JEFFERSON MATH PROJECT REGENTS BY TYPE

The NY Geometry Regents Exams
Fall 2007-August 2010
(Answer Key)

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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.

Geometry Multiple Choice Regents Exam Questions
Answer Section

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

PTS: 2 REF: 080906ge TOP: Identifying Transformations
2 ANS: 4 PTS: 2 REF: 081023ge TOP: Similarity
KEY: perimeter and area
3 ANS: 4 PTS: 2 REF: 061003ge TOP: Solids
4 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 TOP: Parallel and Perpendicular Lines
5 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 TOP: Trapezoids
6 ANS: 1 PTS: 2 REF: 081009ge TOP: Equations of Circles
7 ANS: 1
$a^2 + (5\sqrt{2})^2 = (2\sqrt{15})^2$

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

$a^2 + 50 = 60$

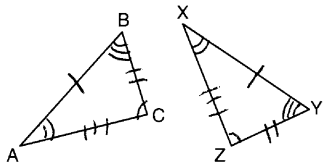
$a^2 = 10$

$a = \sqrt{10}$

PTS: 2 REF: 011016ge TOP: Pythagorean Theorem
8 ANS: 1 PTS: 2 REF: 081008ge TOP: Planes
9 ANS: 1 PTS: 2 REF: 061005ge TOP: Properties of Transformations
10 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 TOP: Midpoint
11 ANS: 3 PTS: 2 REF: 081021ge TOP: Properties of Transformations

12 ANS: 4



PTS: 2 REF: 081001ge TOP: Triangle Congruency

13 ANS: 2

The slope of a line in standard form is $-\frac{A}{B}$, so the slope of this line is $\frac{-2}{-1} = 2$. 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 TOP: Parallel and Perpendicular Lines

14 ANS: 2

$6 + 17 > 22$

PTS: 2 REF: 080916ge TOP: Triangle Inequality Theorem

15 ANS: 4

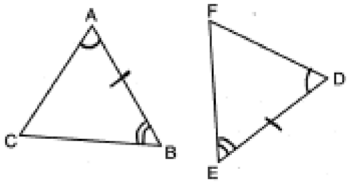
The slope of a line in standard form is $-\frac{A}{B}$, so the slope of this line is $\frac{-4}{2} = -2$. A parallel line would also have a slope of –2. Since the answers are in slope intercept form, find the *y*-intercept: $y = mx + b$

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

$$17 = b$$

PTS: 2 REF: 081010ge TOP: Parallel and Perpendicular Lines

16 ANS: 3



PTS: 2 REF: 060902ge TOP: Triangle Congruency

17 ANS: 3 PTS: 2 REF: fall0816ge TOP: Planes

18 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 TOP: Volume and Surface Area

19 ANS: 3 PTS: 2 REF: 060908ge TOP: Identifying Transformations
20 ANS: 3 PTS: 2 REF: 081026ge TOP: Contrapositive
21 ANS: 1
$\triangle PRT$ and $\triangle SRQ$ share $\angle R$ and it is given that $\angle RPT \cong \angle RSQ$.

PTS: 2 REF: fall0821ge TOP: Similarity Proofs
22 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 TOP: Pythagorean Theorem
23 ANS: 1 PTS: 2 REF: 061010ge TOP: Angle Side Relationship
24 ANS: 2

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

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

$$\overline{RS} = 60$$

PTS: 2 REF: 081025ge TOP: Arcs Determined by Angles
KEY: outside circle
25 ANS: 4 PTS: 2 REF: 011012ge TOP: Planes
26 ANS: 1 PTS: 2 REF: 081028ge
TOP: Centroid, Orthocenter, Incenter and Circumcenter
27 ANS: 4

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

$$x^2 = 36$$

$$x = 6$$

PTS: 2 REF: 011008ge TOP: Segments Intercepted by Circle
KEY: tangent and secant
28 ANS: 4 PTS: 2 REF: 060922ge TOP: Equations of Circles

29 ANS: 3

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

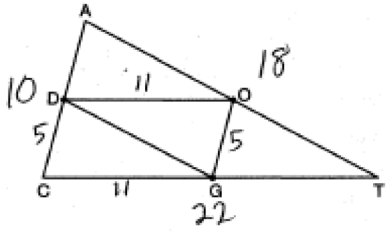
$4x + 16 = 64$

$x = 12$

PTS: 2 REF: 060916ge TOP: Segments Intercepted by Circle
KEY: tangent and secant

30 ANS: 4 PTS: 2 REF: 061008ge TOP: Trapezoids

31 ANS: 3



PTS: 2 REF: 080920ge TOP: Midsegments

32 ANS: 2 PTS: 2 REF: 061020ge TOP: Constructions

33 ANS: 2 PTS: 2 REF: 081015ge TOP: Properties of Transformations

34 ANS: 4 PTS: 2 REF: 061015ge TOP: Identifying Transformations

35 ANS: 1 PTS: 2 REF: 060903ge TOP: Identifying Transformations

36 ANS: 3

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

$6x = 18$

$x = 3$

PTS: 2 REF: fall0801ge TOP: Trapezoids

37 ANS: 3 PTS: 2 REF: 061004ge TOP: Isosceles Triangle Theorem

38 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 TOP: Side Splitter Theorem

39 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 TOP: Parallelograms

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

PTS: 2 REF: 011005ge TOP: Chords
41 ANS: 3 PTS: 2 REF: fall0804ge TOP: Constructions
42 ANS: 2 PTS: 2 REF: 011003ge TOP: Properties of Transformations
43 ANS: 2 PTS: 2 REF: 011006ge TOP: Isometries
44 ANS: 3 PTS: 2 REF: 011010ge TOP: Equations of Circles
45 ANS: 2

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

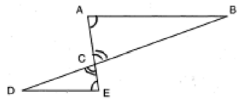
$$5 = (-2)(-2) + b$$
$$b = 1$$

PTS: 2 REF: 060907ge TOP: Parallel and Perpendicular Lines
46 ANS: 2

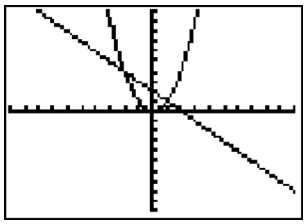
Because the triangles are similar, $\frac{\text{m}\angle A}{\text{m}\angle D} = 1$

PTS: 2 REF: 011022ge TOP: Similarity KEY: perimeter and area
47 ANS: 2

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



PTS: 2 REF: 060917ge TOP: Similarity Proofs
48 ANS: 1 PTS: 2 REF: 081012ge TOP: Tangents
KEY: two tangents
49 ANS: 2 PTS: 2 REF: 011004ge TOP: Constructions
50 ANS: 3



PTS: 2 REF: fall0805ge TOP: Quadratic-Linear Systems
51 ANS: 3 PTS: 2 REF: 060928ge TOP: Planes
52 ANS: 2
$7 + 18 > 6 + 12$

PTS: 2 REF: fall0819ge TOP: Triangle Inequality Theorem
53 ANS: 4
Median $\overline{BF}$ bisects $\overline{AC}$ so that $\overline{CF} \cong \overline{FA}$.

PTS: 2 REF: fall0810ge TOP: Statements

54 ANS: 3 PTS: 2 REF: 080924ge TOP: Negations
55 ANS: 2 PTS: 2 REF: 061007ge TOP: Parallel Lines and Transversals
56 ANS: 3 PTS: 2 REF: fall0814ge TOP: Equations of Circles
57 ANS: 2 PTS: 2 REF: fall0806ge TOP: Planes
58 ANS: 2 PTS: 2 REF: 061022ge TOP: Parallel and Perpendicular Lines
59 ANS: 3

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

PTS: 2 REF: 011025ge TOP: Parallel and Perpendicular Lines
60 ANS: 1

Translations and reflections do not affect distance.

PTS: 2 REF: 080908ge TOP: Properties of Transformations
61 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 TOP: Compositions of Transformations
62 ANS: 2 PTS: 2 REF: 080921ge TOP: Equations of Circles
63 ANS: 2 PTS: 2 REF: 060910ge TOP: Equations of Circles
64 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.

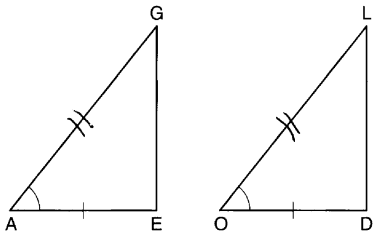
PTS: 2 REF: fall0828ge TOP: Parallel and Perpendicular Lines
65 ANS: 1

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

PTS: 2 REF: fall0803ge TOP: Translations
66 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 TOP: Distance
67 ANS: 3 PTS: 2 REF: 081002ge TOP: Planes
68 ANS: 3 PTS: 2 REF: 080913ge TOP: Triangle Congruency
69 ANS: 2



PTS: 2 REF: 081007ge TOP: Triangle Congruency

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

PTS: 2 REF: 080903ge TOP: Isosceles Triangle Theorem

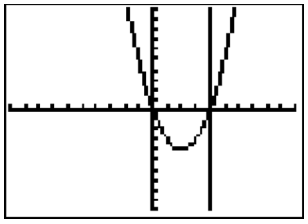
71 ANS: 4
The marked 60º angle and the angle above it are on the same straight line and supplementary. This unmarked supplementary angle is 120º. Because the unmarked 120º angle and the marked 120º angle are alternate exterior angles and congruent, $d \parallel e$.

PTS: 2 REF: 080901ge TOP: Parallel Lines and Transversals

72 ANS: 3
$m=\frac{-A}{B}=\frac{5}{2}.\ m=\frac{-A}{B}=\frac{10}{4}=\frac{5}{2}$

PTS: 2 REF: 011014ge TOP: Parallel and Perpendicular Lines

73 ANS: 1



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

PTS: 2 REF: 060923ge TOP: Quadratic-Linear Systems

74 ANS: 2
Adjacent sides of a rectangle are perpendicular and have opposite and reciprocal slopes.

PTS: 2 REF: 061028ge TOP: Quadrilaterals in the Coordinate Plane

75 ANS: 2 PTS: 2 REF: 061002ge TOP: Negations

76 ANS: 2

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

$6y=-3x+12$

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

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

PTS: 2 REF: 081014ge TOP: Parallel and Perpendicular Lines

77 ANS: 4 PTS: 2 REF: 061018ge TOP: Identifying Transformations

78 ANS: 4
$M_x=\frac{-6+1}{2}=-\frac{5}{2}.\ M_y=\frac{1+8}{2}=\frac{9}{2}.$

PTS: 2 REF: 060919ge TOP: Midpoint

79 ANS: 3 PTS: 2 REF: fall0825ge
TOP: Centroid, Orthocenter, Incenter and Circumcenter
80 ANS: 2 PTS: 2 REF: 080927ge TOP: Planes
81 ANS: 1

$3x^2 + 18x + 24$

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

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

PTS: 2 REF: fall0815ge TOP: Volume
82 ANS: 1
Since $\overline{AC} \cong \overline{BC}$, $m\angle A = m\angle B$ under the Isosceles Triangle Theorem.

PTS: 2 REF: fall0809ge TOP: Triangles in the Coordinate Plane
83 ANS: 4 PTS: 2 REF: 080915ge TOP: Identifying Transformations
84 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 TOP: Interior and Exterior Angles of Polygons
85 ANS: 1 PTS: 2 REF: 061013ge TOP: Tangents
KEY: point of tangency
86 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 TOP: Centroid
87 ANS: 1 PTS: 2 REF: 060920ge TOP: Graphing Circles
88 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 TOP: Interior and Exterior Angles of Triangles

89 ANS: 2

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

$3x = 42$

$x = 14$

PTS: 2 REF: 081027ge TOP: Side Splitter Theorem

90 ANS: 4

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

PTS: 2 REF: 081013ge TOP: Distance

91 ANS: 2

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

$4d + 16 = 72$

$d = 14$

$r = 7$

PTS: 2 REF: 061023ge TOP: Segments Intercepted by Circle
KEY: two secants

92 ANS: 4

$180 - (50+30) = 100$

PTS: 2 REF: 081006ge TOP: Similarity KEY: basic

93 ANS: 3 PTS: 2 REF: 011028ge TOP: Conditional Statements

94 ANS: 4 PTS: 2 REF: 060913ge TOP: Conditional Statements

95 ANS: 2

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

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

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

$x = 9$

PTS: 2 REF: fall0817ge TOP: Segments Intercepted by Circle
KEY: tangent and secant

96 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 TOP: Parallel and Perpendicular Lines

97 ANS: 2

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

PTS: 2 REF: 011015ge TOP: Arcs Determined by Angles
KEY: inside circle

98 ANS: 1

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

$y = -12x - 20$

PTS: 2 REF: 061027ge TOP: Parallel and Perpendicular Lines

99 ANS: 3 PTS: 2 REF: 080928ge TOP: Tangents
KEY: common tangency

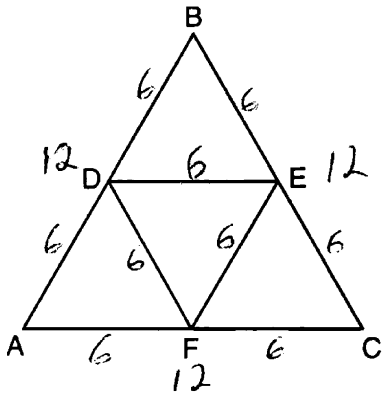
100 ANS: 1

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

$3.6 = x$

PTS: 2 REF: 060915ge TOP: Similarity KEY: leg

101 ANS: 1



PTS: 2 REF: 081003ge TOP: Midsegments

102 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 TOP: Quadratic-Linear Systems

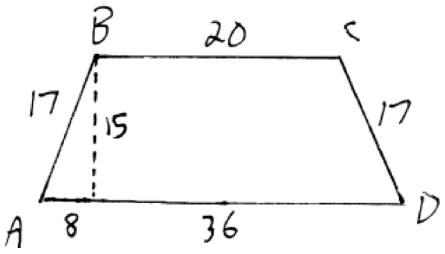
103 ANS: 1 PTS: 2 REF: 011024ge TOP: Planes

104 ANS: 2

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

PTS: 2 REF: 080910ge TOP: Midpoint

105 ANS: 3



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

PTS: 2 REF: 061016ge TOP: Trapezoids

106 ANS: 1

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

$6x + 6 = 180$

$x = 29$

PTS: 2 REF: 011002ge TOP: Interior and Exterior Angles of Triangles

107 ANS: 4 PTS: 2 REF: fall0824ge TOP: Tangents

KEY: common tangency

108 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 TOP: Volume

109 ANS: 4 PTS: 2 REF: fall0818ge

TOP: Analytical Representations of Transformations

110 ANS: 1 PTS: 2 REF: 060918ge TOP: Planes

111 ANS: 1

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

$3x = 6$

$x = 2$

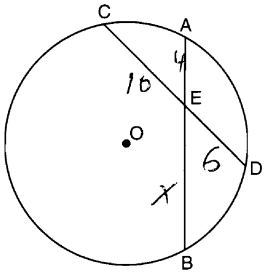
PTS: 2 REF: 011013ge TOP: Parallelograms

112 ANS: 2 PTS: 2 REF: 011011ge TOP: Locus

113 ANS: 1
Parallel lines intercept congruent arcs.

PTS: 2 REF: 061001ge TOP: Chords

114 ANS: 1



$4x = 6 \cdot 10$

$x = 15$

PTS: 2 REF: 081017ge TOP: Segments Intercepted by Circle
KEY: two chords

115 ANS: 4

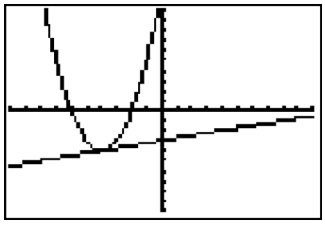
The slope of $y = -3x + 2$ is -3. The perpendicular slope is $\frac{1}{3}$. $-1 = \frac{1}{3}(3) + b$

$-1 = 1 + b$

$b = -2$

PTS: 2 REF: 011018ge TOP: Parallel and Perpendicular Lines

116 ANS: 3



PTS: 2 REF: 061011ge TOP: Quadratic-Linear Systems

117 ANS: 1 PTS: 2 REF: fall0807ge TOP: Constructions

118 ANS: 4
The radius is 4. $r^2 = 16$.

PTS: 2 REF: 061014ge TOP: Equations of Circles

119 ANS: 4
Longest side of a triangle is opposite the largest angle. Shortest side is opposite the smallest angle.

PTS: 2 REF: 081011ge TOP: Angle Side Relationship

120 ANS: 4

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

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

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

PTS: 2 REF: fall0822ge TOP: Parallel and Perpendicular Lines

121 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 TOP: Equations of Circles

122 ANS: 3 PTS: 2 REF: 060925ge TOP: Constructions

123 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 TOP: Interior and Exterior Angles of Polygons

124 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 TOP: Interior and Exterior Angles of Triangles

125 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 TOP: Chords

126 ANS: 4

$L=2\pi rh=2\pi\cdot 5\cdot 11\approx 345.6$

PTS: 2 REF: 061006ge TOP: Volume

127 ANS: 4

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

PTS: 2 REF: fall0827ge TOP: Interior and Exterior Angles of Polygons

128 ANS: 4 PTS: 2 REF: fall0802ge TOP: Negations

129 ANS: 1 PTS: 2 REF: 061009ge TOP: Converse

130 ANS: 2

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

PTS: 2 REF: fall0813ge TOP: Midpoint

131 ANS: 3

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

PTS: 2 REF: 061019ge TOP: Arcs Determined by Angles
KEY: inside circle

132 ANS: 2

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

$16x - 12 = 6x + 24$

$10x = 36$

$x = 3.6$

PTS: 2 REF: 080923ge TOP: Segments Intercepted by Circle
KEY: two chords

133 ANS: 4 PTS: 2 REF: 060912ge TOP: Locus

134 ANS: 3 PTS: 2 REF: 060905ge TOP: Reflections
KEY: basic

135 ANS: 2

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

PTS: 2 REF: 060914ge TOP: Centroid

136 ANS: 4 PTS: 2 REF: 080905ge TOP: Triangle Congruency

137 ANS: 4 PTS: 2 REF: 080914ge TOP: Planes

138 ANS: 4 PTS: 2 REF: 011019ge TOP: Similarity Proofs

139 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 TOP: Parallel and Perpendicular Lines

140 ANS: 4

Corresponding angles of similar triangles are congruent.

PTS: 2 REF: fall0826ge TOP: Similarity KEY: perimeter and area

141 ANS: 3 PTS: 2 REF: 011007ge TOP: Isosceles Triangle Theorem

142 ANS: 4

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

PTS: 2 REF: 060924ge TOP: Exterior Angle Theorem

143 ANS: 3

The lateral edges of a prism are parallel.

PTS: 2 REF: fall0808ge TOP: Solids

144 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 TOP: Volume and Lateral Area

145 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 TOP: Parallel and Perpendicular Lines

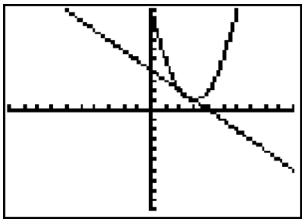
146 ANS: 4

Let $\overline{AD} = x$. $36x = 12^2$

$x = 4$

PTS: 2 REF: 080922ge TOP: Similarity KEY: leg

147 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 TOP: Quadratic-Linear Systems

148 ANS: 4 PTS: 2 REF: 081005ge TOP: Constructions

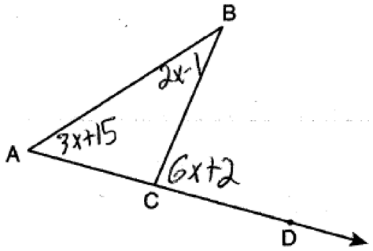
149 ANS: 3

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

PTS: 2 REF: 011027ge TOP: Volume

150 ANS: 1 PTS: 2 REF: 061012ge TOP: Constructions

151 ANS: 1



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

$5x + 14 = 6x + 2$

$x = 12$

PTS: 2 REF: 011021ge TOP: Exterior Angle Theorem

152 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 TOP: Chords

153 ANS: 1

$A'(2,4)$

PTS: 2 REF: 011023ge TOP: Compositions of Transformations
KEY: basic

154 ANS: 1 PTS: 2 REF: 080918ge TOP: Special Quadrilaterals

155 ANS: 2 PTS: 2 REF: 011020ge TOP: Graphing Circles

156 ANS: 4

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

PTS: 2 REF: 061025ge KEY: Centroid, Orthocenter, Incenter and Circumcenter

157 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 TOP: Chords

158 ANS: 4 PTS: 2 REF: 080925ge
TOP: Centroid, Orthocenter, Incenter and Circumcenter

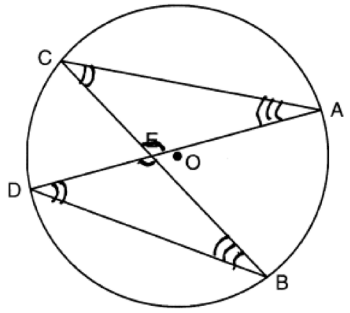
159 ANS: 1

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

PTS: 2 REF: 080919ge TOP: Distance

160 ANS: 1 PTS: 2 REF: 080911ge TOP: Equations of Circles

161 ANS: 2



PTS: 2 REF: 061026GE TOP: Arcs Determined by Angles
KEY: inscribed

162 ANS: 4 PTS: 2 REF: 011009ge TOP: Constructions

163 ANS: 3 PTS: 2 REF: 061017ge TOP: Planes

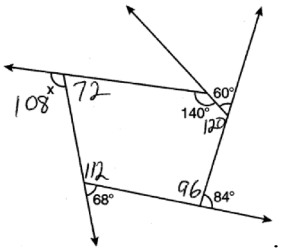
164 ANS: 2

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

PTS: 2 REF: 060911ge TOP: Angle Side Relationship

165 ANS: 3 PTS: 2 REF: 080902ge TOP: Constructions

166 ANS: 3



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

PTS: 2 REF: 011023ge TOP: Interior and Exterior Angles of Polygons

167 ANS: 4

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

PTS: 2 REF: 061021ge TOP: Distance

168 ANS: 4 PTS: 2 REF: 060904ge TOP: Solids

Geometry 2 Point Regents Exam Questions

Answer Section

1 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 TOP: Parallel and Perpendicular Lines

2 ANS:

20. $5x + 10 = 4x + 30$

$x = 20$

PTS: 2 REF: 060934ge TOP: Similarity KEY: basic

3 ANS:

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

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

$288 = 16h$

$18 = h$

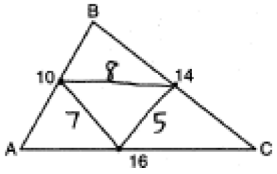
PTS: 2 REF: 061034ge TOP: Volume

4 ANS:

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

PTS: 2 REF: 081034ge TOP: Equations of Circles

5 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 TOP: Midsegments

6 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 TOP: Compound Statements
KEY: disjunction

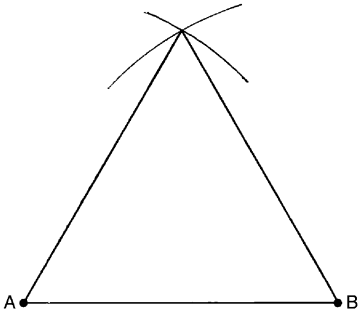
7 ANS:
67. $\frac{180-46}{2} = 67$

PTS: 2 REF: 011029ge TOP: Isosceles Triangle Theorem

8 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 TOP: Centroid

9 ANS:

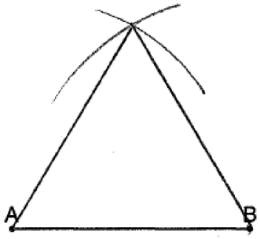


PTS: 2 REF: 081032ge TOP: Constructions

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

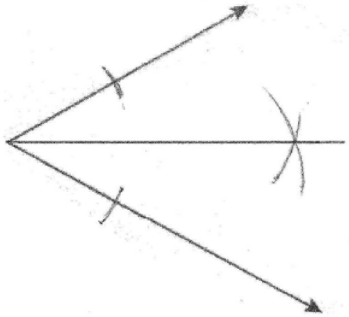
PTS: 2 REF: 061029ge TOP: Volume and Surface Area

11 ANS:



PTS: 2 REF: 011032ge TOP: Constructions

12 ANS:



PTS: 2 REF: fall0832ge TOP: Constructions

13 ANS:

4. $l_1 w_1 h_1 = l_2 w_2 h_2$

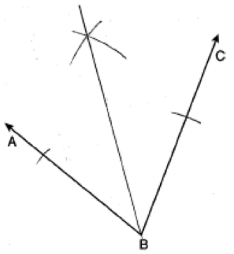
$10 \times 2 \times h = 5 \times w_2 \times h$

$20 = 5w_2$

$w_2 = 4$

PTS: 2 REF: 011030ge TOP: Volume

14 ANS:



PTS: 2 REF: 080932ge TOP: Constructions

15 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 TOP: Parallel and Perpendicular Lines

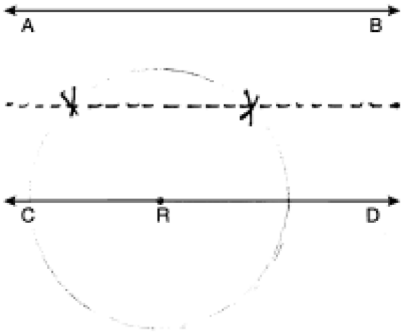
16 ANS:
$\overline{AC}$. $m\angle BCA = 63$ and $m\angle ABC = 80$. $\overline{AC}$ is the longest side as it is opposite the largest angle.

PTS: 2 REF: 080934ge TOP: Angle Side Relationship

17 ANS:
375π $L = \pi r l = \pi(15)(25) = 375\pi$

PTS: 2 REF: 081030ge TOP: Volume and Lateral Area

18 ANS:



PTS: 2 REF: 061033ge TOP: Locus

19 ANS:
34. $2x - 12 + x + 90 = 180$

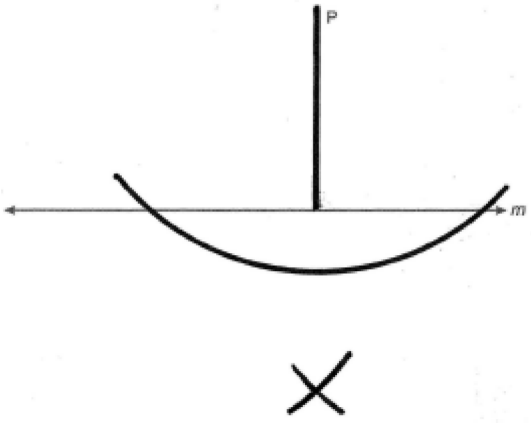
$3x + 78 = 90$

$3x = 102$

$x = 34$

PTS: 2 REF: 061031ge TOP: Interior and Exterior Angles of Triangles

20 ANS:



PTS: 2 REF: 060930ge TOP: Constructions

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

PTS: 2 REF: fall0834ge TOP: Conditional Statements

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

$$x = 3$$

PTS: 2 REF: 080929ge TOP: Trapezoids

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

$$6x + 20 = 5x + 35$$

$$x = 15$$

$$6((15) + 20 = 110$$

PTS: 2 REF: 081031ge TOP: Isosceles Triangle Theorem

24 ANS:
37. Since $\overline{DE}$ is a midsegment, $AC = 14$. $10 + 13 + 14 = 37$

PTS: 2 REF: 061030ge TOP: Midsegments

25 ANS:
70. $3x + 5 + 3x + 5 + 2x + 2x = 180$

$$10x + 10 = 360$$

$$10x = 350$$

$$x = 35$$

$$2x = 70$$

PTS: 2 REF: 081029ge TOP: Trapezoids

26 ANS:
5. $\frac{3}{x} = \frac{6+3}{15}$

$$9x = 45$$

$$x = 5$$

PTS: 2 REF: 011033ge TOP: Side Splitter Theorem

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

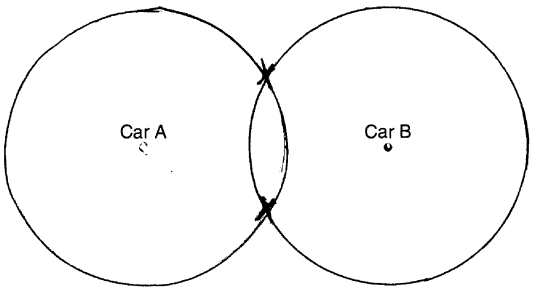
$$3.5 = \frac{1 + R_x}{2} \qquad 2 = \frac{8 + R_y}{2}$$

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

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

PTS: 2 REF: 011031ge TOP: Midpoint

28 ANS:



PTS: 2 REF: 081033ge TOP: Locus

29 ANS:

26. $x + 3x + 5x - 54 = 180$

$9x = 234$

$x = 26$

PTS: 2 REF: 080933ge TOP: Interior and Exterior Angles of Triangles

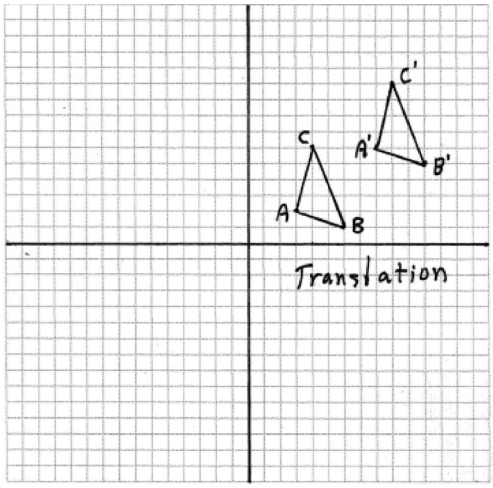
30 ANS:

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

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

PTS: 2 REF: fall0829ge TOP: Similarity KEY: altitude

31 ANS:



PTS: 2 REF: fall0830ge TOP: Properties of Transformations

32 ANS:

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

PTS: 2 REF: fall0831ge TOP: Distance

33 ANS:

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

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

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

$r \approx 22.4$

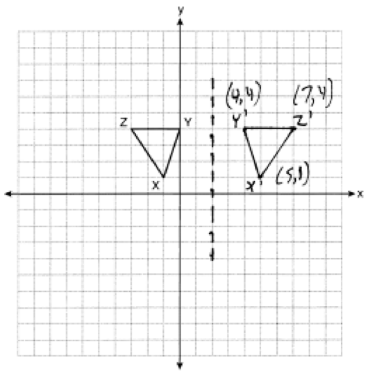
PTS: 2 REF: fall0833ge TOP: Volume

34 ANS:

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

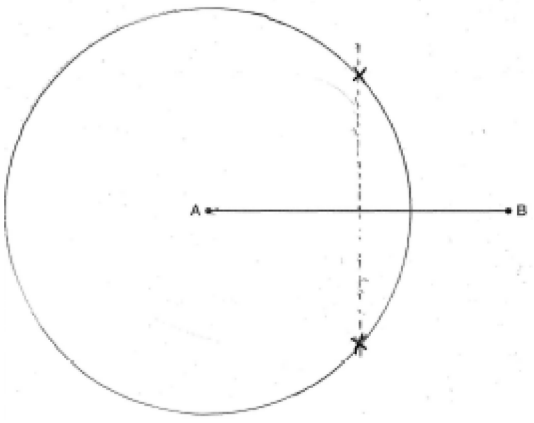
PTS: 2 REF: 080930ge TOP: Volume

35 ANS:



PTS: 2 REF: 061032ge TOP: Reflections KEY: grids

36 ANS:



PTS: 2 REF: 060932ge TOP: Locus

Geometry 4 Point Regents Exam Questions
Answer Section

1 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 TOP: Parallel Lines and Transversals

2 ANS:
2.4. $5a=4^2$ $5b=3^2$ $h^2=ab$

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

$h=\sqrt{5.76}=2.4$

PTS: 4 REF: 081037ge TOP: Similarity KEY: altitude

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

PTS: 4 REF: 011035ge TOP: Properties of Transformations

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

$$r=5$$
$$r^2=25$$

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

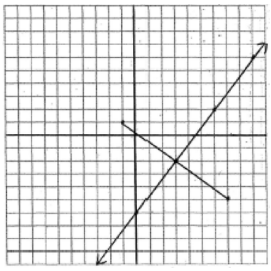
PTS: 2 REF: 061037ge TOP: Equations of Circles

5 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 $\frac{4}{3}$.

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

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

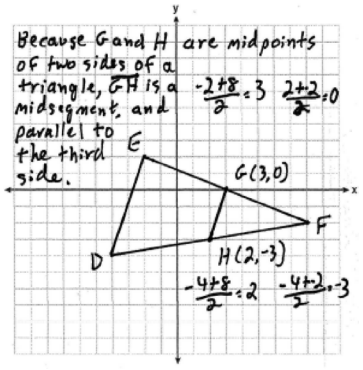


$y - y_M = m(x - x_M)$.

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

PTS: 4 REF: 080935ge TOP: Perpendicular Bisector

6 ANS:



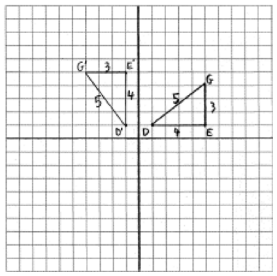
PTS: 4 REF: fall0835ge TOP: Midsegments

7 ANS:

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

PTS: 4 REF: fall0836ge TOP: Arcs Determined by Angles
KEY: inscribed

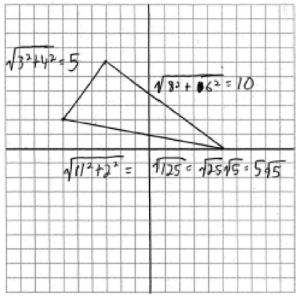
8 ANS:



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

PTS: 4 REF: 080937ge TOP: Properties of Transformations

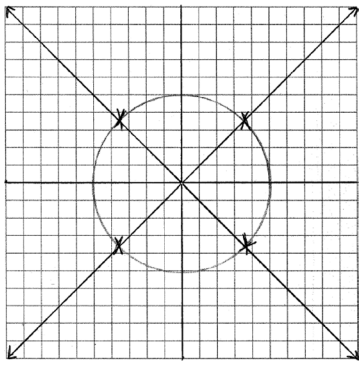
9 ANS:



$15+5\sqrt{5}$.

PTS: 4 REF: 060936ge TOP: Triangles in the Coordinate Plane

10 ANS:



PTS: 4 REF: 011037ge TOP: Locus

11 ANS:

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

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

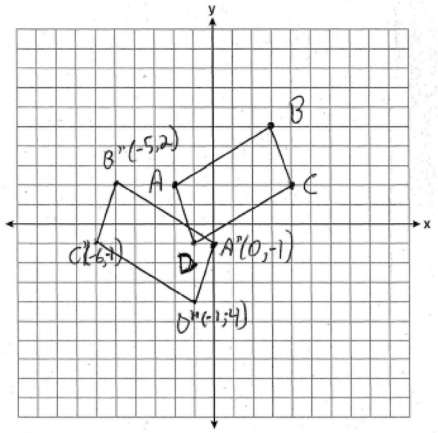
$y = -\frac{3}{2}x + 3$ $5 = 4 + b$

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

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

PTS: 4 REF: 061036ge TOP: Parallel and Perpendicular Lines

12 ANS:



PTS: 4 REF: 060937ge TOP: Compositions of Transformations

KEY: grids

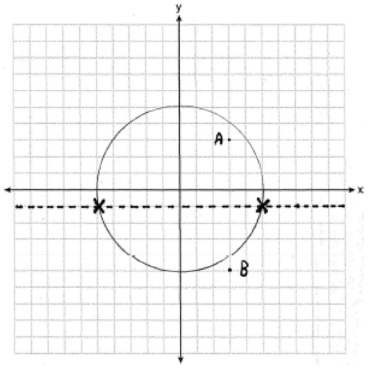
13 ANS:

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 TOP: Tangents KEY: common tangency

14 ANS:

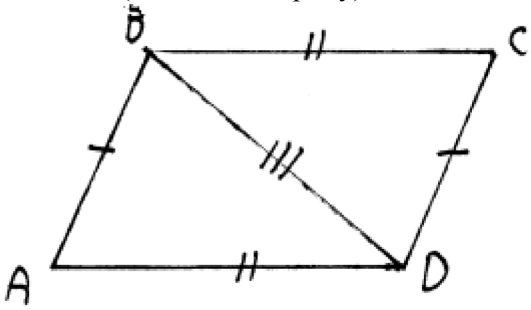


PTS: 4 REF: fall0837ge TOP: Locus

15 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.

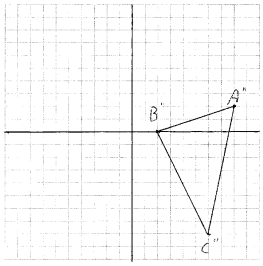
PTS: 4 REF: 011036ge TOP: Special Quadrilaterals

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



PTS: 4 REF: 061035ge TOP: Quadrilateral Proofs

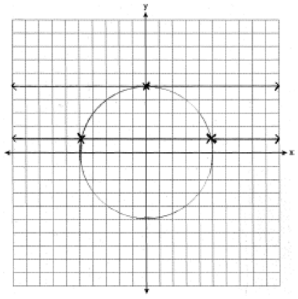
17 ANS:



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

PTS: 4 REF: 081036ge TOP: Compositions of Transformations

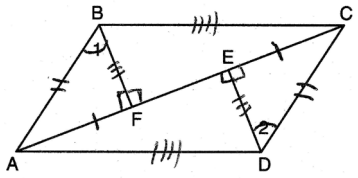
18 ANS:



PTS: 4 REF: 080936ge TOP: Locus

Geometry 6 Point Regents Exam Questions
Answer Section

1 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)

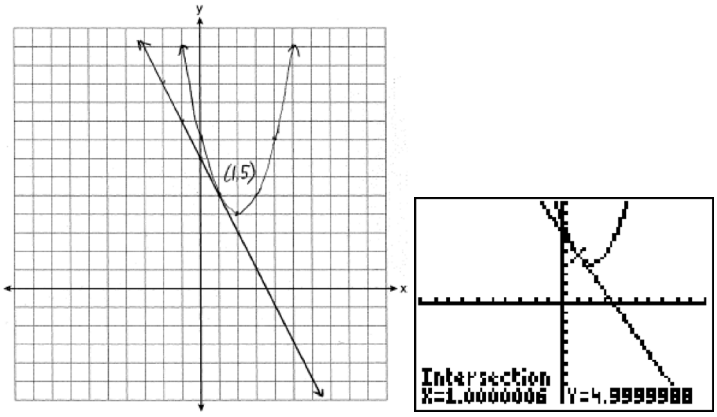
PTS: 6 REF: 080938ge TOP: Special Quadrilaterals

2 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 TOP: Circle Proofs

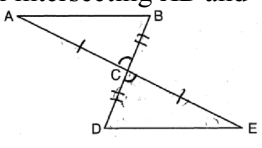
3 ANS:



PTS: 6 REF: 011038ge TOP: Quadratic-Linear Systems

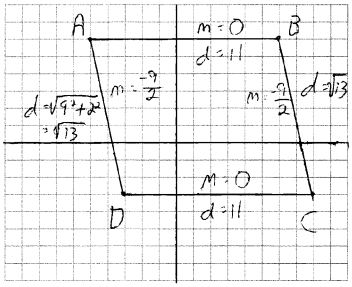
4 ANS:

$\overline{AC} \cong \overline{EC}$ 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 TOP: Triangle Proofs

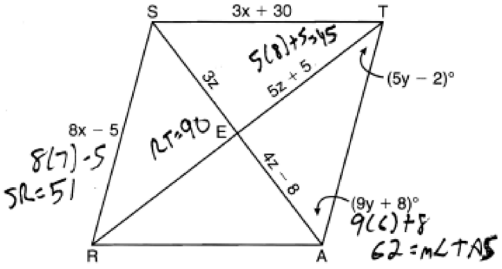
5 ANS:



$\overline{AB} \| \overline{CD}$ 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 TOP: Quadrilaterals in the Coordinate Plane

6 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 TOP: Special Parallelograms