 011021ge STA: G.G.32 TOP: Exterior Angle Theorem

98 ANS:
20. $5x + 10 = 4x + 30$

$x = 20$

PTS: 2 REF: 060934ge STA: G.G.45 TOP: Similarity
KEY: basic

99 ANS: 1
If $\angle A$ is at minimum (50°) and $\angle B$ is at minimum (90°), $\angle C$ is at maximum of 40° (180° - (50° + 90°)). If $\angle A$ is at maximum (60°) and $\angle B$ is at maximum (100°), $\angle C$ is at minimum of 20° (180° - (60° + 100°)).

PTS: 2 REF: 060901ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

100 ANS: 1
$V = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi \cdot 4^2 \cdot 12 \approx 201$

PTS: 2 REF: 060921ge STA: G.G.15 TOP: Volume

101 ANS: 3
$-5 + 3 = -2 \qquad 2 + -4 = -2$

PTS: 2 REF: 011107ge STA: G.G.54 TOP: Translations

102 ANS: 2
$V = \pi r^2 h = \pi \cdot 6^2 \cdot 15 = 540\pi$

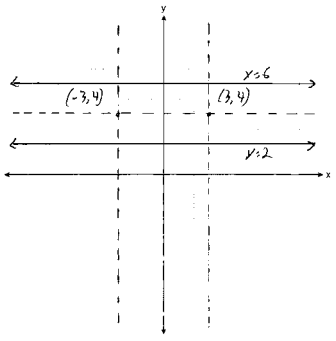
PTS: 2 REF: 011117ge STA: G.G.14 TOP: Volume

103 ANS: 2
Longest side of a triangle is opposite the largest angle. Shortest side is opposite the smallest angle.

PTS: 2 REF: 060911ge STA: G.G.34 TOP: Angle Side Relationship

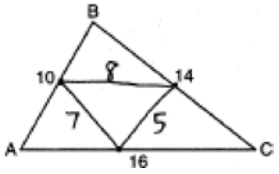
104 ANS: 1 PTS: 2 REF: 061110ge STA: G.G.72
TOP: Equations of Circles

105 ANS:



PTS: 4 REF: 061135ge STA: G.G.23 TOP: Locus

106 ANS:
20. The sides of the triangle formed by connecting the midpoints are half the sides of the original triangle.

$5 + 7 + 8 = 20.$ 

PTS: 2 REF: 060929ge STA: G.G.42 TOP: Midsegments

107 ANS: 4

$x^2 = (4+5) \times 4$

$x^2 = 36$

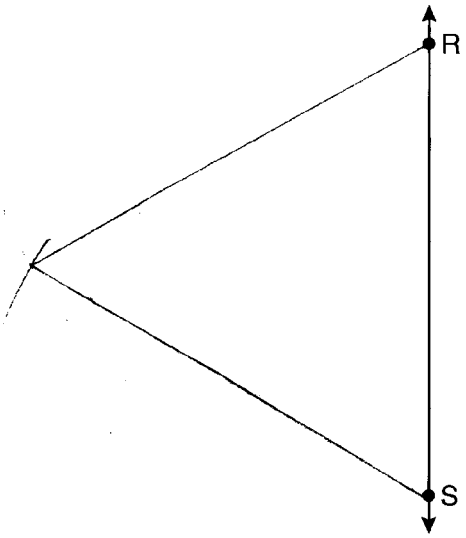
$x = 6$

PTS: 2 REF: 011008ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: tangent and secant

108 ANS: 4 PTS: 2 REF: 060912ge STA: G.G.23
TOP: Locus

109 ANS: 1 PTS: 2 REF: 061113ge STA: G.G.63
TOP: Parallel and Perpendicular Lines

110 ANS:



PTS: 2 REF: 061130ge STA: G.G.20 TOP: Constructions

111 ANS: 2 PTS: 2 REF: 011006ge STA: G.G.56
TOP: Identifying Transformations

112 ANS: 3

$\sqrt{5^2 + 12^2} = 13$

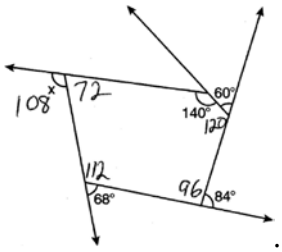
PTS: 2 REF: 061116ge STA: G.G.39 TOP: Special Parallelograms

113 ANS: 3

$V = \pi r^2 h = \pi \cdot 6^2 \cdot 27 = 972\pi$

PTS: 2 REF: 011027ge STA: G.G.14 TOP: Volume

114 ANS: 3



. The sum of the interior angles of a pentagon is $(5-2)180 = 540$.

PTS: 2 REF: 011023ge STA: G.G.36 TOP: Interior and Exterior Angles of Polygons

115 ANS: 1 PTS: 2 REF: 011122GE STA: G.G.28 TOP: Triangle Congruency

116 ANS:

30. $3x + 4x + 5x = 360$. $\text{m}\overset{\frown}{LN} : \text{m}\overset{\frown}{NK} : \text{m}\overset{\frown}{KL} = 90 : 120 : 150$. $\dfrac{150-90}{2} = 30$

$x = 20$

PTS: 4 REF: 061136ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: outside circle

117 ANS: 4 PTS: 2 REF: 011108ge STA: G.G.27 TOP: Angle Proofs

118 ANS:

$\angle B$ and $\angle E$ are right angles because of the definition of perpendicular lines. $\angle B \cong \angle E$ because all right angles are congruent. $\angle BFD$ and $\angle DFE$ are supplementary and $\angle ECA$ and $\angle ACB$ are supplementary because of the definition of supplementary angles. $\angle DFE \cong \angle ACB$ because angles supplementary to congruent angles are congruent. $\triangle ABC \sim \triangle DEF$ because of AA.

PTS: 4 REF: 011136ge STA: G.G.44 TOP: Similarity Proofs

119 ANS: 1 PTS: 2 REF: 061009ge STA: G.G.26 TOP: Converse and Biconditional

120 ANS: 4

$M_x = \dfrac{-6+1}{2} = -\dfrac{5}{2}$. $M_y = \dfrac{1+8}{2} = \dfrac{9}{2}$.

PTS: 2 REF: 060919ge STA: G.G.66 TOP: Midpoint
KEY: graph

121 ANS:

18. If the ratio of TA to AC is 1:3, the ratio of TE to ES is also 1:3. $x + 3x = 24$. $3(6) = 18$.

$x = 6$

PTS: 4 REF: 060935ge STA: G.G.50 TOP: Tangents
KEY: common tangency

122 ANS: 4

$4(x+4) = 8^2$

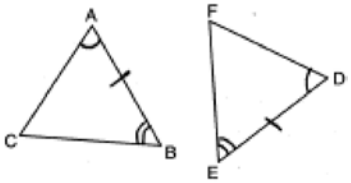
$4x + 16 = 64$

$4x = 48$

$x = 12$

PTS: 2 REF: 061117ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: tangent and secant

123 ANS: 3



PTS: 2 REF: 060902ge STA: G.G.28 TOP: Triangle Congruency

124 ANS: 2

The slope of $y = \frac{1}{2}x + 5$ is $\frac{1}{2}$. The slope of a perpendicular line is –2. $y = mx + b$.

$5 = (-2)(-2) + b$

$b = 1$

PTS: 2 REF: 060907ge STA: G.G.64 TOP: Parallel and Perpendicular Lines

125 ANS:

$(2a-3, 3b+2)$. $\left(\frac{3a+a-6}{2}, \frac{2b-1+4b+5}{2}\right) = \left(\frac{4a-6}{2}, \frac{6b+4}{2}\right) = (2a-3, 3b+2)$

PTS: 2 REF: 061134ge STA: G.G.66 TOP: Midpoint

126 ANS: 2 PTS: 2 REF: 011004ge STA: G.G.17
TOP: Constructions

127 ANS: 3

$\frac{7x}{4} = \frac{7}{x}$. $7(2) = 14$

$7x^2 = 28$

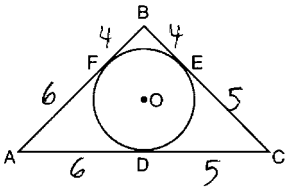
$x = 2$

PTS: 2 REF: 061120ge STA: G.G.45 TOP: Similarity
KEY: basic

128 ANS: 4 PTS: 2 REF: 011012ge STA: G.G.1
TOP: Planes

129 ANS: 4 PTS: 2 REF: 061114ge STA: G.G.73
TOP: Equations of Circles

130 ANS: 3



PTS: 2 REF: 011101ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two tangents

131 ANS:

32. $\frac{16}{20} = \frac{x-3}{x+5}$. $\overline{AC} = x - 3 = 35 - 3 = 32$

$16x + 80 = 20x - 60$

$140 = 4x$

$35 = x$

PTS: 4 REF: 011137ge STA: G.G.46 TOP: Side Splitter Theorem

132 ANS: 4

(4) is not true if $\angle PQR$ is obtuse.

PTS: 2 REF: 060924ge STA: G.G.32 TOP: Exterior Angle Theorem

133 ANS: 3 PTS: 2 REF: 011116ge STA: G.G.71
TOP: Equations of Circles

134 ANS: 4 PTS: 2 REF: 061003ge STA: G.G.10
TOP: Solids

135 ANS: 2

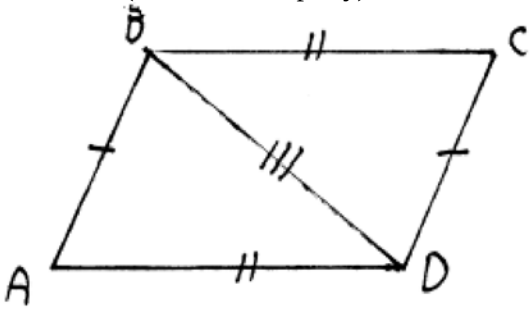
The slope of a line in standard form is $\frac{-A}{B}$, so the slope of this line is $\frac{-4}{3}$. A parallel line would also have a slope of $\frac{-4}{3}$. Since the answers are in standard form, use the point-slope formula. $y - 2 = -\frac{4}{3}(x + 5)$

$3y - 6 = -4x - 20$

$4x + 3y = -14$

PTS: 2 REF: 061123ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

136 ANS:
$\overline{BD} \cong \overline{DB}$ (Reflexive Property); $\triangle ABD \cong \triangle CDB$ (SSS); $\angle BDC \cong \angle ABD$ (CPCTC).



PTS: 4 REF: 061035ge STA: G.G.27 TOP: Quadrilateral Proofs

137 ANS:

$x^2 = 9 \cdot 8$

$x = \sqrt{72}$

$x = \sqrt{36}\sqrt{2}$

$x = 6\sqrt{2}$

PTS: 2 REF: 011132ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two chords

138 ANS: 2 PTS: 2 REF: 060910ge STA: G.G.71
TOP: Equations of Circles

139 ANS:

(6,–4). $C_x = \dfrac{Q_x + R_x}{2}$. $C_y = \dfrac{Q_y + R_y}{2}$.

$3.5 = \dfrac{1 + R_x}{2}$ $\quad 2 = \dfrac{8 + R_y}{2}$

$7 = 1 + R_x$ $\quad 4 = 8 + R_y$

$6 = R_x$ $\quad -4 = R_y$

PTS: 2 REF: 011031ge STA: G.G.66 TOP: Midpoint
KEY: graph

140 ANS:

5. $\dfrac{3}{x} = \dfrac{6+3}{15}$

$9x = 45$

$x = 5$

PTS: 2 REF: 011033ge STA: G.G.46 TOP: Side Splitter Theorem

141 ANS: 1
$\overline{AB} = 10$ since $\triangle ABC$ is a 6-8-10 triangle. $6^2 = 10x$

$3.6 = x$

PTS: 2 REF: 060915ge STA: G.G.47 TOP: Similarity
KEY: leg

142 ANS: 2 PTS: 2 REF: 061121ge STA: G.G.22
TOP: Locus

143 ANS: 3 PTS: 2 REF: 060928ge STA: G.G.8
TOP: Planes

144 ANS: 2 PTS: 2 REF: 011003ge STA: G.G.55
TOP: Properties of Transformations

145 ANS:
$m = \frac{-A}{B} = \frac{6}{2} = 3.\ m_{\perp} = -\frac{1}{3}.$

PTS: 2 REF: 011134ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

146 ANS:
16.7. $\frac{x}{25} = \frac{12}{18}$

$18x = 300$

$x \approx 16.7$

PTS: 2 REF: 061133ge STA: G.G.46 TOP: Side Splitter Theorem

147 ANS: 1
Parallel lines intercept congruent arcs.

PTS: 2 REF: 061105ge STA: G.G.52 TOP: Chords

148 ANS: 2
$\frac{87 + 35}{2} = \frac{122}{2} = 61$

PTS: 2 REF: 011015ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inside circle

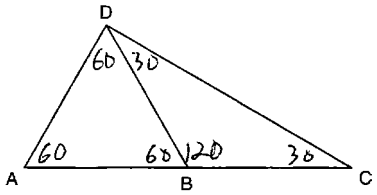
149 ANS:
True. The first statement is true and the second statement is false. In a disjunction, if either statement is true, the disjunction is true.

PTS: 2 REF: 060933ge STA: G.G.25 TOP: Compound Statements
KEY: disjunction

150 ANS: 4
$m\angle A = 80$

PTS: 2 REF: 011115ge STA: G.G.34 TOP: Angle Side Relationship

151 ANS:

30. 

PTS: 2 REF: 011129ge STA: G.G.31 TOP: Isosceles Triangle Theorem

152 ANS: 1 PTS: 2 REF: 060903ge STA: G.G.56
TOP: Identifying Transformations

153 ANS: 4 PTS: 2 REF: 061015ge STA: G.G.56
TOP: Identifying Transformations

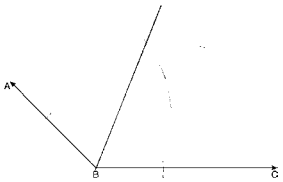
154 ANS: 2

Because the triangles are similar, $\frac{\text{m}\angle A}{\text{m}\angle D} = 1$

PTS: 2 REF: 011022ge STA: G.G.45 TOP: Similarity
KEY: perimeter and area

155 ANS: 4 PTS: 2 REF: 061124ge STA: G.G.31
TOP: Isosceles Triangle Theorem

156 ANS:



PTS: 2 REF: 011133ge STA: G.G.17 TOP: Constructions

157 ANS: 3 PTS: 2 REF: 060925ge STA: G.G.17
TOP: Constructions

158 ANS: 2

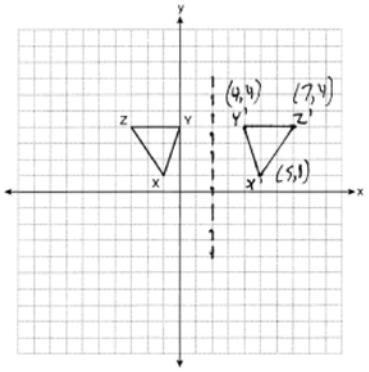
The length of the midsegment of a trapezoid is the average of the lengths of its bases. $\frac{x+30}{2} = 44.$

$$x + 30 = 88$$

$$x = 58$$

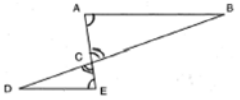
PTS: 2 REF: 011001ge STA: G.G.40 TOP: Trapezoids

159 ANS:



PTS: 2 REF: 061032ge STA: G.G.54 TOP: Reflections
KEY: grids

160 ANS: 2

$\angle ACB$ and $\angle ECD$ are congruent vertical angles and $\angle CAB \cong \angle CED$. 

PTS: 2 REF: 060917ge STA: G.G.44 TOP: Similarity Proofs

161 ANS: 4 PTS: 2 REF: 060904ge STA: G.G.13
TOP: Solids

162 ANS: 2 PTS: 2 REF: 061115ge STA: G.G.69
TOP: Triangles in the Coordinate Plane

163 ANS: 3 PTS: 2 REF: 011028ge STA: G.G.26
TOP: Conditional Statements

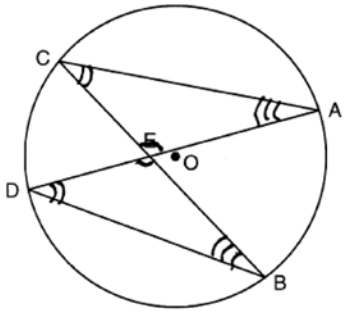
164 ANS: 4 PTS: 2 REF: 011118ge STA: G.G.25
TOP: Compound Statements KEY: general

165 ANS: 3

$\frac{36+20}{2} = 28$

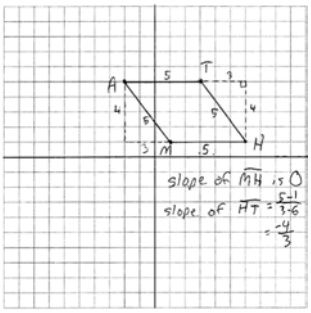
PTS: 2 REF: 061019ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inside circle

166 ANS: 2



PTS: 2 REF: 061026GE STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inscribed

167 ANS:



The length of each side of quadrilateral is 5. Since each side is congruent, quadrilateral *MATH* is a rhombus. The slope of $\overline{MH}$ is 0 and the slope of $\overline{HT}$ is $-\frac{4}{3}$. Since the slopes are not negative reciprocals, the sides are not perpendicular and do not form rights angles. Since adjacent sides are not perpendicular, quadrilateral *MATH* is not a square.

PTS: 6 REF: 011138ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

168 ANS: 2

$7x = 5x + 30$

$2x = 30$

$x = 15$

PTS: 2 REF: 061106ge STA: G.G.35 TOP: Parallel Lines and Transversals

169 ANS: 1 PTS: 2 REF: 061012ge STA: G.G.20
TOP: Constructions

170 ANS: 1 PTS: 2 REF: 011120ge STA: G.G.18
TOP: Constructions

171 ANS: 1

$a^2 + (5\sqrt{2})^2 = (2\sqrt{15})^2$

$a^2 + (25 \times 2) = 4 \times 15$

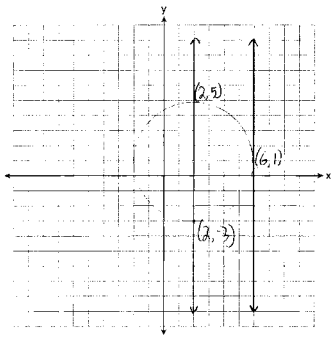
$a^2 + 50 = 60$

$a^2 = 10$

$a = \sqrt{10}$

PTS: 2 REF: 011016ge STA: G.G.48 TOP: Pythagorean Theorem

172 ANS:



PTS: 4 REF: 011135ge STA: G.G.23 TOP: Locus

173 ANS: 2 PTS: 2 REF: 061101ge STA: G.G.18
TOP: Constructions

174 ANS: 3 PTS: 2 REF: 011105ge STA: G.G.10
TOP: Solids

175 ANS: 4 PTS: 2 REF: 060922ge STA: G.G.73
TOP: Equations of Circles

176 ANS: 4 PTS: 2 REF: 061103ge STA: G.G.60
TOP: Identifying Transformations

177 ANS: 1
The closer a chord is to the center of a circle, the longer the chord.

PTS: 2 REF: 011005ge STA: G.G.49 TOP: Chords

178 ANS: 1 PTS: 2 REF: 011102ge STA: G.G.55
TOP: Properties of Transformations

179 ANS: 4

$6^2 = x(x+5)$

$36 = x^2 + 5x$

$0 = x^2 + 5x - 36$

$0 = (x+9)(x-4)$

$x = 4$

PTS: 2 REF: 011123ge STA: G.G.47 TOP: Similarity
KEY: leg

180 ANS:
36, because a dilation does not affect angle measure. 10, because a dilation does affect distance.

PTS: 4 REF: 011035ge STA: G.G.59 TOP: Properties of Transformations

181 ANS: 2

The slope of $2x + 3y = 12$ is $-\frac{A}{B} = -\frac{2}{3}$. The slope of a perpendicular line is $\frac{3}{2}$. Rewritten in slope intercept form, (2) becomes $y = \frac{3}{2}x + 3$.

PTS: 2 REF: 060926ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

182 ANS: 1

In an equilateral triangle, each interior angle is 60° and each exterior angle is 120° (180° - 120°). The sum of the three interior angles is 180° and the sum of the three exterior angles is 360°.

PTS: 2 REF: 060909ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

183 ANS: 2 PTS: 2 REF: 011125ge STA: G.G.74
TOP: Graphing Circles

184 ANS: 3

$4(x + 4) = 8^2$

$4x + 16 = 64$

$x = 12$

PTS: 2 REF: 060916ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: tangent and secant

185 ANS: 4

The slope of $3x + 5y = 4$ is $m = \frac{-A}{B} = \frac{-3}{5}$. $m_{\perp} = \frac{5}{3}$.

PTS: 2 REF: 061127ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

186 ANS: 4

$x + 6y = 12$

$6y = -x + 12$

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

$m = -\frac{1}{6}$

$3(x - 2) = -y - 4$

$-3(x - 2) = y + 4$

$m = -3$

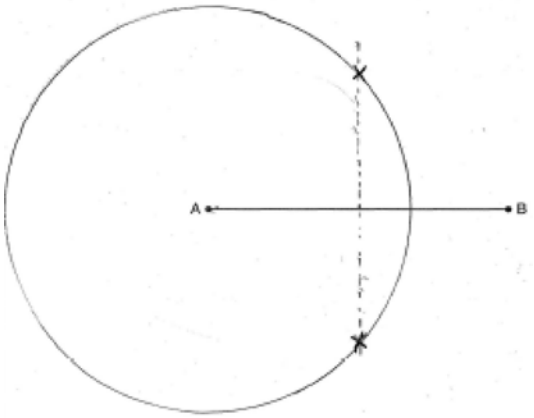
PTS: 2 REF: 011119ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

187 ANS: 1 PTS: 2 REF: 061013ge STA: G.G.50
TOP: Tangents KEY: point of tangency

188 ANS: 3 PTS: 2 REF: 061111ge STA: G.G.38
TOP: Parallelograms

189 ANS: 4 PTS: 2 REF: 060913ge STA: G.G.26
TOP: Conditional Statements

190 ANS:



PTS: 2 REF: 060932ge STA: G.G.22 TOP: Locus

Geometry Regents at Random
Answer Section

191 ANS: 2
$7 + 18 > 6 + 12$

PTS: 2 REF: fall0819ge STA: G.G.33 TOP: Triangle Inequality Theorem

192 ANS:
26. $x + 3x + 5x - 54 = 180$

$9x = 234$

$x = 26$

PTS: 2 REF: 080933ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

193 ANS: 4
sum of interior $\angle$s = sum of exterior $\angle$s

$$(n-2)180 = n\left(180 - \frac{(n-2)180}{n}\right)$$

$180n - 360 = 180n - 180n + 360$

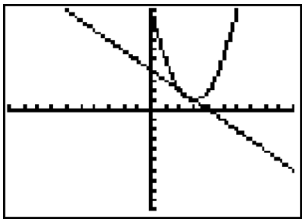
$180n = 720$

$n = 4$

PTS: 2 REF: 081016ge STA: G.G.36 TOP: Interior and Exterior Angles of Polygons

194 ANS: 1 PTS: 2 REF: 081028ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

195 ANS: 4



$y + x = 4$. $x^2 - 6x + 10 = -x + 4$. $y + x = 4$. $y + 2 = 4$

$y = -x + 4$ $x^2 - 5x + 6 = 0$ $y + 3 = 4$ $y = 2$

$(x - 3)(x - 2) = 0$ $y = 1$

$x = 3$ or 2

PTS: 2 REF: 080912ge STA: G.G.70 TOP: Quadratic-Linear Systems

196 ANS:

2.4. $5a = 4^2 \quad 5b = 3^2 \quad h^2 = ab$

$a = 3.2 \quad b = 1.8 \quad h^2 = 3.2 \cdot 1.8$

$h = \sqrt{5.76} = 2.4$

PTS: 4 REF: 081037ge STA: G.G.47 TOP: Similarity
KEY: altitude

197 ANS: 2

$m = \frac{-A}{B} = \frac{-4}{2} = -2 \quad y = mx + b$

$2 = -2(2) + b$

$6 = b$

PTS: 2 REF: 081112ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

198 ANS: 3

$d = \sqrt{(1-9)^2 + (-4-2)^2} = \sqrt{64+36} = \sqrt{100} = 10$

PTS: 2 REF: 081107ge STA: G.G.67 TOP: Distance
KEY: general

199 ANS:

110. $6x + 20 = x + 40 + 4x - 5$

$6x + 20 = 5x + 35$

$x = 15$

$6((15) + 20 = 110$

PTS: 2 REF: 081031ge STA: G.G.32 TOP: Exterior Angle Theorem

200 ANS:

$V = \frac{4}{3}\pi \cdot 9^3 = 972\pi$

PTS: 2 REF: 081131ge STA: G.G.16 TOP: Surface Area

201 ANS:

$\frac{180 - 80}{2} = 50$

PTS: 2 REF: 081129ge STA: G.G.52 TOP: Chords

202 ANS: 1

$(x, y) \rightarrow (x + 3, y + 1)$

PTS: 2 REF: fall0803ge STA: G.G.54 TOP: Translations

203 ANS: 1

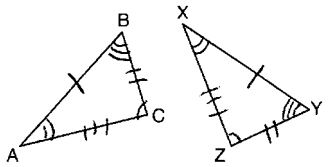
$1 = \frac{-4+x}{2}.$ $5 = \frac{3+y}{2}.$

$-4+x=2$ $3+y=10$

$x=6$ $y=7$

PTS: 2 REF: 081115ge STA: G.G.66 TOP: Midpoint

204 ANS: 4



PTS: 2 REF: 081001ge STA: G.G.29 TOP: Triangle Congruency

205 ANS: 2 PTS: 2 REF: 080927ge STA: G.G.4
TOP: Planes

206 ANS:

Contrapositive-If two angles of a triangle are not congruent, the sides opposite those angles are not congruent.

PTS: 2 REF: fall0834ge STA: G.G.26 TOP: Conditional Statements

207 ANS: 1 PTS: 2 REF: 081012ge STA: G.G.50
TOP: Tangents KEY: two tangents

208 ANS: 3

The diagonals of an isosceles trapezoid are congruent. $5x+3=11x-5.$

$6x=18$

$x=3$

PTS: 2 REF: fall0801ge STA: G.G.40 TOP: Trapezoids

209 ANS:

375π $L=\pi rl=\pi(15)(25)=375\pi$

PTS: 2 REF: 081030ge STA: G.G.15 TOP: Lateral Area

210 ANS: 2

$y+\frac{1}{2}x=4$ $3x+6y=12$

$y=-\frac{1}{2}x+4$ $6y=-3x+12$

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

$m=-\frac{1}{2}$ $y=-\frac{1}{2}x+2$

PTS: 2 REF: 081014ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

211 ANS: 2

$$x^2 = 3(x+18)$$

$$x^2 - 3x - 54 = 0$$

$$(x-9)(x+6) = 0$$

$$x = 9$$

PTS: 2 REF: fall0817ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: tangent and secant

212 ANS: 1

$\angle DCB$ and $\angle ADC$ are supplementary adjacent angles of a parallelogram. $180 - 120 = 60$. $\angle 2 = 60 - 45 = 15$.

PTS: 2 REF: 080907ge STA: G.G.38 TOP: Parallelograms

213 ANS: 4

The slope of $y = -\frac{2}{3}x - 5$ is $-\frac{2}{3}$. Perpendicular lines have slope that are opposite reciprocals.

PTS: 2 REF: 080917ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

214 ANS: 4 PTS: 2 REF: fall0802ge STA: G.G.24
TOP: Negations

215 ANS: 4 PTS: 2 REF: 081101ge STA: G.G.25
TOP: Compound Statements KEY: conjunction

216 ANS: 1

Translations and reflections do not affect distance.

PTS: 2 REF: 080908ge STA: G.G.59 TOP: Properties of Transformations

217 ANS:

22.4.

$$V = \pi r^2 h$$

$$12566.4 = \pi r^2 \cdot 8$$

$$r^2 = \frac{12566.4}{8\pi}$$

$$r \approx 22.4$$

PTS: 2 REF: fall0833ge STA: G.G.14 TOP: Volume

218 ANS: 2 PTS: 2 REF: 080921ge STA: G.G.72
TOP: Equations of Circles

219 ANS: 1

Since $\overline{AC} \cong \overline{BC}$, $m\angle A = m\angle B$ under the Isosceles Triangle Theorem.

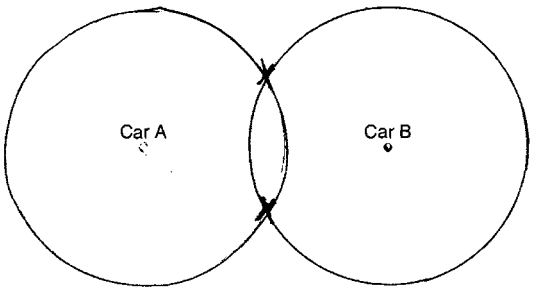
PTS: 2 REF: fall0809ge STA: G.G.69 TOP: Triangles in the Coordinate Plane

220 ANS: 1

After the translation, the coordinates are $A'(-1,5)$ and $B'(3,4)$. After the dilation, the coordinates are $A''(-2,10)$ and $B''(6,8)$.

PTS: 2 REF: fall0823ge STA: G.G.58 TOP: Compositions of Transformations

221 ANS:



PTS: 2 REF: 081033ge STA: G.G.22 TOP: Locus

222 ANS: 1 PTS: 2 REF: 081121ge STA: G.G.39
TOP: Special Parallelograms

223 ANS: 4

The slope of a line in standard form is $-\frac{A}{B}$, so the slope of this line is $\frac{-4}{2} = -2$. A parallel line would also have a slope of –2. Since the answers are in slope intercept form, find the *y*-intercept: $y = mx + b$

$$3 = -2(7) + b$$

$$17 = b$$

PTS: 2 REF: 081010ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

224 ANS: 3 PTS: 2 REF: fall0825ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

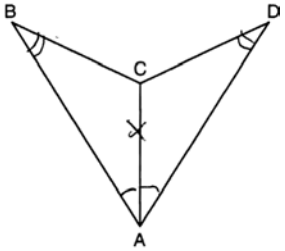
225 ANS: 1 PTS: 2 REF: fall0807ge STA: G.G.19
TOP: Constructions

226 ANS: 4

$(n-2)180 = (8-2)180 = 1080$. $\frac{1080}{8} = 135$.

PTS: 2 REF: fall0827ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

227 ANS: 4



PTS: 2 REF: 081114ge STA: G.G.28 TOP: Triangle Congruency

228 ANS: 2 PTS: 2 REF: 081120ge STA: G.G.8
TOP: Planes

229 ANS:

3. The non-parallel sides of an isosceles trapezoid are congruent. $2x+5=3x+2$

$x=3$

PTS: 2 REF: 080929ge STA: G.G.40 TOP: Trapezoids

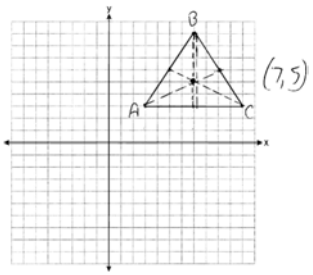
230 ANS: 4

$\sqrt{25^2-7^2}=24$

PTS: 2 REF: 081105ge STA: G.G.50 TOP: Tangents

KEY: point of tangency

231 ANS:



(7,5) $m_{\overline{AB}}=\left(\frac{3+7}{2},\frac{3+9}{2}\right)=(5,6)$ $m_{\overline{BC}}=\left(\frac{7+11}{2},\frac{9+3}{2}\right)=(9,6)$

PTS: 2 REF: 081134ge STA: G.G.21

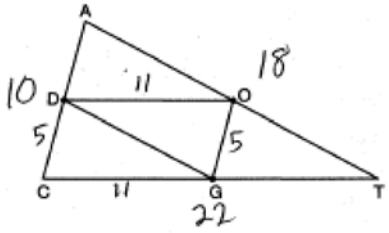
TOP: Centroid, Orthocenter, Incenter and Circumcenter

232 ANS: 1

$\angle A=\frac{(n-2)180}{n}=\frac{(5-2)180}{5}=108$ $\angle AEB=\frac{180-108}{2}=36$

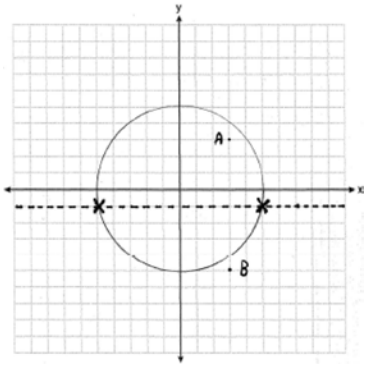
PTS: 2 REF: 081022ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

233 ANS: 3



PTS: 2 REF: 080920ge STA: G.G.42 TOP: Midsegments

234 ANS:



PTS: 4 REF: fall0837ge STA: G.G.23 TOP: Locus

235 ANS: 3

$(x+3)^2 - 4 = 2x + 5$

$x^2 + 6x + 9 - 4 = 2x + 5$

$x^2 + 4x = 0$

$x(x+4) = 0$

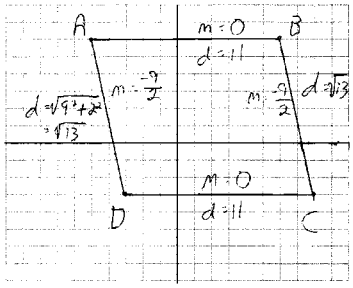
$x = 0, -4$

PTS: 2 REF: 081004ge STA: G.G.70 TOP: Quadratic-Linear Systems

236 ANS: 3 PTS: 2 REF: 081123ge STA: G.G.12
TOP: Volume

237 ANS: 4 PTS: 2 REF: 081106ge STA: G.G.17
TOP: Constructions

238 ANS:



$\overline{AB} \| \overline{CD}$ and $\overline{AD} \| \overline{CB}$ because their slopes are equal. *ABCD* is a parallelogram because opposite side are parallel. $\overline{AB} \neq \overline{BC}$. *ABCD* is not a rhombus because all sides are not equal. $\overline{AB} \sim \perp \overline{BC}$ because their slopes are not opposite reciprocals. *ABCD* is not a rectangle because $\angle ABC$ is not a right angle.

PTS: 4 REF: 081038ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

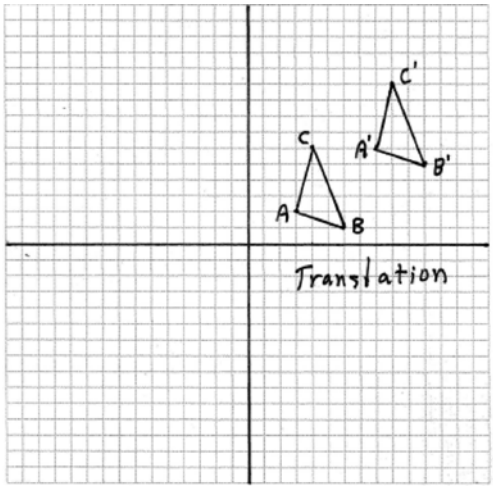
239 ANS:
Yes, $m\angle ABD = m\angle BDC = 44$ $180 - (93 + 43) = 44$ $x + 19 + 2x + 6 + 3x + 5 = 180$. Because alternate interior

$$6x + 30 = 180$$
$$6x = 150$$
$$x = 25$$
$$x + 19 = 44$$

angles $\angle ABD$ and $\angle CDB$ are congruent, $\overline{AB}$ is parallel to $\overline{DC}$.

PTS: 4 REF: 081035ge STA: G.G.35 TOP: Parallel Lines and Transversals

240 ANS:



PTS: 2 REF: fall0830ge STA: G.G.55 TOP: Properties of Transformations

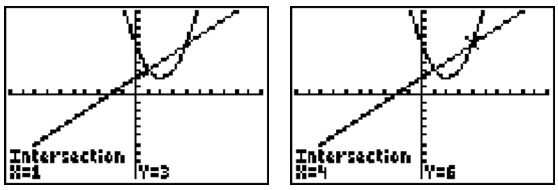
241 ANS: 1 PTS: 2 REF: 081113ge STA: G.G.54
TOP: Reflections KEY: basic

242 ANS: 2

$(n - 2)180 = (6 - 2)180 = 720$. $\frac{720}{6} = 120$.

PTS: 2 REF: 081125ge STA: G.G.37 TOP: Interior and Exterior Angles of Polygons

243 ANS: 3



PTS: 2 REF: 081118ge STA: G.G.70 TOP: Quadratic-Linear Systems

244 ANS: 3 PTS: 2 REF: 080913ge STA: G.G.28
TOP: Triangle Congruency

245 ANS: 1

$V = \pi r^2 h$

$1000 = \pi r^2 \cdot 8$

$r^2 = \frac{1000}{8\pi}$

$r \approx 6.3$

PTS: 2 REF: 080926ge STA: G.G.14 TOP: Volume

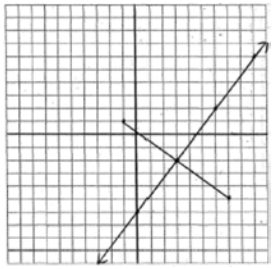
246 ANS: 3 PTS: 2 REF: 081002ge STA: G.G.9
TOP: Planes

247 ANS:

$y = \frac{4}{3}x - 6$. $M_x = \frac{-1+7}{2} = 3$ The perpendicular bisector goes through $(3,-2)$ and has a slope of $\frac{4}{3}$.

$M_y = \frac{1+(-5)}{2} = -2$

$m = \frac{1-(-5)}{-1-7} = -\frac{3}{4}$



$y - y_M = m(x - x_M)$.

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

PTS: 4 REF: 080935ge STA: G.G.68 TOP: Perpendicular Bisector

248 ANS: 3 PTS: 2 REF: 080902ge STA: G.G.17
TOP: Constructions

249 ANS: 3 PTS: 2 REF: 081026ge STA: G.G.26
TOP: Contrapositive

250 ANS: 4
Corresponding angles of similar triangles are congruent.

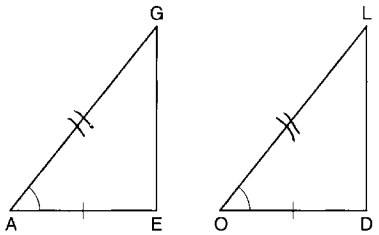
PTS: 2 REF: fall0826ge STA: G.G.45 TOP: Similarity
KEY: perimeter and area

251 ANS: 4

$\sqrt{6^2 - 2^2} = \sqrt{32} = \sqrt{16}\sqrt{2} = 4\sqrt{2}$

PTS: 2 REF: 081124ge STA: G.G.49 TOP: Chords

252 ANS: 2



PTS: 2 REF: 081007ge STA: G.G.28 TOP: Triangle Congruency

253 ANS: 4

$d = \sqrt{(-6-2)^2 + (4-(-5))^2} = \sqrt{64+81} = \sqrt{145}$

PTS: 2 REF: 081013ge STA: G.G.67 TOP: Distance
KEY: general

254 ANS: 3 PTS: 2 REF: fall0814ge STA: G.G.73
TOP: Equations of Circles

255 ANS: 3 PTS: 2 REF: 080928ge STA: G.G.50
TOP: Tangents KEY: common tangency

256 ANS: 4

Median $\overline{BF}$ bisects $\overline{AC}$ so that $\overline{CF} \cong \overline{FA}$.

PTS: 2 REF: fall0810ge STA: G.G.24 TOP: Statements

257 ANS:

$(x-5)^2 + (y+4)^2 = 36$

PTS: 2 REF: 081132ge STA: G.G.72 TOP: Equations of Circles

258 ANS: 4 PTS: 2 REF: fall0818ge STA: G.G.61
TOP: Analytical Representations of Transformations

259 ANS: 1

$d = \sqrt{(-4-2)^2 + (5-(-5))^2} = \sqrt{36+100} = \sqrt{136} = \sqrt{4} \cdot \sqrt{34} = 2\sqrt{34}$.

PTS: 2 REF: 080919ge STA: G.G.67 TOP: Distance
KEY: general

260 ANS: 2 PTS: 2 REF: 081117ge STA: G.G.23
TOP: Locus

261 ANS: 2

$4(4x-3) = 3(2x+8)$

$16x - 12 = 6x + 24$

$10x = 36$

$x = 3.6$

PTS: 2 REF: 080923ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two chords

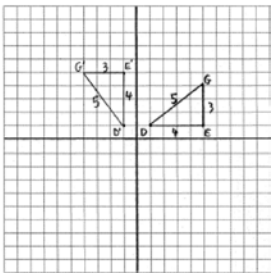
262 ANS: 3 PTS: 2 REF: 080924ge STA: G.G.24
TOP: Negations

263 ANS: 2 PTS: 2 REF: 081102ge STA: G.G.29
TOP: Triangle Congruency

264 ANS: 1 PTS: 2 REF: 080911ge STA: G.G.73
TOP: Equations of Circles

265 ANS: 3 PTS: 2 REF: 081128ge STA: G.G.39
TOP: Special Parallelograms

266 ANS:

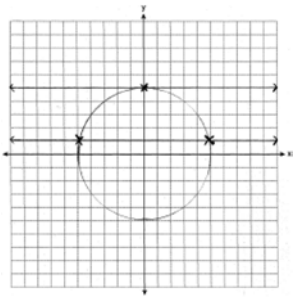


$D'(-1,1)$, $E'(-1,5)$, $G'(-4,5)$

PTS: 4 REF: 080937ge STA: G.G.55 TOP: Properties of Transformations

267 ANS: 2 PTS: 2 REF: fall0806ge STA: G.G.9
TOP: Planes

268 ANS:



PTS: 4 REF: 080936ge STA: G.G.23 TOP: Locus

269 ANS:
$\angle ACB \cong \angle AED$ is given. $\angle A \cong \angle A$ because of the reflexive property. Therefore $\triangle ABC \sim \triangle ADE$ because of AA.

PTS: 2 REF: 081133ge STA: G.G.44 TOP: Similarity Proofs

270 ANS: 4
$180 - (50 + 30) = 100$

PTS: 2 REF: 081006ge STA: G.G.45 TOP: Similarity
KEY: basic

271 ANS: 4
$180 - (40 + 40) = 100$

PTS: 2 REF: 080903ge STA: G.G.31 TOP: Isosceles Triangle Theorem

272 ANS: 2
A dilation affects distance, not angle measure.

PTS: 2 REF: 080906ge STA: G.G.60 TOP: Identifying Transformations

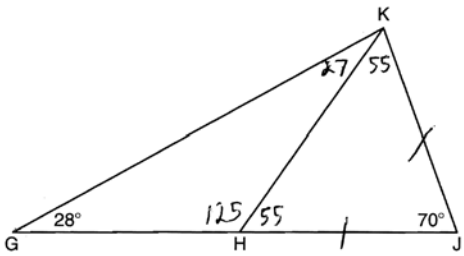
273 ANS: 4 PTS: 2 REF: 080914ge STA: G.G.7
TOP: Planes

274 ANS:

$\angle D$, $\angle G$ and 24° or $\angle E$, $\angle F$ and 84°. $m\overset{\frown}{FE} = \frac{2}{15} \times 360 = 48$. Since the chords forming $\angle D$ and $\angle G$ are intercepted by $\overset{\frown}{FE}$, their measure is 24°. $m\overset{\frown}{GD} = \frac{7}{15} \times 360 = 168$. Since the chords forming $\angle E$ and $\angle F$ are intercepted by $\overset{\frown}{GD}$, their measure is 84°.

PTS: 4 REF: fall0836ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: inscribed

275 ANS:

No, $\angle KGH$ is not congruent to $\angle GKH$. 

PTS: 2 REF: 081135ge STA: G.G.31 TOP: Isosceles Triangle Theorem

276 ANS: 4
Let $\overline{AD} = x$. $36x = 12^2$

$x = 4$

PTS: 2 REF: 080922ge STA: G.G.47 TOP: Similarity
KEY: leg

277 ANS: 2
$6 + 17 > 22$

PTS: 2 REF: 080916ge STA: G.G.33 TOP: Triangle Inequality Theorem

278 ANS:
$(x+1)^2 + (y-2)^2 = 36$

PTS: 2 REF: 081034ge STA: G.G.72 TOP: Equations of Circles

279 ANS:
$2\sqrt{3}$. $x^2 = 3 \cdot 4$

$x = \sqrt{12} = 2\sqrt{3}$

PTS: 2 REF: fall0829ge STA: G.G.47 TOP: Similarity
KEY: altitude

280 ANS: 2

$$\frac{140 - \overline{RS}}{2} = 40$$

$$140 - \overline{RS} = 80$$

$$\overline{RS} = 60$$

PTS: 2 REF: 081025ge STA: G.G.51 TOP: Arcs Determined by Angles
KEY: outside circle

281 ANS:

$\overline{AC}$. $m\angle BCA = 63$ and $m\angle ABC = 80$. $\overline{AC}$ is the longest side as it is opposite the largest angle.

PTS: 2 REF: 080934ge STA: G.G.34 TOP: Angle Side Relationship

282 ANS:

70. $3x + 5 + 3x + 5 + 2x + 2x = 180$

$$10x + 10 = 360$$

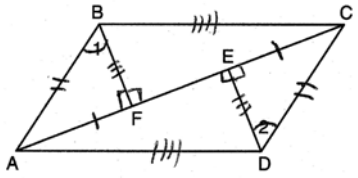
$$10x = 350$$

$$x = 35$$

$$2x = 70$$

PTS: 2 REF: 081029ge STA: G.G.40 TOP: Trapezoids

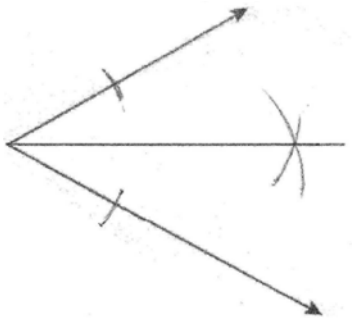
283 ANS:



$\overline{FE} \cong \overline{FE}$ (Reflexive Property); $\overline{AE} - \overline{FE} \cong \overline{FC} - \overline{EF}$ (Line Segment Subtraction Theorem); $\overline{AF} \cong \overline{CE}$ (Substitution); $\angle BFA \cong \angle DEC$ (All right angles are congruent); $\triangle BFA \cong \triangle DEC$ (AAS); $\overline{AB} \cong \overline{CD}$ and $\overline{BF} \cong \overline{DE}$ (CPCTC); $\angle BFC \cong \angle DEA$ (All right angles are congruent); $\triangle BFC \cong \triangle DEA$ (SAS); $\overline{AD} \cong \overline{CB}$ (CPCTC); $ABCD$ is a parallelogram (opposite sides of quadrilateral $ABCD$ are congruent)

PTS: 6 REF: 080938ge STA: G.G.41 TOP: Special Quadrilaterals

284 ANS:



PTS: 2 REF: fall0832ge STA: G.G.17 TOP: Constructions

285 ANS: 3 PTS: 2 REF: fall0816ge STA: G.G.1
TOP: Planes

286 ANS: 1

The centroid divides each median into segments whose lengths are in the ratio 2 : 1. $\overline{GC} = 2\overline{FG}$

$$\overline{GC} + \overline{FG} = 24$$
$$2\overline{FG} + \overline{FG} = 24$$
$$3\overline{FG} = 24$$
$$\overline{FG} = 8$$

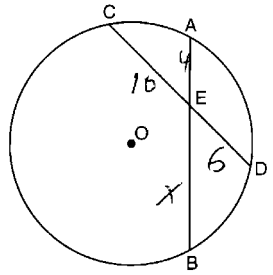
PTS: 2 REF: 081018ge STA: G.G.43 TOP: Centroid

287 ANS: 3

The slope of $y = x + 2$ is 1. The slope of $y - x = -1$ is $\frac{-A}{B} = \frac{-(-1)}{1} = 1$.

PTS: 2 REF: 080909ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

288 ANS: 1



$4x = 6 \cdot 10$

$x = 15$

PTS: 2 REF: 081017ge STA: G.G.53 TOP: Segments Intercepted by Circle
KEY: two chords

289 ANS: 4 PTS: 2 REF: 081005ge STA: G.G.18
TOP: Constructions

290 ANS:

$m_{\overline{AB}} = \left(\frac{-6+2}{2}, \frac{-2+8}{2}\right) = D(2,3)$ $m_{\overline{BC}} = \left(\frac{2+6}{2}, \frac{8+-2}{2}\right) = E(4,3)$ $F(0,-2)$. To prove that *ADEF* is a parallelogram, show that both pairs of opposite sides of the parallelogram are parallel by showing the opposite sides have the same slope: $\mathrm{m}_{\overline{AD}} = \frac{3--2}{-2--6} = \frac{5}{4}$ $\overline{AF} \| \overline{DE}$ because all horizontal lines have the same slope. *ADEF*

$$\mathrm{m}_{FE} = \frac{3--2}{4-0} = \frac{5}{4}$$

is not a rhombus because not all sides are congruent. $AD = \sqrt{5^2 + 4^2} = \sqrt{41}$ $AF = 6$

PTS: 6 REF: 081138ge STA: G.G.69 TOP: Quadrilaterals in the Coordinate Plane

291 ANS: 3

Because $\overline{OC}$ is a radius, its length is 5. Since $CE = 2$ $OE = 3$. $\triangle EDO$ is a 3-4-5 triangle. If $ED = 4$, $BD = 8$.

PTS: 2 REF: fall0811ge STA: G.G.49 TOP: Chords

292 ANS: 1

$3x^2 + 18x + 24$

$3(x^2 + 6x + 8)$

$3(x + 4)(x + 2)$

PTS: 2 REF: fall0815ge STA: G.G.12 TOP: Volume

293 ANS: 2 PTS: 2 REF: 081108ge STA: G.G.54
TOP: Reflections KEY: basic

294 ANS: 2

$M_x = \dfrac{-2+6}{2} = 2.$ $M_y = \dfrac{-4+2}{2} = -1$

PTS: 2 REF: 080910ge STA: G.G.66 TOP: Midpoint
KEY: general

295 ANS: 2

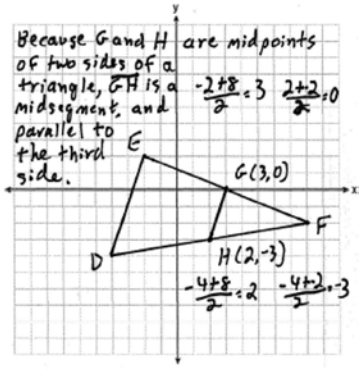
The slope of a line in standard form is $-\dfrac{A}{B}$, so the slope of this line is $\dfrac{-2}{-1} = 2$. A parallel line would also have a slope of 2. Since the answers are in slope intercept form, find the y-intercept: $y = mx + b$

$-11 = 2(-3) + b$

$-5 = b$

PTS: 2 REF: fall0812ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

296 ANS:



PTS: 4 REF: fall0835ge STA: G.G.42 TOP: Midsegments

297 ANS: 1 PTS: 2 REF: 081009ge STA: G.G.73
TOP: Equations of Circles

298 ANS:

25. $d = \sqrt{(-3-4)^2 + (1-25)^2} = \sqrt{49+576} = \sqrt{625} = 25.$

PTS: 2 REF: fall0831ge STA: G.G.67 TOP: Distance
KEY: general

299 ANS: 4 PTS: 2 REF: 081110ge STA: G.G.71
TOP: Equations of Circles

300 ANS: 1

$\triangle PRT$ and $\triangle SRQ$ share $\angle R$ and it is given that $\angle RPT \cong \angle RSQ$.

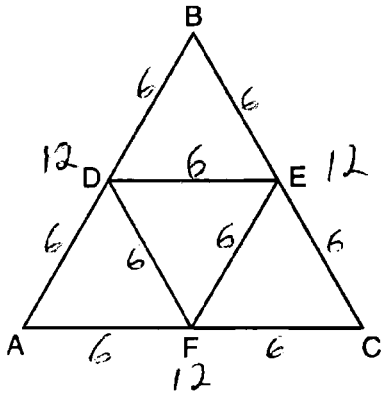
PTS: 2 REF: fall0821ge STA: G.G.44 TOP: Similarity Proofs

301 ANS: 2

$M_x = \frac{2+(-4)}{2} = -1.$ $M_Y = \frac{-3+6}{2} = \frac{3}{2}.$

PTS: 2 REF: fall0813ge STA: G.G.66 TOP: Midpoint
KEY: general

302 ANS: 1



PTS: 2 REF: 081003ge STA: G.G.42 TOP: Midsegments

303 ANS: 3 PTS: 2 REF: 081111ge STA: G.G.32
TOP: Exterior Angle Theorem

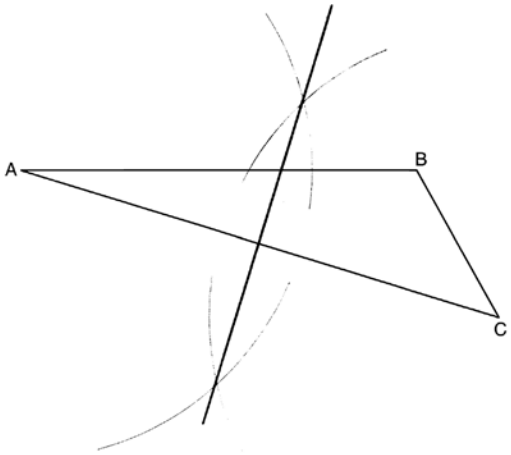
304 ANS: 2

The slope of a line in standard form is $-\frac{A}{B}$ so the slope of this line is $-\frac{5}{3}$ Perpendicular lines have slope that are the opposite and reciprocal of each other.

PTS: 2 REF: fall0828ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

305 ANS: 3 PTS: 2 REF: fall0804ge STA: G.G.18
TOP: Constructions

306 ANS:



PTS: 2 REF: 081130ge STA: G.G.18 TOP: Constructions

307 ANS: 4 PTS: 2 REF: 081023ge STA: G.G.45
TOP: Similarity KEY: perimeter and area

308 ANS: 3 PTS: 2 REF: 081104ge STA: G.G.55
TOP: Properties of Transformations

309 ANS: 4

$$\frac{5}{2+3+5} \times 180 = 90$$

PTS: 2 REF: 081119ge STA: G.G.30 TOP: Interior and Exterior Angles of Triangles

310 ANS: 4

The marked 60º angle and the angle above it are on the same straight line and supplementary. This unmarked supplementary angle is 120º. Because the unmarked 120º angle and the marked 120º angle are alternate exterior angles and congruent, $d \parallel e$.

PTS: 2 REF: 080901ge STA: G.G.35 TOP: Parallel Lines and Transversals

311 ANS: 4

Longest side of a triangle is opposite the largest angle. Shortest side is opposite the smallest angle.

PTS: 2 REF: 081011ge STA: G.G.34 TOP: Angle Side Relationship

312 ANS: 1 PTS: 2 REF: 081008ge STA: G.G.3
TOP: Planes

313 ANS: 4 PTS: 2 REF: fall0824ge STA: G.G.50
TOP: Tangents KEY: common tangency

314 ANS: 1

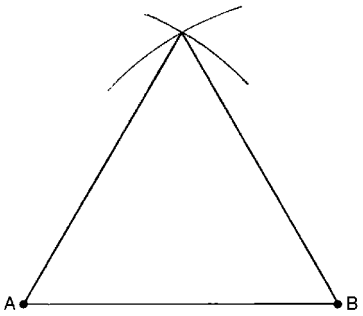
$$m = \left(\frac{8+0}{2}, \frac{2+6}{2}\right) = (4,4) \quad m = \frac{6-2}{0-8} = \frac{4}{-8} = -\frac{1}{2} \quad m_{\perp} = 2 \quad y = mx + b$$

$$4 = 2(4) + b$$

$$-4 = b$$

PTS: 2 REF: 081126ge STA: G.G.68 TOP: Perpendicular Bisector

315 ANS:



PTS: 2 REF: 081032ge STA: G.G.20 TOP: Constructions

316 ANS: 2

$\frac{3}{7} = \frac{6}{x}$

$3x = 42$

$x = 14$

PTS: 2 REF: 081027ge STA: G.G.46 TOP: Side Splitter Theorem

317 ANS: 3

The lateral edges of a prism are parallel.

PTS: 2 REF: fall0808ge STA: G.G.10 TOP: Solids

318 ANS: 1 PTS: 2 REF: 081116ge STA: G.G.7 TOP: Planes

319 ANS: 3

$\frac{5}{7} = \frac{10}{x}$

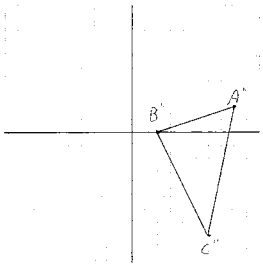
$5x = 70$

$x = 14$

PTS: 2 REF: 081103ge STA: G.G.46 TOP: Side Splitter Theorem

320 ANS: 4 PTS: 2 REF: 080905ge STA: G.G.29 TOP: Triangle Congruency

321 ANS:



$A''(8,2),\ B''(2,0),\ C''(6,-8)$

PTS: 4 REF: 081036ge STA: G.G.58 TOP: Compositions of Transformations

322 ANS: 1

$M_x = \frac{-2+6}{2} = 2$. $M_y = \frac{3+3}{2} = 3$. The center is (2,3). $d = \sqrt{(-2-6)^2 + (3-3)^2} = \sqrt{64+0} = 8$. If the diameter is 8, the radius is 4 and $r^2 = 16$.

PTS: 2 REF: fall0820ge STA: G.G.71 TOP: Equations of Circles

323 ANS: 2 PTS: 2 REF: 081015ge STA: G.G.55
TOP: Properties of Transformations

324 ANS: 4

$3y + 1 = 6x + 4$. $2y + 1 = x - 9$

$3y = 6x + 3$ $2y = x - 10$

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

PTS: 2 REF: fall0822ge STA: G.G.63 TOP: Parallel and Perpendicular Lines

325 ANS: 2

Parallel chords intercept congruent arcs. $\text{m}\overset{\frown}{AC} = \text{m}\overset{\frown}{BD} = 30$. $180 - 30 - 30 = 120$.

PTS: 2 REF: 080904ge STA: G.G.52 TOP: Chords

326 ANS:

2 $\frac{x+2}{x} = \frac{x+6}{4}$

$x^2 + 6x = 4x + 8$

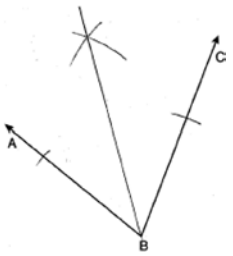
$x^2 + 2x - 8 = 0$

$(x+4)(x-2) = 0$

$x = 2$

PTS: 2 REF: 081137ge STA: G.G.45 TOP: Similarity
KEY: basic

327 ANS:



PTS: 2 REF: 080932ge STA: G.G.17 TOP: Constructions

328 ANS: 4 PTS: 2 REF: 080915ge STA: G.G.56
TOP: Identifying Transformations

329 ANS: 4 PTS: 2 REF: 080925ge STA: G.G.21
TOP: Centroid, Orthocenter, Incenter and Circumcenter

330 ANS: 3 PTS: 2 REF: 081021ge STA: G.G.57
TOP: Properties of Transformations

331 ANS: 2

The slope of $x + 2y = 3$ is $m = \frac{-A}{B} = \frac{-1}{2}$. $m_{\perp} = 2$.

PTS: 2 REF: 081122ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

332 ANS: 3

$x^2 + 7^2 = (x+1)^2 \qquad x + 1 = 25$

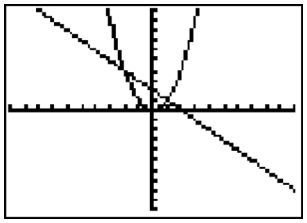
$x^2 + 49 = x^2 + 2x + 1$

$48 = 2x$

$24 = x$

PTS: 2 REF: 081127ge STA: G.G.48 TOP: Pythagorean Theorem

333 ANS: 3



PTS: 2 REF: fall0805ge STA: G.G.70 TOP: Quadratic-Linear Systems

334 ANS: 2

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

PTS: 2 REF: 081019ge STA: G.G.66 TOP: Midpoint
KEY: general

335 ANS:

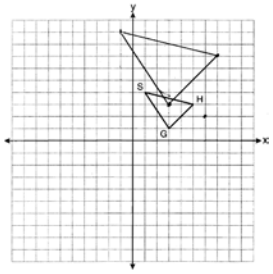
$y = \frac{2}{3}x - 9$. The slope of $2x - 3y = 11$ is $-\frac{A}{B} = \frac{-2}{-3} = \frac{2}{3}$. $-5 = \left(\frac{2}{3}\right)(6) + b$

$-5 = 4 + b$

$b = -9$

PTS: 2 REF: 080931ge STA: G.G.65 TOP: Parallel and Perpendicular Lines

336 ANS:



$G''(3,3), H''(7,7), S''(-1,9)$

PTS: 4 REF: 081136ge STA: G.G.58 TOP: Compositions of Transformations

337 ANS: 1 PTS: 2 REF: 080918ge STA: G.G.41
TOP: Special Quadrilaterals

338 ANS:

Because $\overline{AB} \parallel \overline{DC}$, $\overset{\frown}{AD} \cong \overset{\frown}{BC}$ since parallel chords intersect congruent arcs. $\angle BDC \cong \angle ACD$ because inscribed angles that intercept congruent arcs are congruent. $\overline{AD} \cong \overline{BC}$ since congruent chords intersect congruent arcs. $\overline{DC} \cong \overline{CD}$ because of the reflexive property. Therefore, $\triangle ACD \cong \triangle BDC$ because of SAS.

PTS: 6 REF: fall0838ge STA: G.G.27 TOP: Circle Proofs

339 ANS: 3

$2y = -6x + 8$ Perpendicular lines have slope the opposite and reciprocal of each other.

$y = -3x + 4$

$m = -3$

$m_{\perp} = \frac{1}{3}$

PTS: 2 REF: 081024ge STA: G.G.62 TOP: Parallel and Perpendicular Lines

340 ANS: 3

$7x = 5x + 30$

$2x = 30$

$x = 15$

PTS: 2 REF: 081109ge STA: G.G.35 TOP: Parallel Lines and Transversals

341 ANS:

2016. $V = \frac{1}{3}Bh = \frac{1}{3}s^2h = \frac{1}{3}12^2 \cdot 42 = 2016$

PTS: 2 REF: 080930ge STA: G.G.13 TOP: Volume

342 ANS: 4

$\text{SA} = 4\pi r^2 \quad V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot 6^3 = 288\pi$

$144\pi = 4\pi r^2$

$36 = r^2$

$6 = r$

PTS: 2 REF: 081020ge STA: G.G.16 TOP: Surface Area