# JMAP
# REGENTS BY STATE
# STANDARD: TOPIC

NY Geometry Regents Exam Questions
from Spring 2014 to August 2025 Sorted by State
Standard: Topic

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# Geometry Regents Exam Questions by State Standard: Topic

## TOOLS OF GEOMETRY

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

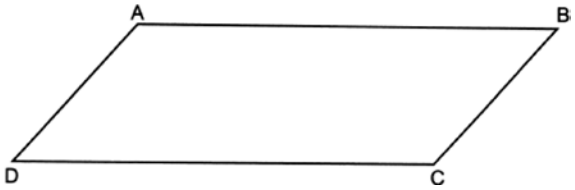
1 An equilateral triangle is continuously rotated around one of its altitudes. The three-dimensional object formed is a
1) cone
2) sphere
3) cylinder
4) pyramid

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

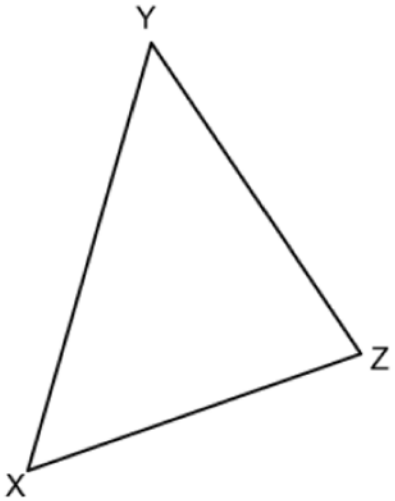
2 Which two-dimensional figure is always formed when a plane intersects a right cylinder perpendicular to its base?
1) circle
2) triangle
3) rhombus
4) rectangle

### G.CO.D.12: CONSTRUCTIONS

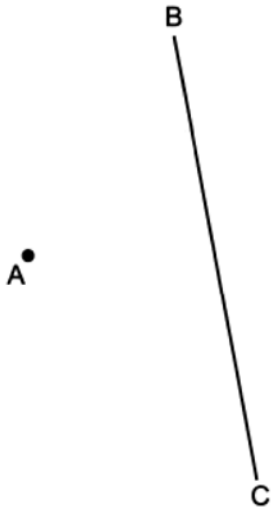
3 Parallelogram *ABCD* is shown below. Using a compass and straightedge, construct the altitude from point *A* to side $\overline{DC}$. [Leave all construction marks.]




4 Triangle *XYZ* is shown below. Using a compass and straightedge, construct the circumcenter of $\triangle XYZ$.




5 Using a compass and straightedge, construct the image of point *A* after a reflection over $\overline{BC}$. [Leave all construction marks.]



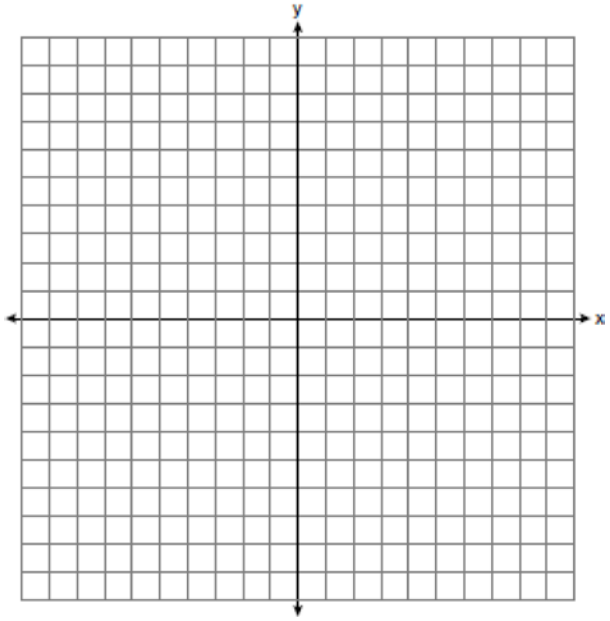
# LINES AND ANGLES

## G.GPE.B.6: DIRECTED LINE SEGMENTS

6 Point $O$ divides $\overline{COA}$ such that $CO{:}OA = 1{:}4$. If $C$ has coordinates $(-2,-9)$ and $A$ has coordinates $(3,6)$, the coordinates of $O$ are

1) $(2,3)$
2) $(1,0)$
3) $(0,-3)$
4) $(-1,-6)$

7 The endpoints of $\overline{CAS}$ are $C(-3,1)$ and $S(7,6)$. Determine and state the coordinates of point $A$ such that the ratio of $CA:AS$ is $3:2$. [The use of the set of axes below is optional.]




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

8 Which equation represents a line parallel to the line represented $y = 4x + 6$ and passing through the point $(-3,2)$?

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

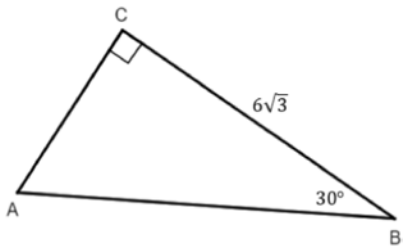
9 Line $h$ is represented by the equation $y = \frac{2}{3}x - 4$. Which equation represents the line that is perpendicular to line $h$ and passes through the point $(6,1)$?

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

# TRIANGLES

## G.SRT.C.8: SPECIAL TRIANGLES

10 In right triangle $ABC$ below, $m\angle C = 90°$, $m\angle B = 30°$, and $CB = 6\sqrt{3}$.

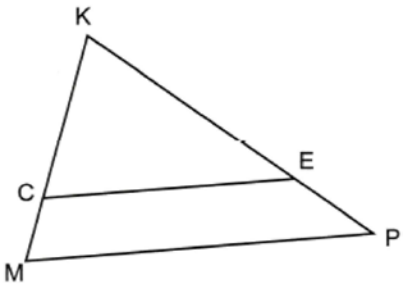



The length of $\overline{AB}$ is
1) $3\sqrt{3}$
2) 9
3) 12
4) $12\sqrt{3}$

11 Triangle $DUG$ is an isosceles right triangle with the right angle at $G$. If $DU = 10\sqrt{2}$, what is the length of $\overline{GU}$?
1) 5
2) $5\sqrt{2}$
3) 10
4) $10\sqrt{2}$

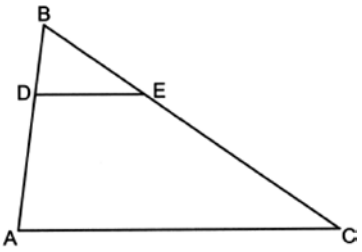
## G.SRT.B.4: SIDE SPLITTER THEOREM

12 In $\triangle KMP$ below, $\overline{CE}$ is drawn parallel to $\overline{MP}$.




If $KC = 8$, $CM = 3$, and $CE = 12$, what is the length of $\overline{MP}$?
1) 24
2) 16.5
3) 15
4) 4.5

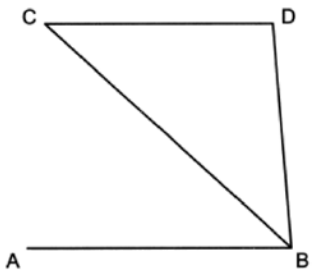
13 In $\triangle ABC$ below, points $D$ and $E$ are on $\overline{AB}$ and $\overline{CB}$, respectively, such that $\overline{DE} \parallel \overline{AC}$.




If $AD = 8$, $DB = 4$, and $DE = 6$, what is the length of $\overline{AC}$?
1) 24
2) 18
3) 12
4) 10

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

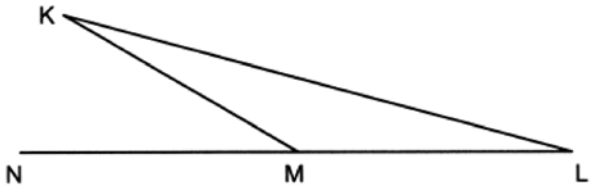
14 In the diagram below, $\overline{CD} \parallel \overline{AB}$, and $\overline{CB}$ bisects $\angle ABD$.




Which statement must be true?
1) $\overline{CD} \cong \overline{AB}$
2) $\overline{AB} \cong \overline{BD}$
3) $\triangle CDB$ is a right triangle
4) $\triangle CDB$ is an isosceles triangle

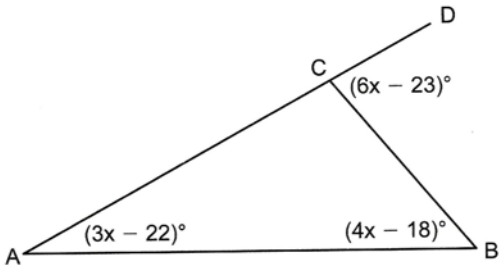
G.CO.C.10: EXTERIOR ANGLE THEOREM

15 Angle $KML$ is the vertex angle of isosceles triangle $KLM$ below. Side $\overline{LM}$ is extended through vertex $M$ to point $N$.




If $m\angle K = 15°$, determine and state $m\angle KMN$.

16 In $\triangle ABC$ below, $\overline{AC}$ is extended through $C$ to $D$, $m\angle A = (3x - 22)°$, $m\angle B = (4x - 18)°$, and $m\angle BCD = (6x - 23)°$.



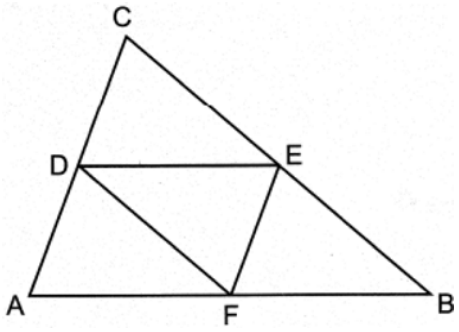

Determine and state $m\angle ACB$.

G.CO.C.10: TRIANGLE INEQUALITY THEOREM

17 If two sides of a triangle have lengths of 2 and 8, the length of the third side could be
1) 10
2) 7
3) 6
4) 4

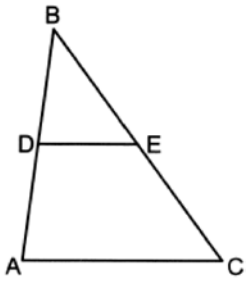
G.CO.C.10: MIDSEGMENTS

18 In $\triangle CAB$ below, midsegments $\overline{DE}$, $\overline{EF}$, and $\overline{FD}$ are drawn.




If $CA = 14$, $CB = 20$, and $FB = 9$, what is the perimeter of quadrilateral $DEFA$?
1) 26
2) 32
3) 44
4) 52

19 In $\triangle ABC$ below, midsegment $\overline{DE}$ is drawn.

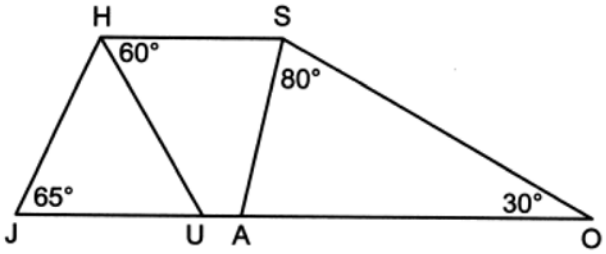



If $DE = x + 3$ and $AC = 3x - 5$, what is the length of $\overline{DE}$?
1) 28
2) 14
3) 7
4) 4

# POLYGONS

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

20 Trapezoid $JOSH$, shown below, has non-parallel sides $\overline{JH}$ and $\overline{OS}$, $m\angle J = 65°$, $m\angle O = 30°$, $m\angle OSA = 80°$, and $m\angle SHU = 60°$.




What is $m\angle HSA$?
1) 55°
2) 60°
3) 65°
4) 70°

G.CO.C.11: TRAPEZOIDS

21 Trapezoid $ZOYD$ has parallel sides $\overline{ZO}$ and $\overline{DY}$. If $m\angle Z = 141°$ and $m\angle Y = 73°$, what is $m\angle D$?
1) 39º
2) 73º
3) 107º
4) 141º

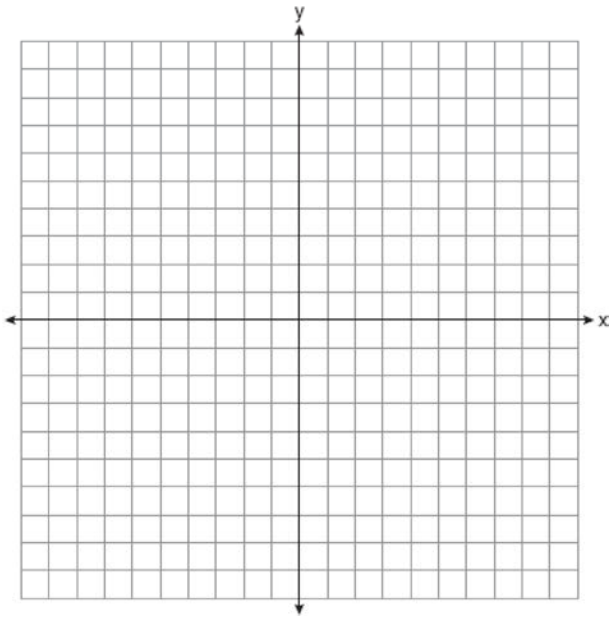
G.CO.C.11: SPECIAL QUADRILATERALS

22 A parallelogram must be a rectangle if its diagonals
1) are perpendicular
2) bisect each other
3) bisect its angles
4) are congruent

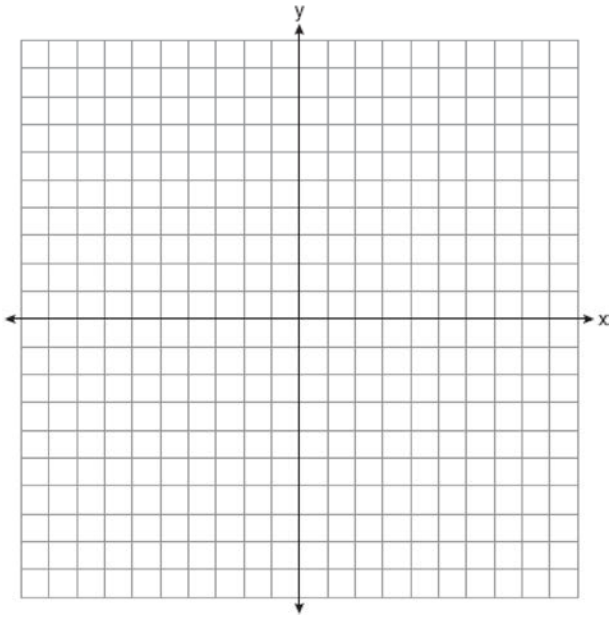
23 In parallelogram $ABCD$, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at $E$. Which information is sufficient to prove $ABCD$ is a rhombus?
1) $\overline{AE} \cong \overline{EC}$
2) $\overline{AC} \cong \overline{BD}$
3) $\overline{AB} \perp \overline{BC}$
4) $\overline{AC} \perp \overline{BD}$

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

24 Quadrilateral *MIKE* has vertices with coordinates $M(-1,-3)$, $I(-3,3)$, $K(5,4)$, and $E(7,-2)$. Prove *MIKE* is a parallelogram, and prove *MIKE* is *not* a rhombus. [The use of the set of axes below is optional.]



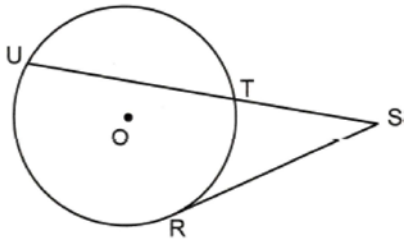

25 Quadrilateral *READ* has vertices with coordinates $R(-1,3)$, $E(2,7)$, $A(10,1)$, and $D(7,-3)$. Prove *READ* is a rectangle. [The use of the set of axes below is optional.]




# CONICS

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

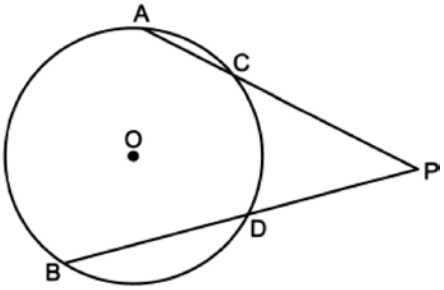
26 In the diagram below, tangent $\overline{SR}$ and secant $\overline{STU}$ are drawn to circle *O* from external point *S*.




If $\overset{\frown}{TU} \cong \overset{\frown}{RU}$ and $m\overset{\frown}{TR} = 68°$, what is $m\angle S$?

1) 22°
2) 34°
3) 39°
4) 78°

27 In circle $O$ below, secants $\overline{PCA}$ and $\overline{PDB}$ are drawn from external point $P$.

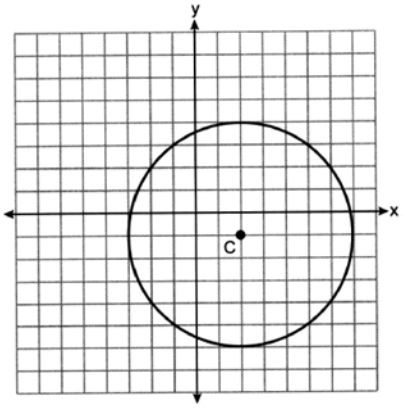



If $PA = 17$, $PD = 10$, and $BD = 12$, what is the length of $\overline{PC}$, to the *nearest tenth*?

1) 7.1
2) 7.7
3) 12.9
4) 14.2

G.GPE.A.1: EQUATIONS OF CIRCLES

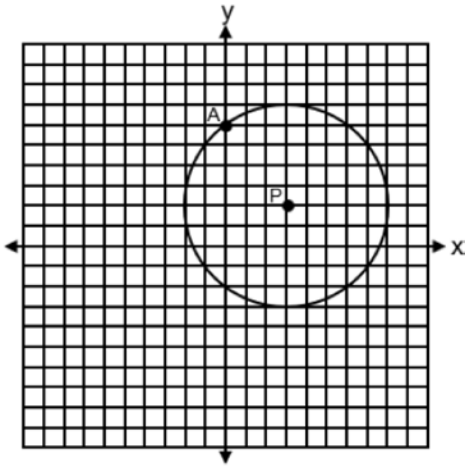
28 On the set of axes below, circle $C$ has a center with coordinates $(2,-1)$.




Which equation represents circle $C$?

1) $(x-2)^2+(y+1)^2=25$
2) $(x-2)^2+(y+1)^2=16$
3) $(x+2)^2+(y-1)^2=25$
4) $(x+2)^2+(y-1)^2=16$

29 Circle $P$ with center at $(3,2)$ and passing through $A(0,6)$ is graphed on the set of axes below.




An equation of circle $P$ is

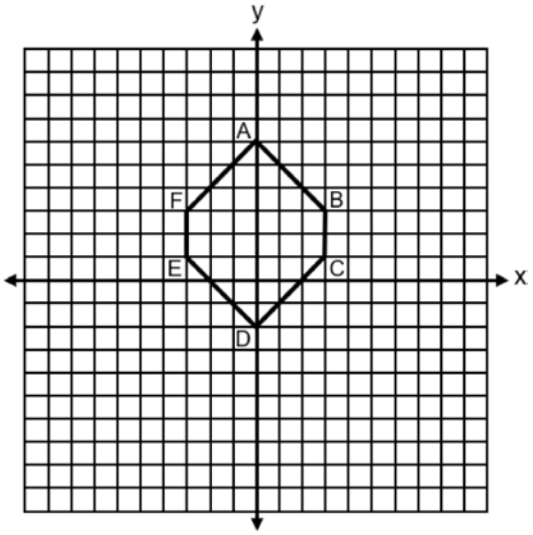
1) $(x+3)^2+(y+2)^2=5$
2) $(x+3)^2+(y+2)^2=25$
3) $(x-3)^2+(y-2)^2=5$
4) $(x-3)^2+(y-2)^2=25$

30 An equation of a circle is $x^2+y^2-6x+2y=14$. What are the coordinates of the center and the length of the radius of this circle?

1) $(-3,1)$ and $r=5$
2) $(3,-1)$ and $r=5$
3) $(-3,1)$ and $r=\sqrt{24}$
4) $(3,-1)$ and $r=\sqrt{24}$

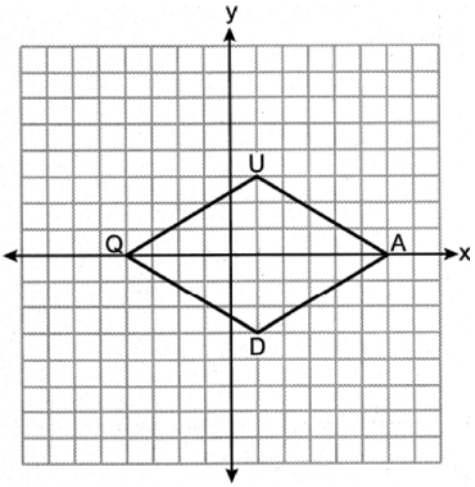
G.GPE.B.7: POLYGONS IN THE COORDINATE PLANE

31 Hexagon *ABCDEF* with coordinates at $A(0,6)$, $B(3,3)$, $C(3,1)$, $D(0,-2)$, $E(-3,1)$, and $F(-3,3)$ is graphed on the set of axes below.




Determine and state the perimeter of *ABCDEF* in simplest radical form.

32 Quadrilateral *QUAD* is graphed on the set of axes below.



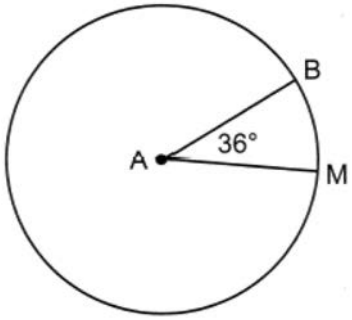

Determine and state the area of quadrilateral *QUAD*.

33 What is the perimeter of $\triangle ABC$, where the vertices have coordinates $A(-2,3)$, $B(-2,-1)$, and $C(6,-1)$?

1) 16
2) 92
3) $16\sqrt{5}$
4) $12+4\sqrt{5}$

G.C.B.5: ARC LENGTH

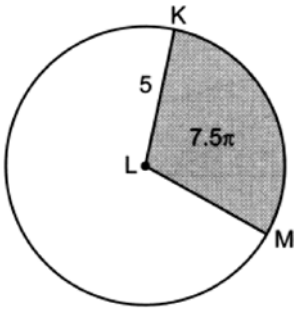
34 In circle *A* below, $m\angle BAM = 36°$.




If $AB = 20$, determine and state the length of $\overset{\frown}{MB}$. [Leave your answer in terms of π.]

G.C.B.5: SECTORS

35 In the diagram below of circle *L*, the area of the shaded sector *KLM* is $7.5\pi$ and $LK = 5$.

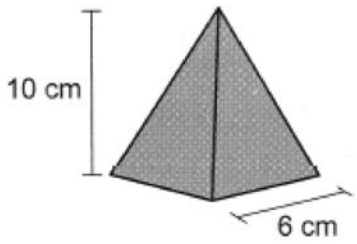



Determine and state the degree measure of angle *KLM*, the central angle of the shaded sector.

G.GMD.A.3: VOLUME

36 A section of sidewalk in the shape of a rectangular prism is being replaced. The sidewalk is 10 feet long, 4 feet wide, and 4 inches deep. A brand of concrete mix yields 0.6 cubic foot of concrete per bag. What is the minimum number of bags of concrete mix that must be purchased to completely replace this sidewalk?
1) 22
2) 23
3) 26
4) 27

37 A candle can be modeled by a pyramid with a square base, as shown below. The height of the candle is 10 cm, and each side of the base measures 6 cm.

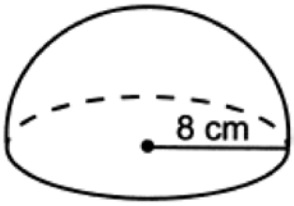



If the candle wax burns at a rate of 3.5 cubic centimeters per hour, what is the approximate number of hours this candle could burn?
1) 103
2) 51
3) 34
4) 11

38 A cone has a height of 8 inches and volume of 75.4 cubic inches. What is the diameter of the cone, to the *nearest inch*?
1) 9
2) 2
3) 3
4) 6

39 A spherical balloon is fully inflated with helium to a diameter of 1.7 feet. If helium costs \$0.80 per cubic foot, what is the cost to completely fill the balloon with helium?
1) \$2.06
2) \$2.42
3) \$3.22
4) \$16.46

40 The hemisphere below has a radius of 8 cm.



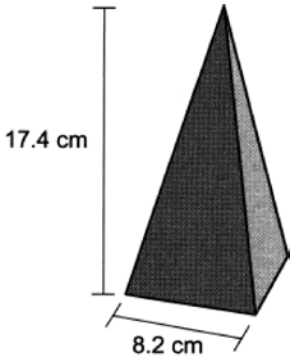

To the *nearest cubic centimeter*, the volume of the hemisphere is
1) 201
2) 268
3) 1072
4) 2145

41 A store sells colored craft sand in the three different containers below.
Container 1: A square prism with a base length of 4 inches and a height of 7.5 inches.
Container 2: A cylinder with a diameter of 5 inches and a height of 6 inches.
Container 3: A cone with a diameter of 7.5 inches and a height of 8.5 inches.
If the containers are filled to the top, which container will hold the most sand? Justify your answer.

42 Joan wants to fill an empty 75-liter fish tank with water. She uses a cylindrical bucket with a diameter of 20 cm. Determine and state the maximum number of buckets of water, filled to an exact height of 26 cm, Joan can put into the fish tank before it overflows. [1000 $cm^3$=1 liter]

G.MG.A.2: DENSITY

43 A wooden toy block can be modeled by a pyramid with a square base, as shown below. The height of the block is 17.4 cm and the square base has a side length of 8.2 cm.




The block is made of solid oak, which has a density of 0.77 g/cm$^3$. What is the mass of the block, to the *nearest gram*?

1) 300
2) 506
3) 637
4) 901

44 In the year 2020, the village of Depew, New York had an area of 5.1 square miles and a population of 15,069. In the same year, the village of Lancaster, New York had an area of 2.7 square miles and a population of 10,087. Which village had the larger population density in 2020? Justify your answer.

45 The table below lists five metals and their densities.

| **Metal** | **Density** (g/cm$^3$) |
|---|---|
| Zinc | 7.14 |
| Tin | 7.31 |
| Iron | 7.86 |
| Copper | 8.96 |
| Silver | 10.5 |

A solid metal cube has an edge length of 5 cm and a mass of 982.5 grams. Using the table above, determine and state the type of metal from which this cube is made.

# TRANSFORMATIONS

## G.SRT.A.1: LINE DILATIONS

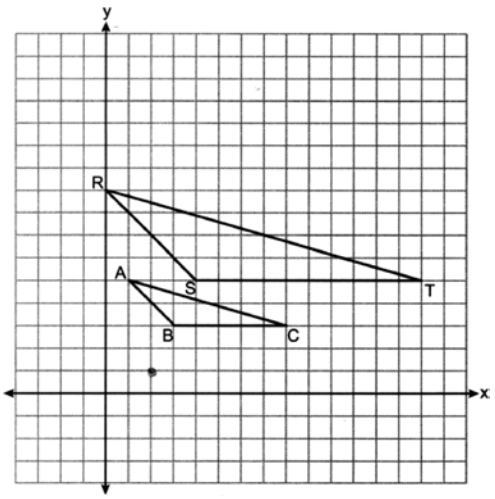
46 The line represented by the equation $5x - 2y = 10$ is transformed by a dilation centered at $(2,0)$ with a scale factor of 2. The image of the line
1) is the original line
2) passes through the point $(4,0)$
3) passes through the point $(0,-10)$
4) is perpendicular to the original line

47 The line $4x - 6y = 24$ is transformed by a dilation of scale factor 3 centered at the origin. Which equation represents the image of the line after this dilation?
1) $y = \frac{2}{3}x - 12$
2) $y = \frac{2}{3}x - 4$
3) $y = 2x - 12$
4) $y = 2x - 4$

## G.SRT.A.2: DILATIONS

48 The perimeter of a triangle is 18. What is the perimeter of a similar triangle after a dilation with scale factor of 3?
1) 6
2) 18
3) 54
4) 162

49 Triangle $ABC$ is dilated by a scale factor of 2 to map onto its image, $\triangle RST$, on the set of axes below.

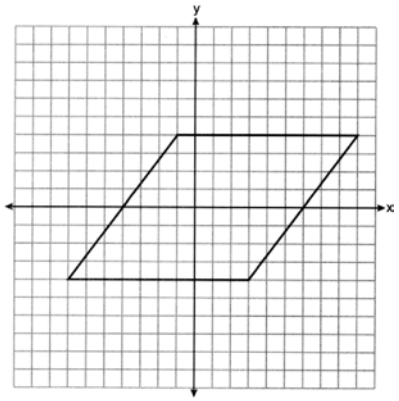



What are the coordinates of the center of this dilation?
1) $(1,-1)$
2) $(2,1)$
3) $(3,3)$
4) $(0,0)$

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

50 A regular octagon is rotated about its center. Which angle measure will carry the octagon onto itself?
1) 36°
2) 90°
3) 144°
4) 160°

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

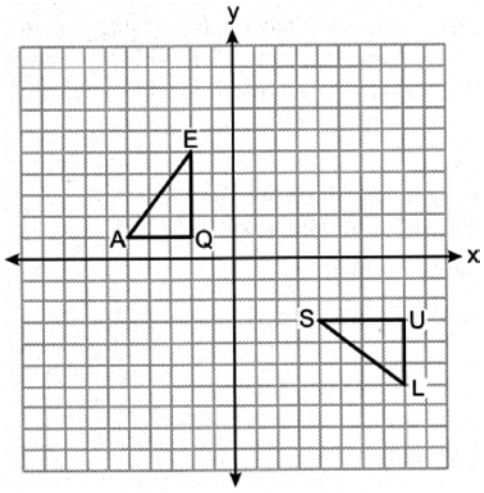



Which transformation does *not* carry the rhombus onto itself?

1) a rotation of 180º about the origin
2) a rotation of 180º about point $(1,0)$
3) a reflection over the line $y = \frac{1}{2}x - \frac{1}{2}$
4) a reflection over the line $y = -2x + 2$

G.CO.A.5: COMPOSITIONS OF TRANSFORMATIONS

52 On the set of axes below, $\triangle EQA$ and $\triangle SUL$ are graphed.




Which sequence of transformations shows that $\triangle EQA \cong \triangle SUL$?

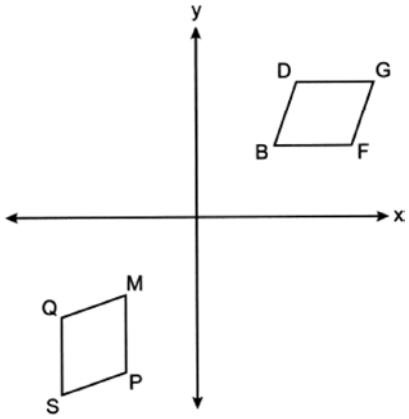
1) Rotate $\triangle EQA$ 90º counterclockwise about the origin and then translate 9 units right and 1 unit down.
2) Rotate $\triangle EQA$ 90º counterclockwise about the origin and then reflect over the line $x = 4$.
3) Reflect $\triangle EQA$ over the $x$-axis and then rotate clockwise about the origin.
4) Translate $\triangle EQA$ 10 units right and then reflect over the line $x = -1$.

G.CO.B.6: PROPERTIES OF TRANSFORMATIONS

53 Triangle $ABC$ is translated 5 units to the left and 2 units up to map onto $\triangle PQR$. Which statement is *not* always true?

1) $\triangle PQR \cong \triangle ABC$
2) $\angle A \cong \angle Q$
3) $BQ = \sqrt{29}$
4) $RQ = CB$

54 On the set of axes below, quadrilateral *BDGF* is rotated 90 degrees clockwise about the origin and then reflected over the *y*-axis. The image of quadrilateral *BDGF* is quadrilateral *MQSP*.



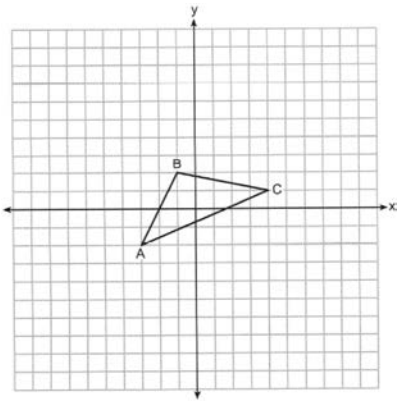

Side $\overline{BD}$ will always map onto

1) $\overline{MP}$
2) $\overline{PS}$
3) $\overline{MQ}$
4) $\overline{SQ}$

55 Triangle $D'A'N'$ is the image of $\triangle DAN$ after a translation. Explain why $\triangle D'A'N'$ must be congruent to $\triangle DAN$.

G.CO.A.2: IDENTIFYING TRANSFORMATIONS

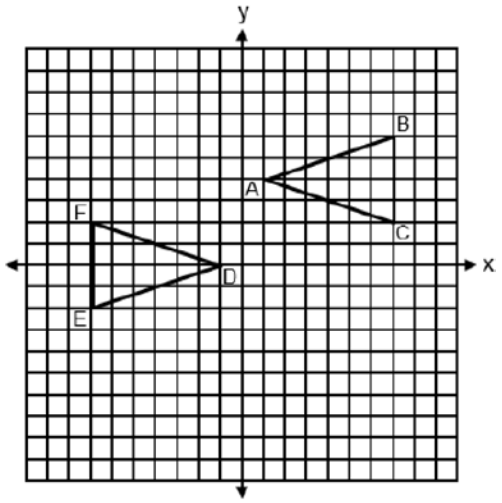
56 Triangle *ABC*, with vertices whose coordinates are $A(-3,-2)$, $B(-1,2)$, and $C(4,1)$, is graphed on the set of axes below.




Triangle *A'B'C'*, whose vertices have coordinates $A'(-6,-2)$, $B'(-2,2)$, and $C'(8,1)$, is the image of $\triangle ABC$. The transformation that maps $\triangle ABC$ onto $\triangle A'B'C'$ is a

1) dilation
2) translation
3) vertical stretch
4) horizontal stretch

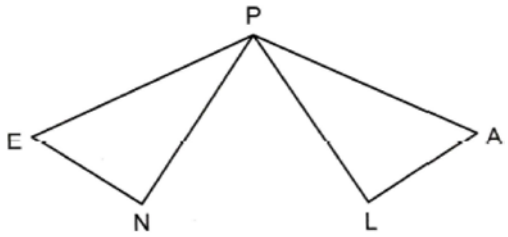
57 Triangles $ABC$ and $DEF$ are graphed on the set of axes below.




Which sequence of rigid motions maps $\triangle ABC$ onto $\triangle DEF$?

1) A reflection over $y = -x + 2$.
2) A point reflection through $(0,2)$.
3) A translation 2 units left followed by a reflection over the $x$-axis.
4) A translation 4 units down followed by a reflection over the $y$-axis.

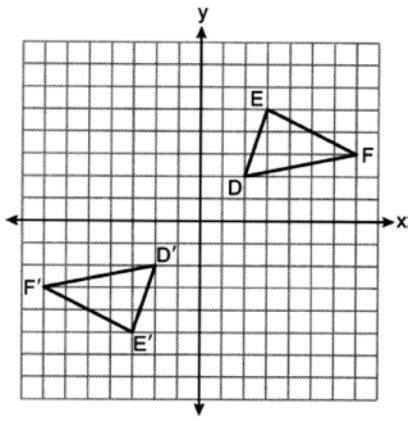
58 In the diagram below, congruent triangles $PEN$ and $PAL$ are drawn.




Which rigid motion maps $\triangle PEN$ onto $\triangle PAL$?

1) a point reflection of $\triangle PEN$ through $P$
2) a reflection of $\triangle PEN$ over the angle bisector of $\angle EPA$
3) a rotation of $\triangle PEN$ about point $P$, mapping $\overline{PE}$ onto $\overline{PA}$
4) a translation of $\triangle PEN$ along $\overline{EA}$, mapping point $E$ onto $A$

59 On the set of axes below, $\triangle D'E'F'$ is the image of $\triangle DEF$.

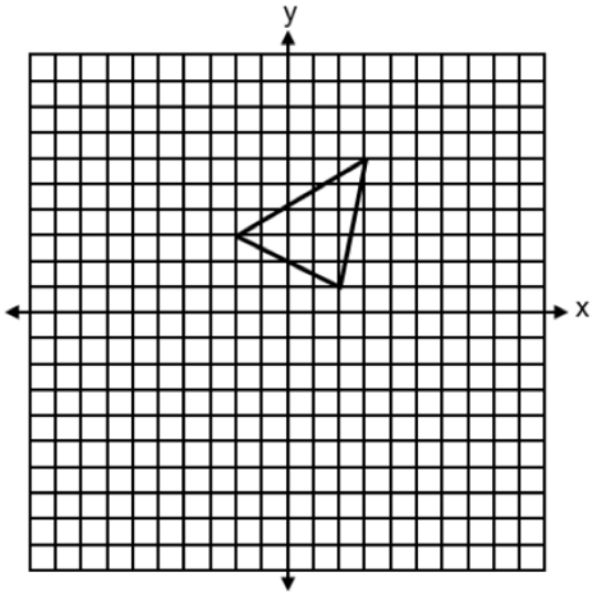



A transformation that maps $\triangle DEF$ onto $\triangle D'E'F'$ is a

1) reflection over the line $y = x$
2) reflection over the line $y = -x$
3) point reflection through the origin
4) translation 4 units left and 4 units down

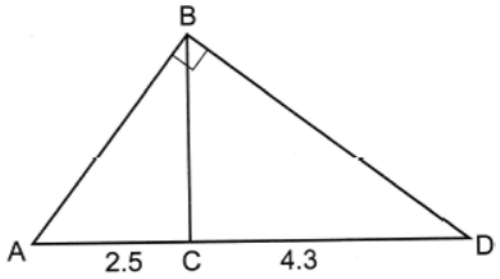
G.CO.A.2: ANALYTICAL REPRESENTATIONS OF TRANSFORMATIONS

60 A triangle with vertices at $(-2,3)$, $(3,6)$, and $(2,1)$, is graphed on the set of axes below. A horizontal stretch of scale factor 2 with respect to $x = 0$, is represented by $(x,y) \rightarrow (2x,y)$. Graph the image of this triangle, after the horizontal stretch on the same set of axes.



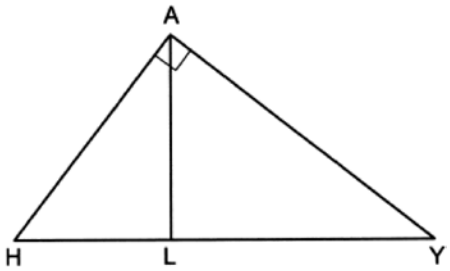

G.SRT.B.4: SIMILARITY

61 In right triangle $ABD$ below, altitude $\overline{BC}$ is drawn to hypotenuse $\overline{AD}$, $AC = 2.5$, and $CD = 4.3$.




What is the length of $\overline{BA}$, to the *nearest tenth*?
1) 3.3
2) 3.4
3) 4.1
4) 5.4

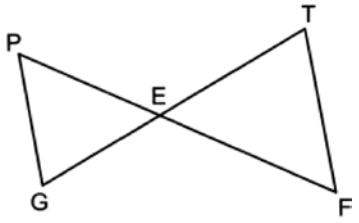
62 In right triangle $HAY$ below, altitude $\overline{AL}$ is drawn to hypotenuse $\overline{HY}$.




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

G.SRT.B.5: SIMILARITY

63 In the diagram below, $\overline{GT}$ and $\overline{PF}$ intersect at $E$, and $\angle P \cong \angle F$.




Which equation is always true?

1) $\frac{PE}{FE} = \frac{FT}{PG}$

2) $\frac{GE}{TE} = \frac{FT}{PG}$

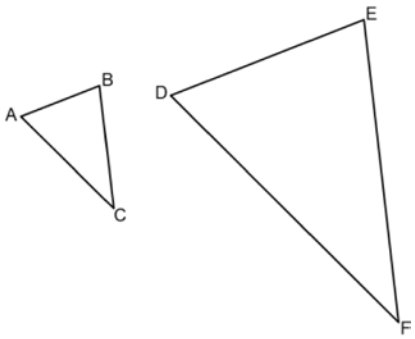
3) $\frac{PE}{GE} = \frac{TE}{FE}$

4) $\frac{PE}{FE} = \frac{PG}{FT}$

64 Square $ABCD$ has an area of 36. If the square is dilated by a scale factor of $\frac{1}{2}$ centered at $A$, what is the area of its image?

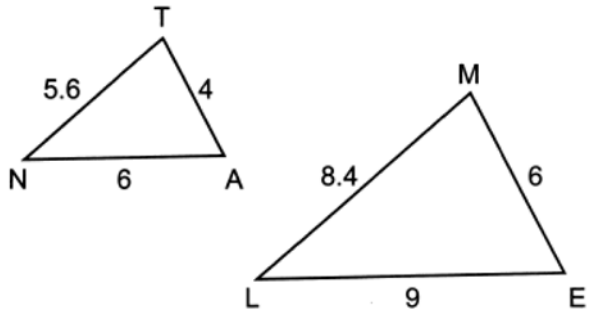
1) 9
2) 18
3) 72
4) 144

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




If $AB = 4$, $BC = x - 1$, $DE = x + 3$, and $EF = 15$, determine and state the length of $\overline{DE}$.

66 In triangles $ANT$ and $ELM$ below, $AN = 6$, $NT = 5.6$, $TA = 4$, $EL = 9$, $LM = 8.4$, and $ME = 6$.




Explain why $\triangle ANT \sim \triangle ELM$.

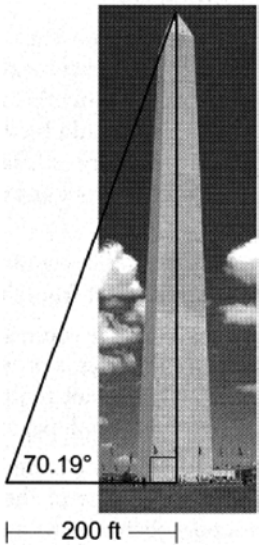
# TRIGONOMETRY

G.SRT.C.7: COFUNCTIONS

67 In a right triangle, the acute angles have the relationship $\sin(3x - 7)° = \cos(x + 1)°$. Determine and state the value of $x$.

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

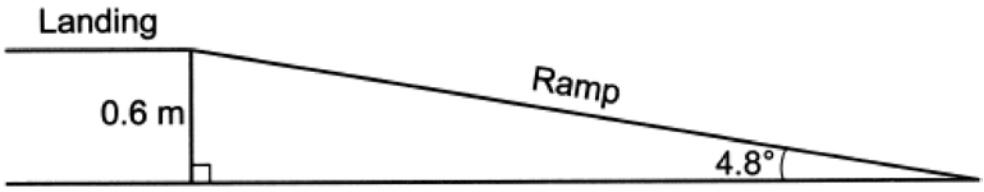
68 The Washington Monument, shown below, is in Washington, D.C. At a point on the ground 200 feet from the center of the base of the monument, the angle of elevation to the top of the monument is 70.19°.




What is the height of the monument, to the *nearest foot*?
1) 188
2) 213
3) 555
4) 590

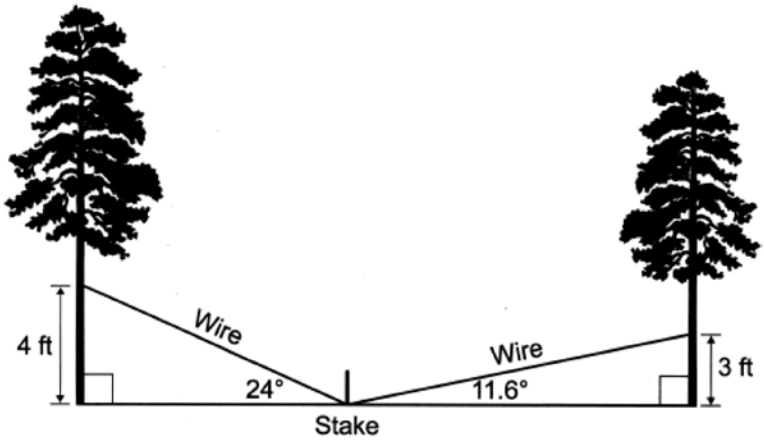
69 In right triangle *JOE*, hypotenuse $JO = 31.8$ and $m\angle J = 38°$. To the *nearest tenth*, the length of $\overline{EJ}$ is
1) 19.6
2) 25.1
3) 40.4
4) 51.7

70 The ramp shown in the diagram below has an angle of elevation of 4.8º. The ramp is built to a landing 0.6 m above the ground.




Determine and state the length of the ramp, to the *nearest tenth of a meter*.

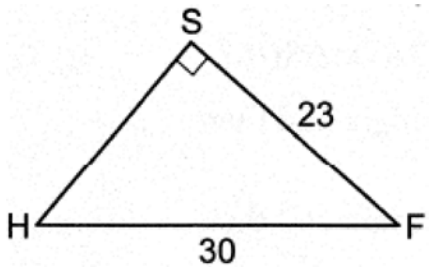
71 A park ranger needs to secure two different trees with wire. A wire is to be attached from a stake in the ground to each tree. The wire is attached at two different heights and two different angles of elevation, as indicated in the model below.




The park ranger has 20 feet of wire. Does the park ranger have enough wire to secure both trees? Justify your answer.

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

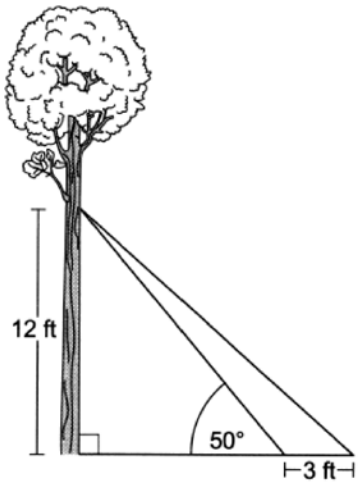
72 In $\triangle HSF$ below, $m\angle S = 90°$, $HF = 30$, and $FS = 23$.




What is $m\angle F$, to the *nearest degree*?

1) 53°
2) 50°
3) 40°
4) 37°

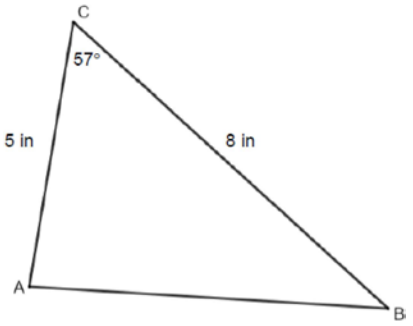
73 As modeled in the diagram below, two cables are attached from a point on a tree 12 feet above the ground. The longer cable is anchored on the ground 3 feet farther from the tree than the shorter cable is anchored. The angle of elevation between the shorter cable and the ground is 50º.




Determine and state, to the *nearest foot*, the distance from the base of the tree to the point where the longer cable is attached to the ground. Determine and state, to the *nearest degree*, the angle of elevation between the longer cable and the ground.

G.SRT.D.9: USING TRIGONOMETRY TO FIND AREA

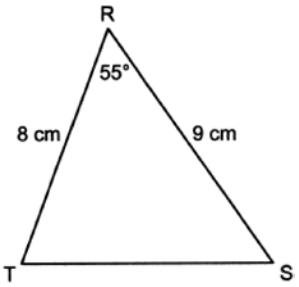
74 In non-right triangle $ABC$ shown below, $AC = 5$ in, $BC = 8$ in, and $m\angle C = 57°$.




What is the area of $\triangle ABC$, to the *nearest tenth of a square inch*?

1) 10.9
2) 16.8
3) 21.8
4) 33.5

75 In $\triangle RST$ below, $RS = 9$ cm, $RT = 8$ cm, and $m\angle TRS = 55°$.




What is the area of $\triangle RST$, to the *nearest square centimeter*?

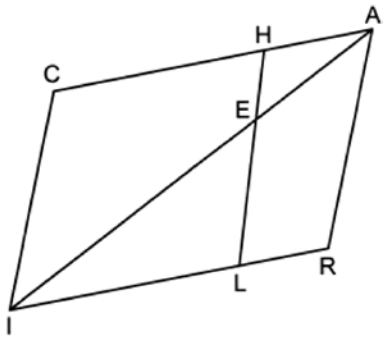
1) 59
2) 36
3) 29
4) 21

76 Triangle $RST$ has $m\angle S = 33°$, $RS = 7$, and $ST = 12$. What is the area of $\triangle RST$, to the *nearest tenth*?

1) 22.9
2) 27.3
3) 35.2
4) 45.7

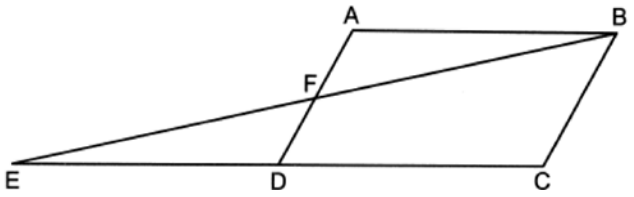
G.SRT.B.5: QUADRILATERAL PROOFS

77 Given: Quadrilateral $CARI$ with $\overline{CA} \cong \overline{RI}$ and $\overline{CI} \cong \overline{RA}$, and $\overline{AEI}$ and $\overline{LEH}$ are drawn




Prove: $HA \bullet EL = LI \bullet EH$

78 In quadrilateral $ABCD$ below, side $\overline{CD}$ is extended through $D$ to point $E$ such that $\overline{AFD}$ and $\overline{BFE}$ bisect each other, and $\overline{DE} \cong \overline{DC}$.



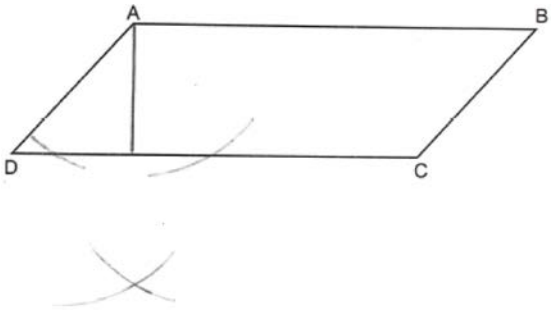

Prove $ABCD$ is a parallelogram.

# Geometry Regents Exam Questions by State Standard: Topic
## Answer Section

1 ANS: 1 PTS: 2 REF: 082501geo NAT: G.GMD.B.4
TOP: Rotations of Two-Dimensional Objects

2 ANS: 4 PTS: 2 REF: 062514geo NAT: G.GMD.B.4
TOP: Cross-Sections of Three-Dimensional Objects

3 ANS:




PTS: 2 REF: 062527geo NAT: G.CO.D.12 TOP: Constructions
KEY: parallel and perpendicular lines

4 ANS:


PTS: 2 REF: spr2406geo NAT: G.CO.D.12 TOP: Constructions
KEY: line bisector

5 ANS:


PTS: 2 REF: 082531geo NAT: G.CO.D.12 TOP: Constructions
KEY: line bisector

6 ANS: 4

$-2+\frac{1}{5}(3--2)=-2+\frac{1}{5}(5)=-2+1=-1 \quad -9+\frac{1}{5}(6--9)=-9+\frac{1}{5}(15)=-9+3=-6$

PTS: 2 REF: 062517geo NAT: G.GPE.B.6 TOP: Directed Line Segments

7 ANS:

$-3+\frac{3}{5}(7--3)=-3+\frac{3}{5}(10)=-3+6=3 \quad 1+\frac{3}{5}(6-1)=1+\frac{3}{5}(5)=1+3=4 \quad (3,4)$

PTS: 2 REF: 082527geo NAT: G.GPE.B.6 TOP: Directed Line Segments

8 ANS: 1

$m=4$

PTS: 2 REF: 062513geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of parallel line

9 ANS: 3

The slope of line $h$ is $\frac{2}{3}$. The perpendicular slope is $-\frac{3}{2}$.

PTS: 2 REF: 082512geo NAT: G.GPE.B.5 TOP: Parallel and Perpendicular Lines
KEY: write equation of perpendicular line

10 ANS: 3

$\frac{6\sqrt{3}}{x}=\frac{\sqrt{3}}{2}$

$x=12$

PTS: 2 REF: spr2402geo NAT: G.SRT.C.8 TOP: Special Right Triangles

11 ANS: 3

$x^2 + x^2 = (10\sqrt{2})^2$

$2x^2 = 200$

$x^2 = 100$

$x = 10$

PTS: 2 REF: 082515geo NAT: G.SRT.C.8 TOP: Special Right Triangles

12 ANS: 2

$\frac{8}{12} = \frac{11}{x}$

$8x = 132$

$x = 16.5$

PTS: 2 REF: 062515geo NAT: G.SRT.B.4 TOP: Side Splitter Theorem

13 ANS: 2

$\frac{4}{6} = \frac{12}{x}$

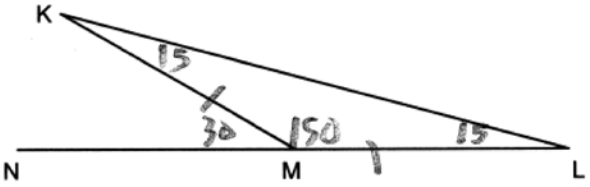
$4x = 72$

$x = 18$

PTS: 2 REF: 082507geo NAT: G.SRT.B.4 TOP: Side Splitter Theorem

14 ANS: 4 PTS: 2 REF: 082511geo NAT: G.CO.C.10
TOP: Interior and Exterior Angles of Triangles

15 ANS:




PTS: 2 REF: 082529geo NAT: G.CO.C.10 TOP: Exterior Angle Theorem

16 ANS:

$3x - 22 + 4x - 18 = 6x - 23$ $180 - (6(17) - 23) = 180 - (102 - 23) = 180 - 79 = 101$

$7x - 40 = 6x - 23$

$x = 17$

PTS: 2 REF: 062526geo NAT: G.CO.C.10 TOP: Exterior Angle Theorem

17 ANS: 2

$2 + 7 > 8$

PTS: 2 REF: 062504geo NAT: G.CO.C.10 TOP: Triangle Inequality Theorem

18 ANS: 2

$\frac{14}{2} + 9 + \frac{14}{2} + 9 = 32$

PTS: 2 REF: 062508geo NAT: G.CO.C.10 TOP: Midsegments

19 ANS: 2

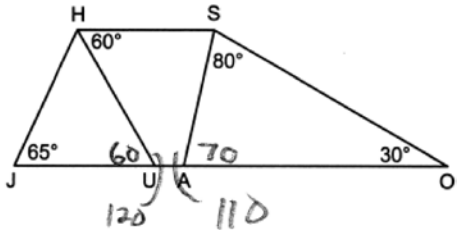
$3x - 5 = 2(x + 3)$

$3x - 5 = 2x + 6$

$x = 11$

PTS: 2 REF: 082514geo NAT: G.CO.C.10 TOP: Midsegments

20 ANS: 4




PTS: 2 REF: 082506geo NAT: G.CO.C.11 TOP: Interior and Exterior Angles of Polygons

21 ANS: 1

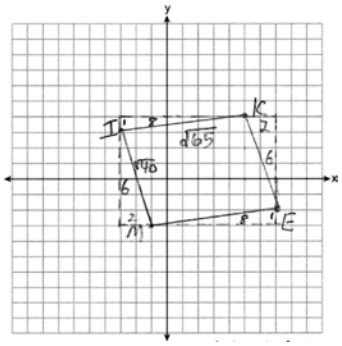
$180 - 141 = 39$

PTS: 2 REF: 062520geo NAT: G.CO.C.11 TOP: Trapezoids

22 ANS: 4 PTS: 2 REF: 062516geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

23 ANS: 4 PTS: 2 REF: 082505geo NAT: G.CO.C.11
TOP: Special Quadrilaterals

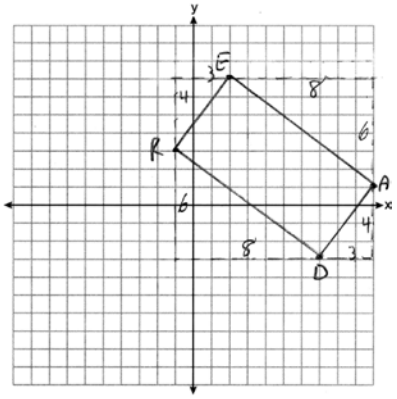
24 ANS:



$m_{\overline{MI}} = \frac{-3-3}{-1--3} = \frac{-6}{2} = -3$; $m_{\overline{KE}} = \frac{4--2}{5-7} = \frac{6}{-2} = -3$; $m_{\overline{IK}} = \frac{4-3}{5--3} = \frac{1}{8}$; $m_{\overline{ME}} = \frac{-2--3}{7--1} = \frac{1}{8}$. Because opposite side of Quadrilateral *MIKE* have the same slope, the sides are parallel. The opposite sides of a parallelogram are parallel, so *MIKE* is a parallelogram. $MI = \sqrt{6^2 + 2^2} = \sqrt{40}$; $IK = \sqrt{8^2 + 1^2} = \sqrt{65}$. Because two sides of Quadrilateral *MIKE* have different lengths, they are not congruent. All the sides of a rhombus are congruent, so *MIKE* is not a rhombus.

PTS: 4 REF: 062533geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane

25 ANS:



$m_{\overline{RE}} = \frac{4}{3}$ $m_{\overline{EA}} = -\frac{6}{8} = -\frac{3}{4}$ $m_{\overline{AD}} = \frac{4}{3}$ $m_{\overline{DR}} = -\frac{6}{8} = -\frac{3}{4}$ Adjacent sides have slopes that are opposite reciprocals, so are perpendicular. Perpendicular lines form right angles. A quadrilateral with four right angles is a rectangle.

PTS: 4 REF: 082534geo NAT: G.GPE.B.4 TOP: Quadrilaterals in the Coordinate Plane

26 ANS: 3

$$\frac{\frac{360-68}{2} - 68}{2} = 39$$

PTS: 2 REF: 062510geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secant and tangent drawn from common point, angle

27 ANS: 3

$17x = 22 \cdot 10$

$x \approx 12.9$

PTS: 2 REF: 082510geo NAT: G.C.A.2 TOP: Chords, Secants and Tangents
KEY: secants drawn from common point, length

28 ANS: 1 PTS: 2 REF: 082508geo NAT: G.GPE.A.1
TOP: Equations of Circles KEY: write equation, given graph

29 ANS: 4 PTS: 2 REF: spr2404geo NAT: G.GPE.A.1
TOP: Equations of Circles KEY: write equation, given graph

30 ANS: 4

$x^2 - 6x + 9 + y^2 + 2y + 1 = 14 + 9 + 1$

$(x-3)^2 + (y+1)^2 = 24$

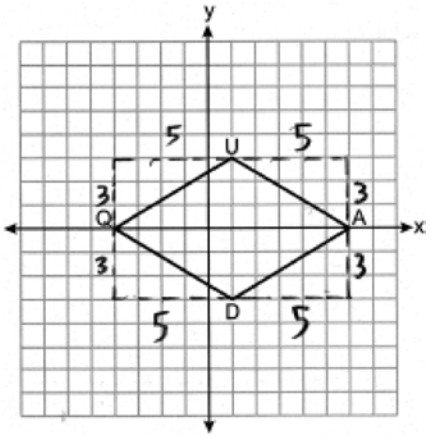
PTS: 2 REF: 062506geo NAT: G.GPE.A.1 TOP: Equations of Circles
KEY: completing the square

31 ANS:

$4\sqrt{3^2 + 3^2} + 2(2) = 4\sqrt{18} + 4 = 12\sqrt{2} + 4$

PTS: 2 REF: spr2408geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

32 ANS:




$(10 \times 6) - 4\left(\frac{1}{2}(5)(3)\right) = 60 - 30 = 30$

PTS: 2 REF: 062528geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

33 ANS: 4

$4 + 8 + \sqrt{4^2 + 8^2} = 12 + \sqrt{80} = 12 + 4\sqrt{5}$

PTS: 2 REF: 082518geo NAT: G.GPE.B.7 TOP: Polygons in the Coordinate Plane

34 ANS:

$40\pi\left(\frac{36}{360}\right) = 4\pi$

PTS: 2 REF: 062530geo NAT: G.C.B.5 TOP: Arc Length

35 ANS:

$\frac{7.5\pi}{25\pi} \cdot 360 = 108$

PTS: 2 REF: 082530geo NAT: G.C.B.5 TOP: Sectors

36 ANS: 2

$\frac{10 \cdot 4 \cdot \frac{1}{3}}{0.6} \approx 22.2$

PTS: 2 REF: 082520geo NAT: G.GMD.A.3 TOP: Volume
KEY: prisms

37 ANS: 3

$\frac{\frac{1}{3}(6^2)(10)}{3.5} \approx 34.3$

PTS: 2 REF: 062509geo NAT: G.GMD.A.3 TOP: Volume
KEY: pyramids

38 ANS: 4

$75.4 = \frac{1}{3}\pi r^2(8)$

$r \approx 3$

PTS: 2 REF: 062523geo NAT: G.GMD.A.3 TOP: Volume
KEY: cones

39 ANS: 1

$\frac{4}{3}\pi\left(\frac{1.7}{2}\right)^3 \times .8 \approx 2.06$

PTS: 2 REF: 062518geo NAT: G.GMD.A.3 TOP: Volume
KEY: spheres

40 ANS: 3

$V = \frac{1}{2} \times \frac{4}{3}\pi \cdot (8)^3 \approx 1072$

PTS: 2 REF: 082504geo NAT: G.GMD.A.3 TOP: Volume
KEY: spheres

41 ANS:

The cone: 1) $4 \times 4 \times 7.5 = 120$; 2) $\pi(2.5)^2(6) \approx 118$; 3) $\frac{1}{3}\pi(3.75)^2(8.5) \approx 125$

PTS: 4 REF: 062532geo NAT: G.GMD.A.3 TOP: Volume
KEY: cones

42 ANS:

$$\frac{75000}{\pi(10)^2(26)} \approx 9$$

PTS: 4 REF: 082532geo NAT: G.GMD.A.3 TOP: Volume
KEY: cylinders

43 ANS: 1

$$\frac{1}{3}(8.2)^2(17.4)(0.77) \approx 300$$

PTS: 2 REF: 082513geo NAT: G.MG.A.2 TOP: Density

44 ANS:

Lancaster $\frac{10087}{2.7} > \frac{15069}{5.1}$

PTS: 2 REF: 062525geo NAT: G.MG.A.2 TOP: Density

45 ANS:

$\frac{982.5}{5^3} = 7.86$ Iron

PTS: 2 REF: 082526geo NAT: G.MG.A.2 TOP: Density

46 ANS: 1

$5(2) - 2(0) = 10$

PTS: 2 REF: 062524geo NAT: G.SRT.A.1 TOP: Line Dilations

47 ANS: 1

$4x - 6y = 24$

$-6y = -4x + 24$

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

PTS: 2 REF: 082521geo NAT: G.SRT.A.1 TOP: Line Dilations

48 ANS: 3 PTS: 2 REF: 062501geo NAT: G.SRT.A.2
TOP: Dilations

49 ANS: 2

$x_0 = \frac{kx_1 - x_2}{k-1} = \frac{2(3)-4}{2-1} = 2 \quad y_0 = \frac{ky_1 - y_2}{k-1} = \frac{2(3)-5}{2-1} = 1$

PTS: 2 REF: 082517geo NAT: G.SRT.A.2 TOP: Dilations

50 ANS: 2

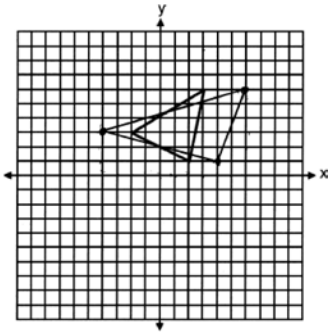
$\frac{360°}{8} = 45°$ 90º is a multiple of 45º

PTS: 2 REF: 062505geo NAT: G.CO.A.3 TOP: Mapping a Polygon onto Itself

51 ANS: 1 PTS: 2 REF: 082522geo NAT: G.CO.A.3
TOP: Mapping a Polygon onto Itself

52 ANS: 1 PTS: 2 REF: 062503geo NAT: G.CO.A.5
TOP: Compositions of Transformations
53 ANS: 2 PTS: 2 REF: 062521geo NAT: G.CO.B.6
TOP: Properties of Transformations
54 ANS: 3 PTS: 2 REF: 082502geo NAT: G.CO.B.6
TOP: Properties of Transformations
55 ANS:
Translations preserve distance.

PTS: 2 REF: 082525geo NAT: G.CO.B.6 TOP: Properties of Transformations
56 ANS: 4 PTS: 2 REF: 062512geo NAT: G.CO.A.2
TOP: Identifying Transformations
57 ANS: 2 PTS: 2 REF: spr2401geo NAT: G.CO.A.2
TOP: Identifying Transformations
58 ANS: 2 PTS: 2 REF: 062522geo NAT: G.CO.A.2
TOP: Identifying Transformations
59 ANS: 3 PTS: 2 REF: 082509geo NAT: G.CO.A.2
TOP: Identifying Transformations KEY: graphics
60 ANS:




PTS: 2 REF: spr2405geo NAT: G.CO.A.2
TOP: Analytical Representations of Transformations KEY: graphics
61 ANS: 3
$x^2 = 2.5 \times (2.5 + 4.3)$

$x \approx 4.1$

PTS: 2 REF: 062519geo NAT: G.SRT.B.4 TOP: Similarity
62 ANS: 2
$\frac{x}{20} = \frac{15}{25}$

$25x = 300$

$x = 12$

PTS: 2 REF: 082523geo NAT: G.SRT.B.4 TOP: Similarity
63 ANS: 4 PTS: 2 REF: 082519geo NAT: G.SRT.B.5
TOP: Similarity KEY: basic

64 ANS: 1

$$\left(\frac{\sqrt{36}}{2}\right)^2 = 9$$

PTS: 2 REF: 082524geo NAT: G.SRT.B.5 TOP: Similarity
KEY: perimeter and area

65 ANS:

$$\frac{4}{x+3} = \frac{x-1}{15} \quad 7+3=10$$

$$x^2 - x + 3x - 3 = 60$$

$$x^2 + 2x - 63 = 0$$

$$(x+9)(x-7) = 0$$

$$x = 7$$

PTS: 4 REF: spr2407geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

66 ANS:

$\frac{5.6}{6} = \frac{8.4}{9} \rightarrow 50.4 = 50.4$ $\frac{4}{6} = \frac{6}{9} \rightarrow 36 = 36$ $\frac{4}{5.6} = \frac{6}{8.4} \rightarrow 33.6 = 33.6$ The corresponding sides are proportional.

PTS: 2 REF: 062531geo NAT: G.SRT.B.5 TOP: Similarity
KEY: basic

67 ANS:

$$3x - 7 + x + 1 = 90$$

$$4x - 6 = 90$$

$$4x = 96$$

$$x = 24$$

PTS: 2 REF: 062529geo NAT: G.SRT.C.7 TOP: Cofunctions

68 ANS: 3

$$\tan 70.19 = \frac{h}{200}$$

$$h \approx 555$$

PTS: 2 REF: 062502geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

69 ANS: 2

$$\cos 38 = \frac{x}{31.8}$$

$$x \approx 25.1$$

PTS: 2 REF: 082503geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

70 ANS:

$\sin 4.8 = \frac{.6}{x}$

$x \approx 7.2$

PTS: 2 REF: 082528geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

71 ANS:

$\sin 24 = \frac{4}{x}$ . $\sin 11.6 = \frac{3}{y}$ No, because $9.8 + 14.9 > 20$.

$x \approx 9.8$ $y \approx 14.9$

PTS: 4 REF: 062534geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find a Side

72 ANS: 3

$\cos F = \frac{23}{30}$

$F \approx 40°$

PTS: 2 REF: 062507geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

73 ANS:

$\tan 50 = \frac{12}{x}$ $10 + 3 = 13$ $\tan \theta = \frac{12}{13}$

$x \approx 10$ $\theta \approx 43$

PTS: 4 REF: 082533geo NAT: G.SRT.C.8 TOP: Using Trigonometry to Find an Angle

74 ANS: 2

$K = \frac{1}{2}(8)(5)\sin 57 \approx 16.8$

PTS: 2 REF: spr2403geo NAT: G.SRT.D.9 TOP: Using Trigonometry to Find Area
KEY: basic

75 ANS: 3

$K = \frac{1}{2}(8)(9)\sin 55 \approx 29$

PTS: 2 REF: 082516geo NAT: G.SRT.D.9 TOP: Using Trigonometry to Find Area
KEY: basic

76 ANS: 1

$\frac{1}{2}(7)(12)\sin(33) \approx 22.9$

PTS: 2 REF: 062511geo NAT: G.SRT.D.9 TOP: Using Trigonometry to Find Area
KEY: basic

77 ANS:

1) Quadrilateral $CARI$ with $\overline{CA} \cong \overline{RI}$ and $\overline{CI} \cong \overline{RA}$, and $\overline{AEI}$ and $\overline{LEH}$ are drawn (Given); 2) Quadrilateral $CARI$ is a parallelogram (Opposite sides of a parallelogram are congruent); 3) $\overline{CA} \parallel \overline{RI}$ and $\overline{CI} \parallel \overline{RA}$ (Opposite sides of a parallelogram are parallel); 4) $\angle AHE \cong \angle ILE$ and $\angle HAE \cong \angle LIE$ (Parallel lines cut by a transversal create congruent alternate interior angles); 5) $\triangle HAE \sim \triangle LIE$ (AA); 6) $\frac{HA}{EH} = \frac{LI}{EL}$ (Corresponding sides of similar triangles are proportional); 7) $HA \bullet EL = LI \bullet EH$ (The product of the means equals the product of the extremes).

PTS: 6 REF: 062535geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs

78 ANS:

1) Quadrilateral $ABCD$, side $\overline{CD}$ is extended through $D$ to point $E$ such that $\overline{AFD}$ and $\overline{BFE}$ bisect each other, and $\overline{DE} \cong \overline{DC}$ (given); 2) $\overline{FE} \cong \overline{FB}$ and $\overline{FD} \cong \overline{FA}$ (bisected lines form two congruent segments); 3) $\angle EFD \cong \angle BFA$ (vertical angles are congruent); 4) $\triangle EFD \cong \triangle BFA$ (SAS); 5) $\overline{AB} \cong \overline{DE}, \angle E \cong \angle ABF$ (CPCTC); 6) $\overline{AB} \cong \overline{DC}$ (Substitution); 7) $\overline{AB} \parallel \overline{DC}$ (if the alternate interior angles formed by a transversal crossing two lines are congruent, the lines are parallel); 8) $ABCD$ is a parallelogram (if a pair of opposite sides of a quadrilateral are parallel and congruent, it is a parallelogram).

PTS: 6 REF: 082535geo NAT: G.SRT.B.5 TOP: Quadrilateral Proofs