Name _____   Date _____
Mr. Schlansky   Geometry

CCG Regents Review Homework 2025

1. In $\triangle DEF$, $\angle F$ is the vertex angle. If $\overline{DF} = 5x + 4$, $\overline{DE} = 12x - 4$, and $\overline{EF} = 7x$, find $\overline{DE}$.

2. In $\triangle ROY$, $m\angle R = 50^\circ$ and $m\angle O = 95^\circ$. What is the largest side of $\triangle ROY$? What is the smallest side of $\triangle ROY$?
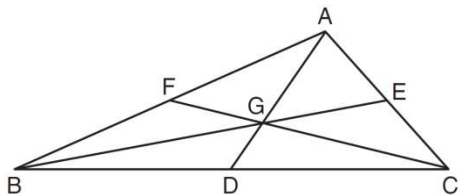
3. Which set of numbers represents the lengths of the sides of a triangle?
1) $\{5, 18, 13\}$ 3) $\{16, 24, 7\}$
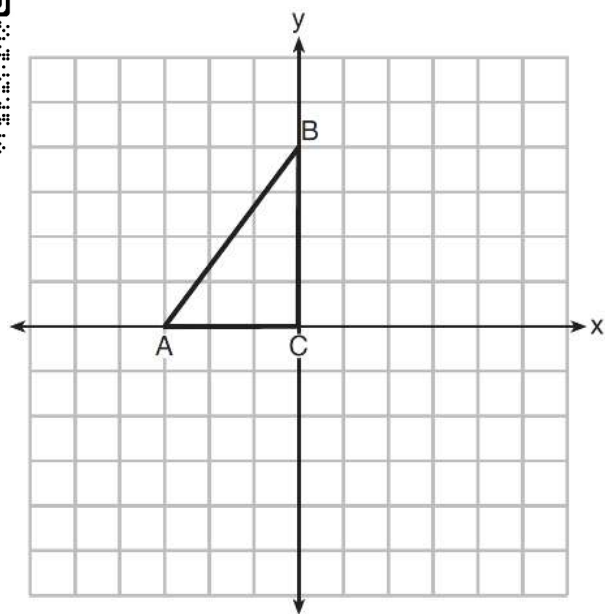2) $\{6, 17, 22\}$ 4) $\{26, 8, 15\}$

4. In $\triangle ABC$, $AB = 5$ feet and $BC = 3$ feet. Which *cannot* represent the value for the length of $\overline{AC}$, in feet?
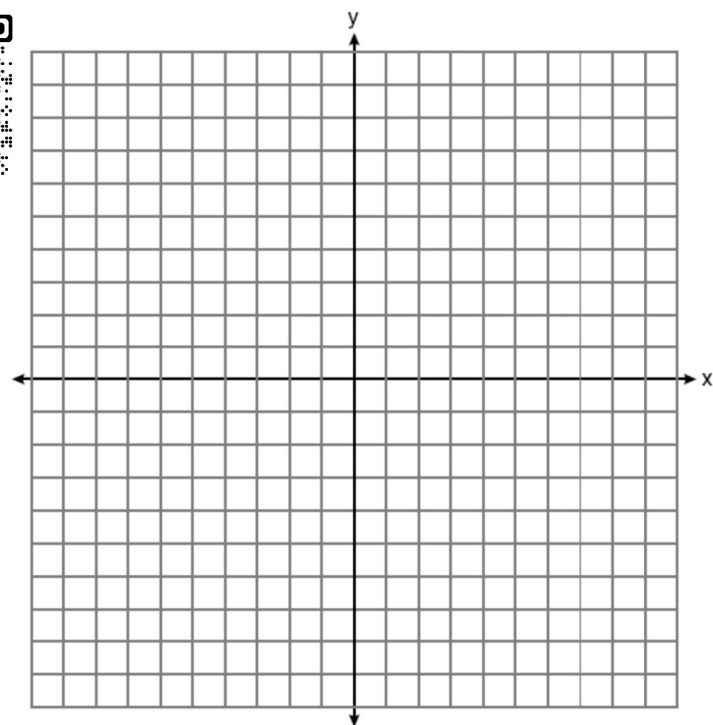1) 3
2) 5
3) 7
4) 9

5. In the diagram below of $\triangle ABC$, medians $\overline{AD}$, $\overline{BE}$, and $\overline{CF}$ intersect at G. If $CF = 24$, what is the length of $\overline{FG}$?

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

7. The coordinates of the vertices of $\triangle RST$ are $R(-2, 3)$, $S(4, 4)$, and $T(2, -2)$. Graph $\triangle RST$ and $\triangle R'S'T'$, the image of $\triangle RST$ after a dilation of 3 centered at (1,2).

8. The triangle graphed below with vertices at A(-2,5), B(4,2), and C(-8,-1), is graphed on the set of axes below. A vertical stretch of scale factor 2 with respect to y = 0 is represented by $(x, y) \rightarrow (x, 2y)$. Graph the image of this triangle, after the vertical stretch on the same set of axes.
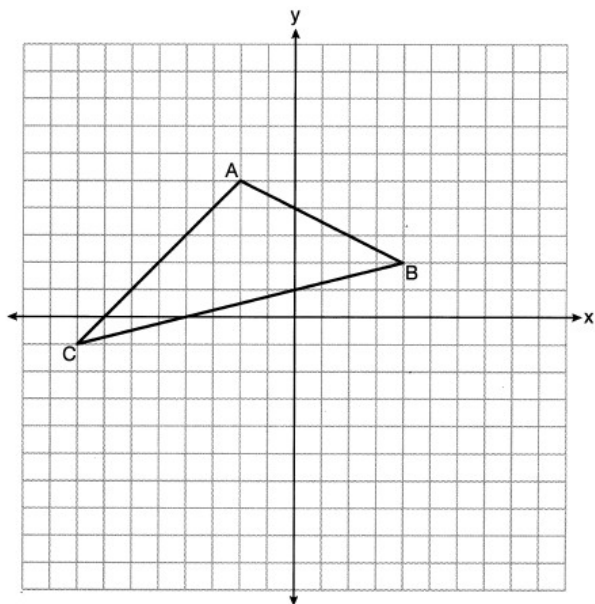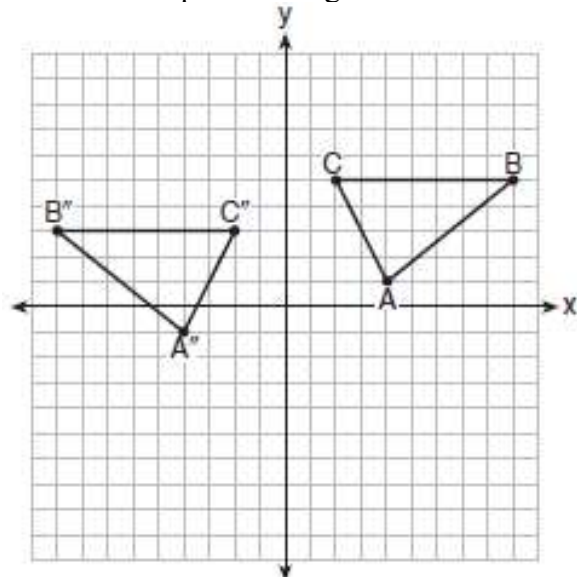

9. On the set of axes below, $\triangle LET$ and $\triangle L''E''T''$ are graphed in the coordinate plane where $\triangle LET \cong \triangle L''E''T''$.
Which sequence of rigid motions maps $\triangle LET$ onto $\triangle L''E''T''$?

1) a reflection over the y-axis followed by a reflection over the x-axis

2) a rotation of 180° about the origin

3) a rotation of 90° counterclockwise about the origin followed by a reflection over the y-axis

4) a reflection over the x-axis followed by a rotation of 90° clockwise about the origin
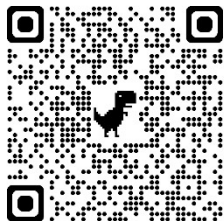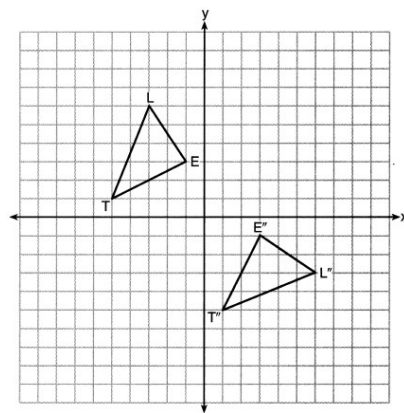
10. The graph below shows $\triangle ABC$ and its image, $\triangle A''B''C''$.
Describe a sequence of rigid motions which would map $\triangle ABC$ onto $\triangle A''B''C''$.


11. On the set of axes below, $\triangle ABC$ and $\triangle DEF$ are graphed. Describe a sequence of rigid motions that would map $\triangle ABC$ onto $\triangle DEF$.
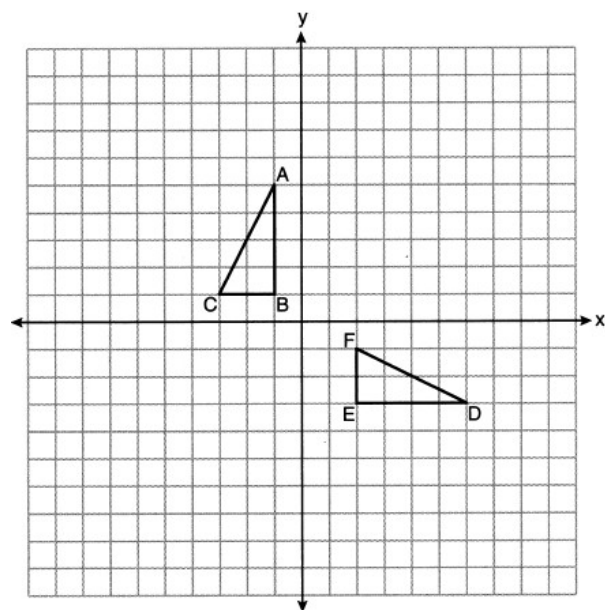
12. If $\triangle A'B'C'$ is the image of $\triangle ABC$, under which transformation will the triangles *not* be congruent?
1) reflection over the *x*-axis   3) dilation centered at the origin with scale factor 2
2) translation to the left 5 and down 4   4) rotation of 270° counterclockwise about the origin

13. In the diagram below, parallelogram *EFGH* is mapped onto parallelogram *IJKH* after a reflection over line ℓ. Use the properties of rigid motions to explain why parallelogram *EFGH* is congruent to parallelogram *IJKH*.
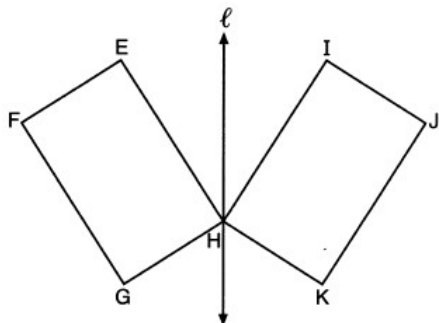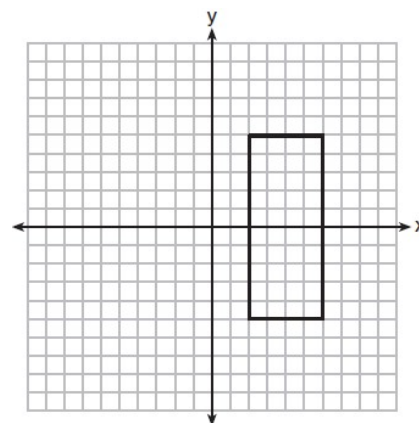

14. Which rotation would map a regular hexagon onto itself?
1) 45°   3) 240°
2) 150°   4) 315°

15. As shown in the graph below, the quadrilateral is a rectangle. Which transformation would *not* map the rectangle onto itself?
1) a reflection over the *x*-axis   3) a rotation of 180° about the origin
2) a reflection over the line $x = 4$ 4) a rotation of 180° about the point $(4, 0)$
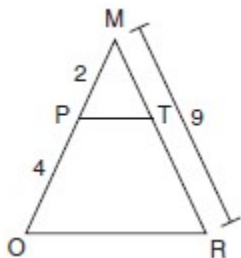
16. In the diagram below, $\overline{AD}$ intersects $\overline{BE}$ at C, and $\overline{AB}\,\|\,\overline{DE}$. If $CD = 6.6$ cm, $DE = 3.4$ cm, $CE = 4.2$ cm, and $BC = 5.25$ cm, what is the length of $\overline{AC}$, to the *nearest hundredth of a centimeter*?
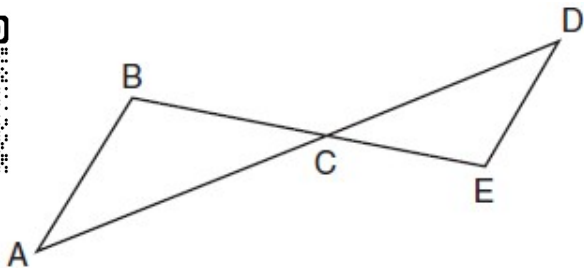

17. In $\triangle XYZ$, A is the midpoint of XY and B is the midpoint of YZ. If $AB = 4x + 10$ and $XZ = 13x - 5$, find AB.

18. Given $\triangle MRO$ shown below, with trapezoid $PTRO$, $MR = 9$, $MP = 2$, and $PO = 4$. What is the length of $\overline{TR}$?


19. To find the distance across a pond from point B to point C, a surveyor drew the diagram below. The measurements he made are indicated on his diagram.
Use the surveyor's information to determine and state the distance from point B to point C, to the *nearest yard*.
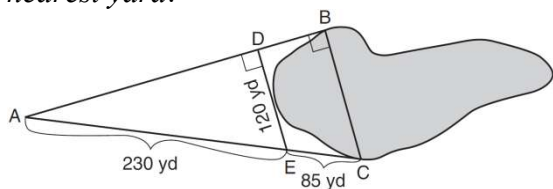
20. In the diagram below of $\triangle ABC$, X and Y are points on $\overline{AB}$ and $\overline{AC}$, respectively, such that $m\angle AYX = m\angle B$. If $\overline{AX} = 2$, $\overline{AY} = 5$, and $\overline{YC} = 4$, find $\overline{BX}$.
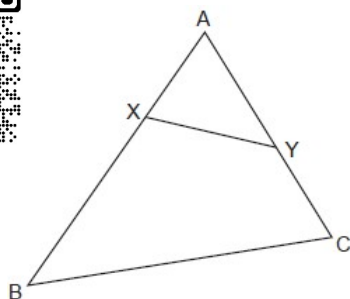
21. Triangle ABC shown below is a right triangle with altitude $\overline{AD}$ drawn to the hypotenuse $\overline{BC}$. If $BD = 2$ and $DC = 10$, what is the length of $\overline{AB}$ to the *nearest tenth*?
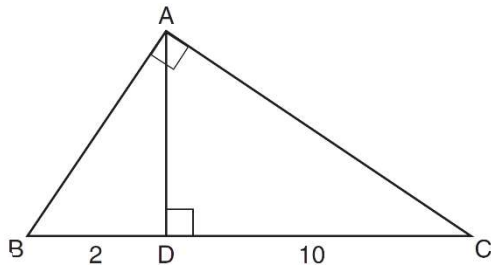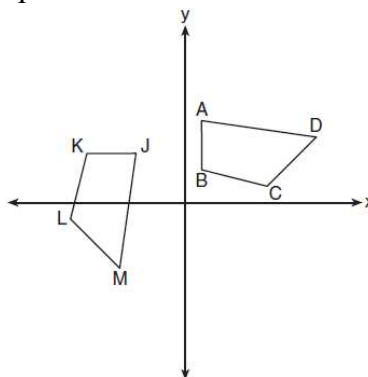

22. In right triangle ABC, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. If $AD = 4$ and $CD = 8$, the length of $\overline{BD}$ is
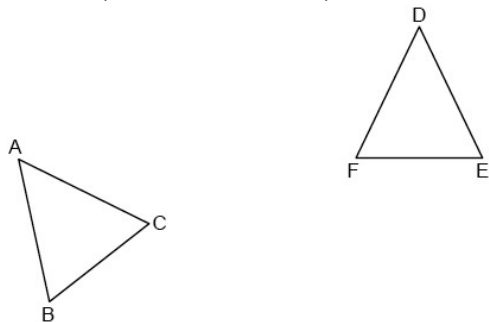
1) $\sqrt{48}$ 3)   12
2) $\sqrt{80}$ 4)   16

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

Which of the following statements must be true?

1) $\angle L \cong \angle B$ 3) $\overline{JK} \cong \overline{AC}$
2) $\angle A \cong \angle J$ 4) $\overline{JM} \cong \overline{AB}$
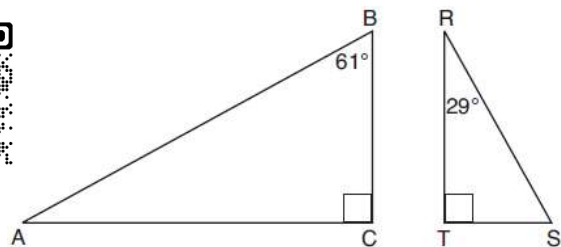
24. In the diagram below, $\triangle DEF$ is the image of $\triangle ABC$ after a reflection. If $\overline{AB}=7$, $\overline{CB}=5$, $\overline{AC}=8$, and $\overline{DE}=5x-3$, find the value of x.

25. Given right triangle ABC with a right angle at C, $m\angle B = 61°$. Given right triangle RST with a right angle at T, $m\angle R = 29°$.
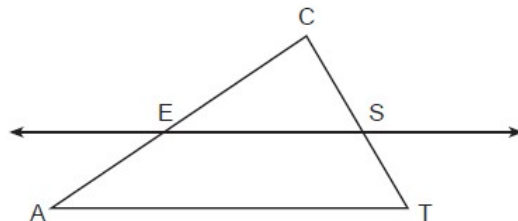Which proportion in relation to $\triangle ABC$ and $\triangle RST$ is *not* correct?

1) $\dfrac{AB}{RS} = \dfrac{RT}{AC}$

2) $\dfrac{BC}{ST} = \dfrac{AB}{RS}$

3) $\dfrac{BC}{ST} = \dfrac{AC}{RT}$

4) $\dfrac{AB}{AC} = \dfrac{RS}{RT}$

26. In the diagram below of $\triangle ACT$, $\overleftrightarrow{ES}$ is drawn parallel to $\overline{AT}$ such that E is on $\overline{CA}$ and S is on $\overline{CT}$.
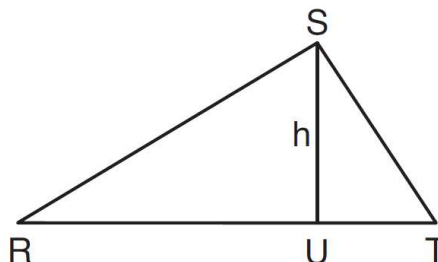Which statement is always true?

1) $\dfrac{CE}{CA} = \dfrac{CS}{ST}$

2) $\dfrac{CE}{ES} = \dfrac{EA}{AT}$

3) $\dfrac{CE}{EA} = \dfrac{CS}{ST}$

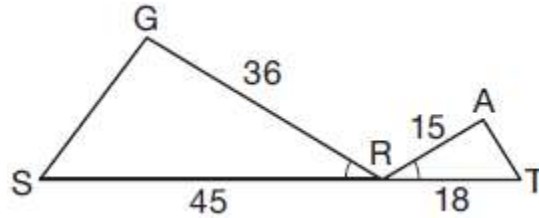4) $\dfrac{CE}{ST} = \dfrac{EA}{CS}$

27. In right triangle RST below, altitude $\overline{SU}$ is drawn to hypotenuse $\overline{RT}$. Which of the following proportions is *not* true?

1) $\dfrac{\overline{RU}}{\overline{SU}} = \dfrac{\overline{SU}}{\overline{UT}}$

2) $\dfrac{\overline{SU}}{\overline{RU}} = \dfrac{\overline{RU}}{\overline{UT}}$

3) $\dfrac{\overline{RT}}{\overline{RS}} = \dfrac{\overline{RS}}{\overline{RU}}$

4) $\dfrac{\overline{TR}}{\overline{ST}} = \dfrac{\overline{ST}}{\overline{UT}}$

28. In the diagram below, $\angle GRS \cong \angle ART$, $GR = 36$, $SR = 45$, $AR = 15$, and $RT = 18$.

Which triangle similarity statement is correct?
1) $\triangle GRS \sim \triangle ART$ by AA.
2) $\triangle GRS \sim \triangle ART$ by SAS.
3) $\triangle GRS \sim \triangle ART$ by SSS.
4) $\triangle GRS$ is not similar to $\triangle ART$.

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

30. Triangle JOY has a perimeter of 10 and an area of 12. What is the perimeter and area of triangle JOY after a dilation by a scale factor of 2?

31. Which equation shows a correct trigonometric ratio for angle A in the right triangle below?
1) $\sin A = \dfrac{15}{17}$
2) $\tan A = \dfrac{8}{17}$
3) $\cos A = \dfrac{15}{17}$
4) $\tan A = \dfrac{5}{8}$
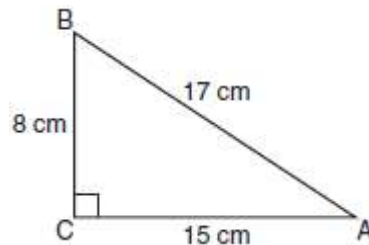
32. A 28-foot ladder is leaning against a house. The bottom of the ladder is 6 feet from the base of the house. Find the measure of the angle formed by the ladder and the ground, to the *nearest degree*.

33. Cape Canaveral, Florida is where NASA launches rockets into space. As modeled in the diagram below, a person views the launch of a rocket from observation area A, 3280 feet away from launch pad B. After launch, the rocket was sighted at C with an angle of elevation of 15°. The rocket was later sighted at D with an angle of elevation of 31°. Determine and state, to the *nearest foot*, the distance the rocket traveled between the two sightings, C and D.
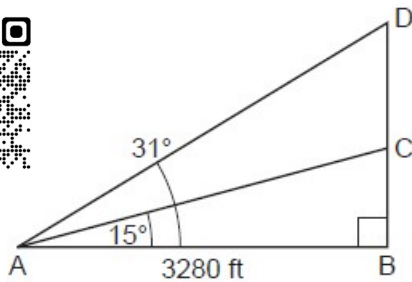
34. Find the measure of $\overline{SP}$ in the diagram of right triangle SEP below to the nearest unit.
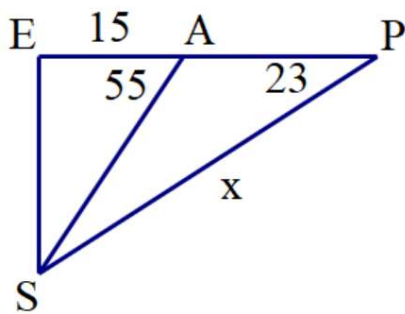
35. Right triangle *TMR* is a scalene triangle with the right angle at M. Which equation is true?
1) $\sin M = \cos T$
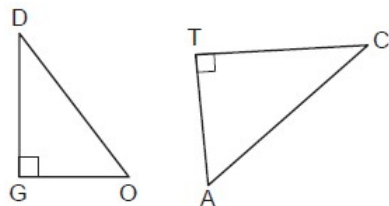2) $\sin R = \cos R$
3) $\sin T = \cos R$
4) $\sin T = \cos M$

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

37. Which of the following is equivalent to $\sin 40$?
1) $\sin 50$ 2) $\cos 50$ 3) $\cos 40$ 4) $\tan 50$

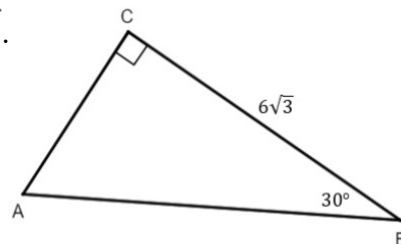38. In the diagram below, $\triangle DOG \sim \triangle CAT$, where $\angle G$ and $\angle T$ are right angles.

Which expression is always equivalent to $\sin D$?
1) $\cos A$ 3) $\tan A$
2) $\sin A$ 4) $\cos C$

39. 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) $3\sqrt{3}$ 3) 12
2) 9   4) $12\sqrt{3}$
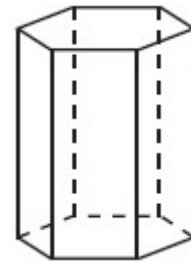

40. A plane intersects a cylinder parallel to its bases.

This cross section can be described as a
1) rectangle   3) triangle
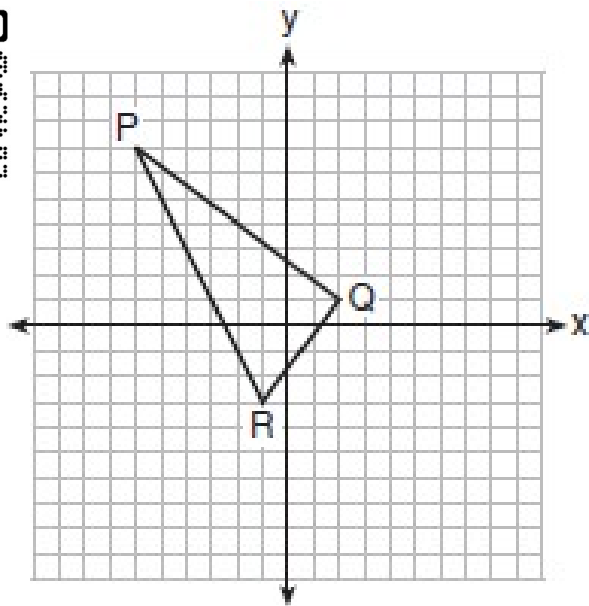2) parabola   4) circle

41. A right hexagonal prism is shown below. A two-dimensional cross section that is perpendicular to the base is taken from the prism.
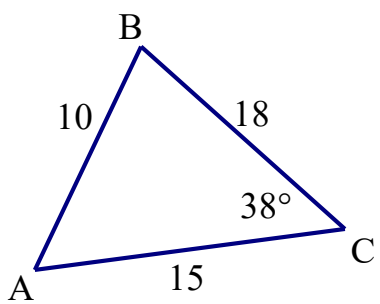
Which figure describes the two-dimensional cross section?
1) triangle
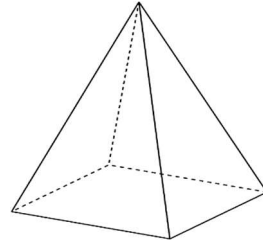2) rectangle
3) pentagon
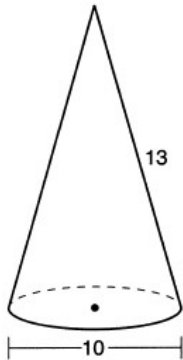4) hexagon

42. Find the area of *PQR*.

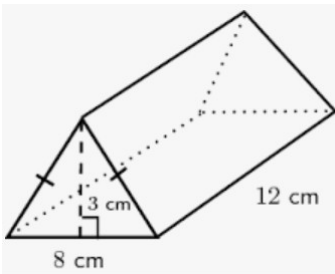43. Find the area of *ABC* to the *nearest tenth of a unit*.

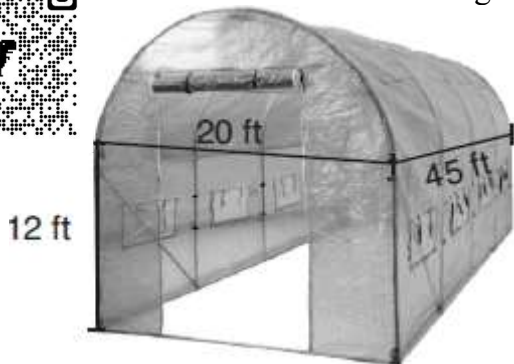44. A regular pyramid has a square base with an edge length of 14 cm and an altitude of 24 cm. Find its volume.

45. Determine and state the volume of the cone, in terms of π.

13

10

46. Clay in the shape of a triangular prism shown below has a mass of 1260 grams. What is its density?

3 cm

12 cm

8 cm

47. Find the volume of the figure below to the *nearest tenth of a foot*.

20 ft

45 ft

12 ft

48. A hollow cylinder has a height of 10 inches, an outer diameter of 5 inches, and a thickness of 1 inch. Find the volume to the hollow cylinder to the nearest cubic inch.

49. Find the volume of a cone whose diameter is 15 inches and height of 2 feet rounded to the *nearest cubic foot*.


50. A machinist creates a solid steel part for a wind turbine engine. The part has a volume of 1015 cubic centimeters. Steel can be purchased for $0.29 per kilogram, and has a density of 7.95 g/cm³. If the machinist makes 500 of these parts, what is the cost of the steel, to the *nearest dollar*?

51. Walter wants to make 100 candles in the shape of a cone for his new candle business. The mold shown below will be used to make the candles. Each mold will have a height of 8 inches and a diameter of 3 inches.

Walter goes to a hobby store to buy the wax for his candles. The wax costs $0.10 per ounce. If the weight of the wax is 0.52 ounce per cubic inch, how much will it cost Walter to buy the wax for 100 candles?
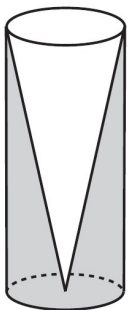
52. Ian needs to replace two concrete sections in his sidewalk, as modeled below. Each section is 36 inches by 36 inches and 4 inches deep. He can mix his own concrete for $3.25 per cubic foot. How much money will it cost Ian to replace the two concrete sections?
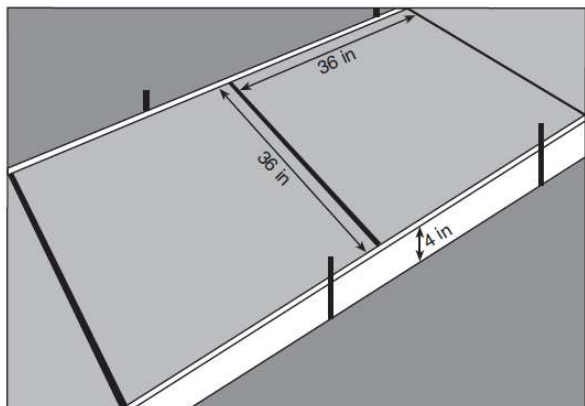
53. Baseballs that have a diameter of 2.8 inches are to be packed into a rectangular shipping box that has dimensions 24 inches by 12 inches by 6 inches. What is the maximum number of baseballs that can fit into the shipping box?

54. In the diagram below, right triangle ABC has legs whose lengths are 4 and 6. What is the volume, in terms of π, of the three-dimensional object formed by continuously rotating the right triangle around $\overline{AB}$?
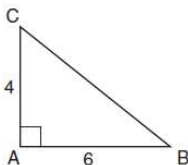
55. The line $y = 3x - 2$ is dilated by a scale factor of 2 and centered at the origin. Write an equation that represents the image of the line after the dilation.
1) $y = 3x - 2$ 3) $y = 6x - 2$
2) $y = 3x - 4$ 4) $y = 6x - 4$

56. The line $y = 3x - 2$ is dilated by a scale factor of 2 and centered at (-1,-5). Write an equation that represents the image of the line after the dilation.
1) $y = 3x - 2$
2) $y = 3x - 4$
3) $y = 6x - 2$
4) $y = 6x - 4$

57. The line $y = \frac{2}{3}x + 3$ is dilated centered at the origin. Which linear equation could be its image?
1) $2x + 3y = 7$
2) $2x - 3y = 7$
3) $3x - 2y = 7$
4) $3x + 2y = 7$

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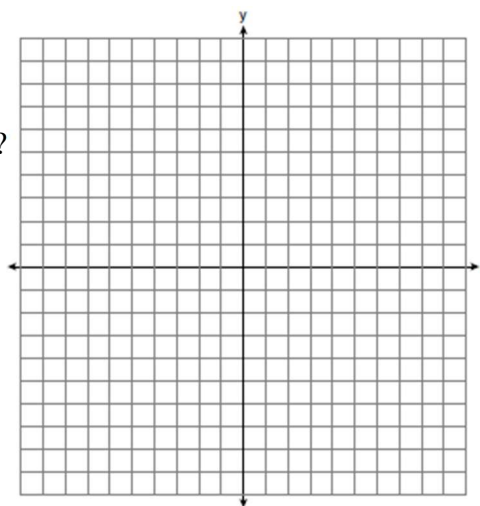1) $y = 2x + 5$
2) $y = 2x - 5$
3) $y = \frac{1}{2}x + \frac{25}{2}$
4) $y = -\frac{1}{2}x - \frac{25}{2}$

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

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

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

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

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

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

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

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

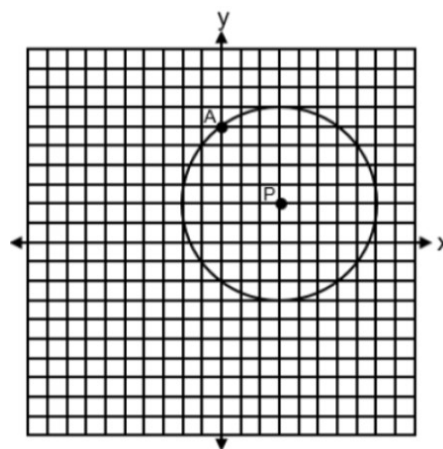3) $y - 6 = \frac{4}{3}(x - 8)$

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

61. Which of the following is the equation of the given circle?

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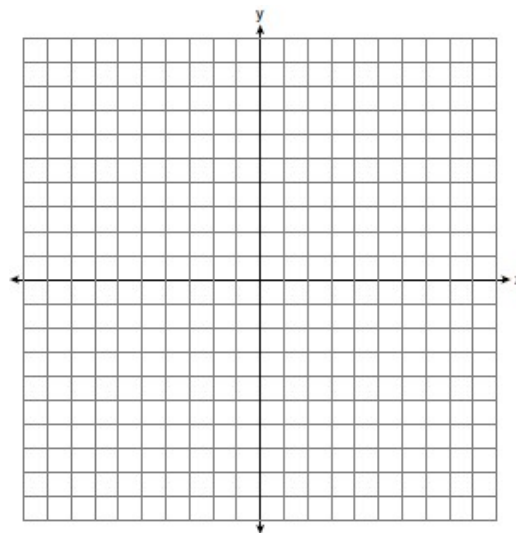
$(x+3)^2 + (y+2)^2 = 25$

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

$(x+3)^2 + (y+2)^2 = 5$

62. State the center and the exact value of the radius of $x^2 + y^2 - 4x + 8y + \dfrac{31}{4} = 0$
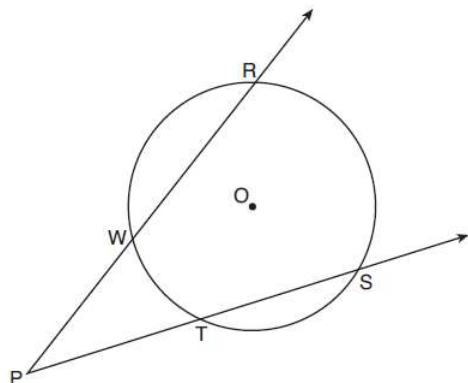
63. Directed line segment *SB* has endpoints whose coordinates are $S(-6,3)$ and $B(9,-2)$. Determine the coordinates of point *J* that divides the segment in the ratio 2 to 3.
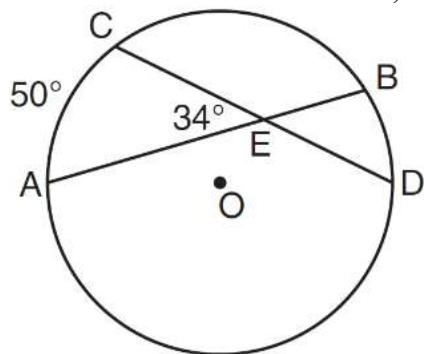
64. As shown in the diagram below, secants $\overrightarrow{PWR}$ and $\overrightarrow{PTS}$ are drawn to circle O from external point P.

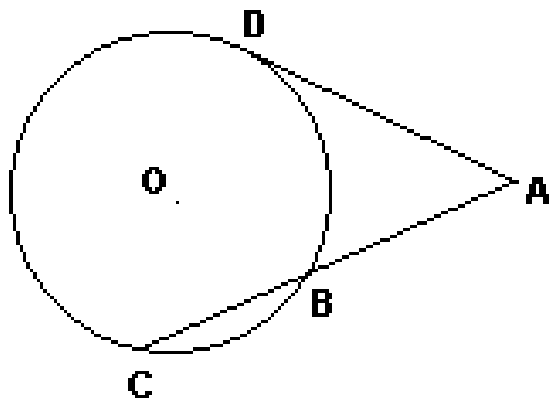If $m\angle RPS = 35°$ and $m\overset{\frown}{RS} = 121°$, determine and state $m\overset{\frown}{WT}$.

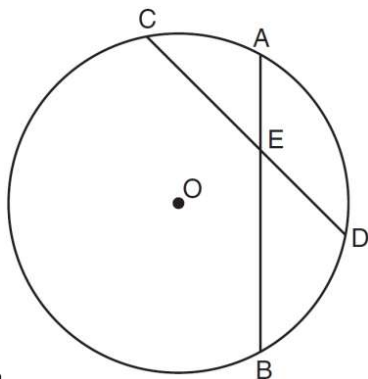65. In the diagram below of circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E.

If $m\angle AEC = 34$ and $m\overset{\frown}{AC} = 50$, what is $m\overset{\frown}{DB}$?

66. In the diagram, $\overline{AD}$ is tangent to circle O at D, and $\overline{CBA}$ is a secant. If $AD = 6$ and $AC = 9$, what is AB?
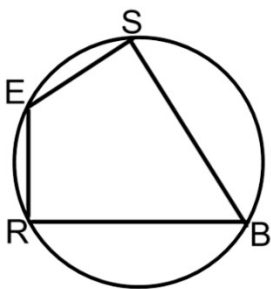
67. In the diagram below of circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E.
If $CE = 10$, $ED = 6$, and $AE = 4$, what is the length of $\overline{EB}$?

68. In circle O two secants, $\overline{ABP}$ and $\overline{CDP}$, are drawn to external point P. If $m\overset{\frown}{AC} = 72°$, and $m\overset{\frown}{BD} = 34°$, what is the measure of $\angle P$?

69. In the diagram below, quadrilateral $SBRE$ is inscribed in the circle. If $m\angle BRE = 91°$ and $m\angle SBR = 40°$, find $m\angle BSE$ and $m\angle SER$

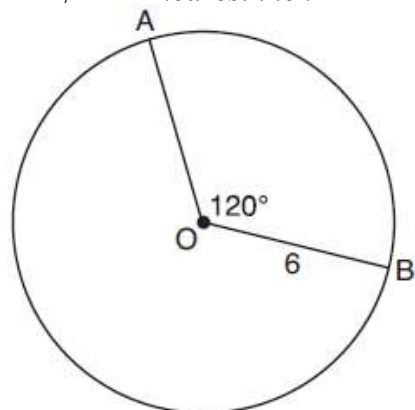70. In the diagram below of circle O, $GO = 8$ and $m\angle GOJ = 60°$.
What is the area, in terms of π, of the shaded region?

1) $\dfrac{4\pi}{3}$

2) $\dfrac{20\pi}{3}$

3) $\dfrac{32\pi}{3}$

4) $\dfrac{160\pi}{3}$
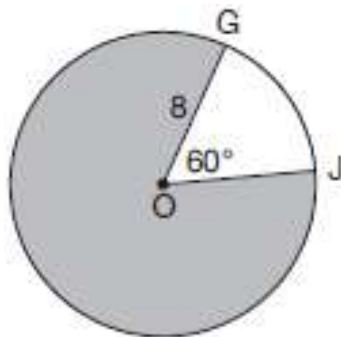
71. The diagram below shows circle O with radii $\overline{OA}$ and $\overline{OB}$. The measure of angle AOB is 120°, and the length of a radius is 6 inches. Find the length of arc AB, to the *nearest inch*.

72. The volume of a cylinder is 12,566.4 cm³. The height of the cylinder is 8 cm. Find the radius of the cylinder to the *nearest tenth of a centimeter*.
1) 12.3
2) 22.4
3) 7.9
4) 501.8

73. Altitude $\overline{CD}$ is drawn to right triangle ABC. If $\overline{AC} = 8$, $\overline{AB} = $ x, and $\overline{AD} = $ x – 12. Find the measure of $\overline{AD}$.
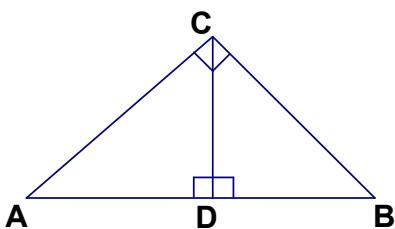
74. In the diagram below of circle O, chord $\overline{AB}$ bisects chord $\overline{CD}$ at E. If $AE = 8$ and $BE = 9$, find the length of $\overline{CE}$ in simplest radical form.
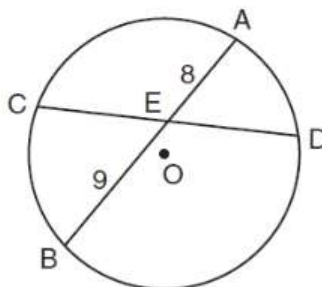
75. Which quadrilateral has diagonals that always bisect its angles and also bisect each other?
1) rhombus
2) rectangle
3) parallelogram
4) isosceles trapezoid

76. A parallelogram must be a rectangle when its
1) diagonals are perpendicular
2) diagonals are congruent
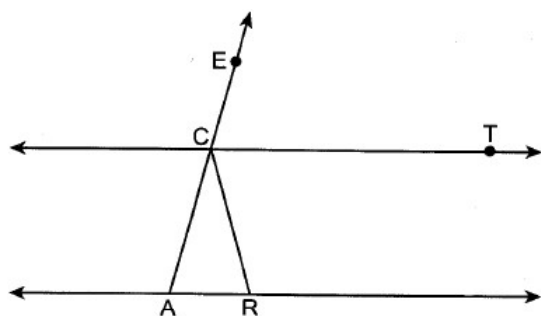3) opposite sides are parallel
4) opposite sides are congruent

77. If $ABCD$ is a parallelogram, which statement would prove that $ABCD$ is a rhombus?
1) $\angle ABC \cong \angle CDA$
2) $\overline{AC} \cong \overline{BD}$
3) $\overline{AC} \perp \overline{BD}$
4) $\overline{AB} \perp \overline{CD}$

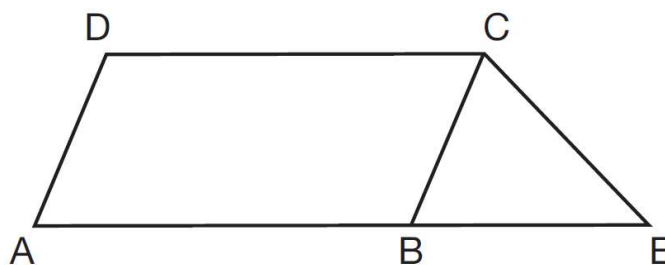78. A rhombus has diagonals that measure 6 and 8. Find the perimeter of the rhombus.

79. In the diagram below, $\overleftrightarrow{CT} \parallel \overleftrightarrow{AR}$, and $\overrightarrow{ACE}$ and $\overline{RC}$ are drawn such that $\overline{AC} \cong \overline{RC}$. If $m\angle ECT = 75°$, what is $m\angle ACR$?
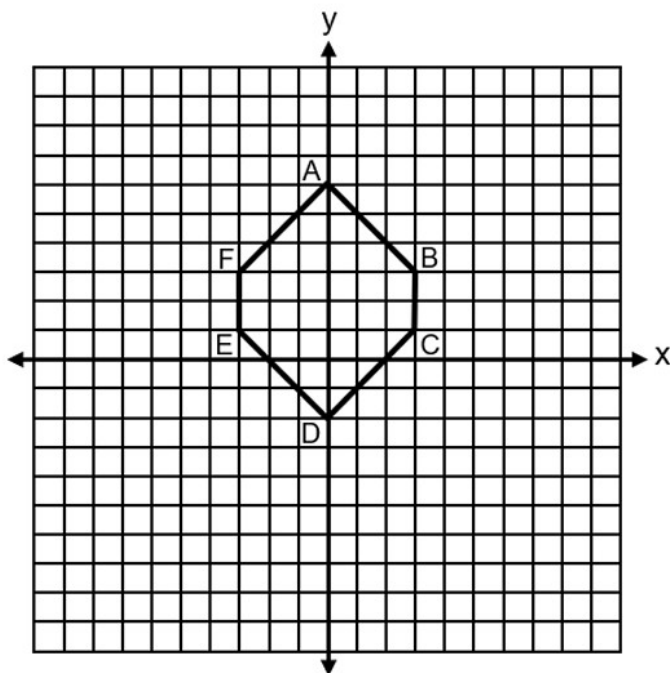
80. In the diagram below, $ABCD$ is a parallelogram, $\overline{AB}$ is extended through B to E, and $\overline{CE}$ is drawn.

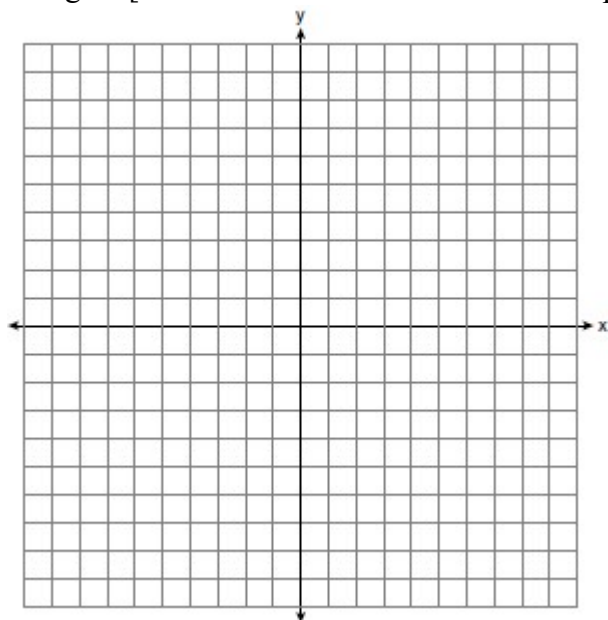If $\overline{CE} \cong \overline{BE}$ and $m\angle D = 112°$, what is $m\angle E$?
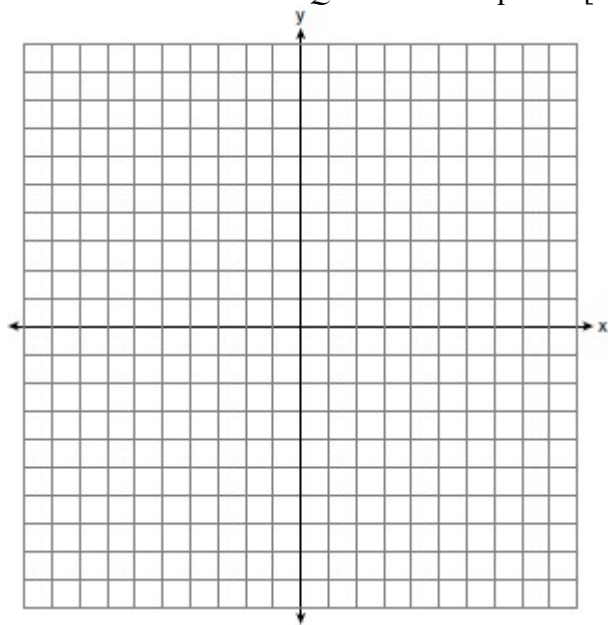1) 44°
2) 56°
3) 68°
4) 112°

81. Find the perimeter of $ABCDEF$ in simplest radical form.

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

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

84. Quadrilateral DEFG has vertices D(1,3) E(-1,1) F(-1,-2) G(4,3). Prove that DEFG is an isosceles trapezoid.
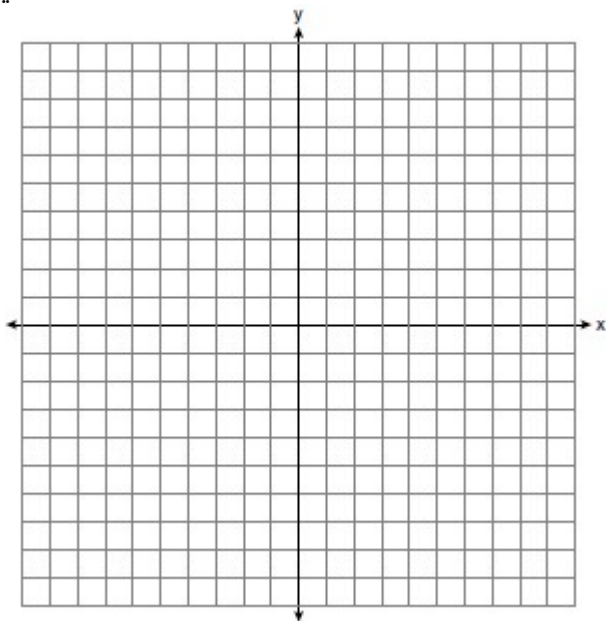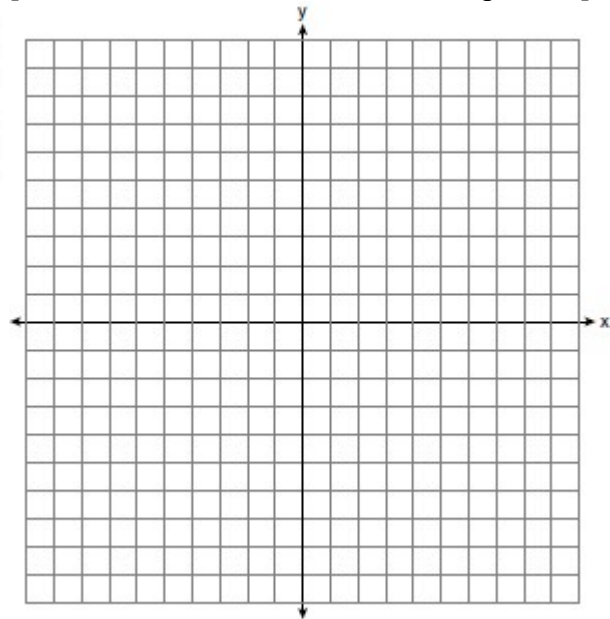
85. Given: Triangle DUC with coordinates $D(-3,-1)$, $U(-1,8)$, and $C(8,6)$

Prove: $\triangle DUC$ is a right triangle

Point U is reflected over $\overline{DC}$ to locate its image point, U', forming quadrilateral $DUCU'$.
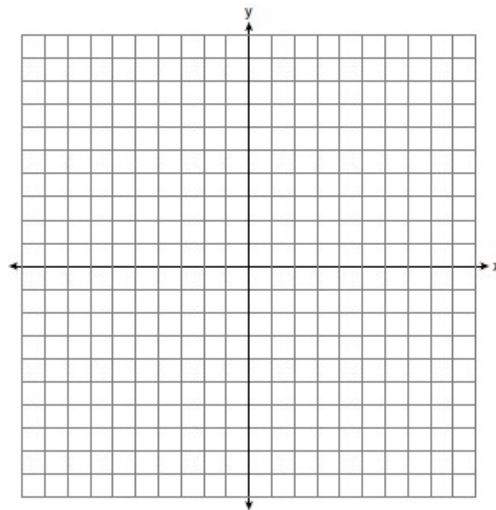Prove quadrilateral $DUCU'$ is a square.

[The use of the set of axes below is optional.]

86. Parallelogram $ABCD$ has coordinates $A(0,7)$ and $C(2,1)$.
Which statement would prove that $ABCD$ is a rhombus?

1) The midpoint of $\overline{AC}$ is $(1,4)$.

2) The length of $\overline{BD}$ is $\sqrt{40}$.

3) The slope of $\overline{BD}$ is $\frac{1}{3}$.

4) The slope of $\overline{AB}$ is $\frac{1}{3}$.

87. Right triangle STR is shown below, with $m\angle T = 90°$. Altitude $\overline{TQ}$ is drawn to $\overline{SQR}$, and $TQ = 8$. If the ratio $SQ:QR$ is $1:4$, determine and state the length of $\overline{SR}$.
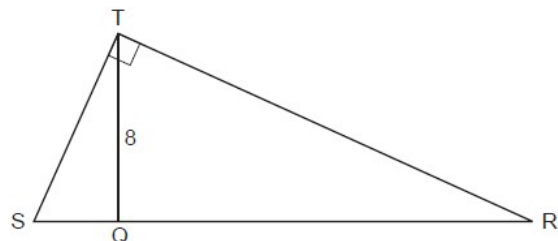
Reference Sheet for Geometry (NGLS)

	Cylinder	$V = Bh$ where B is the area of the base
	General Prism	$V = Bh$ where B is the area of the base
Volume	Sphere	$V = \frac{4}{3}\pi r^3$
	Cone	$V = \frac{1}{3}Bh$ where B is the area of the base
	Pyramid	$V = \frac{1}{3}Bh$ where B is the area of the base

Rectangular Prism $\quad V = \ell wh$

Triangular Prism $\quad V = \frac{1}{2}\ell wh$

Pyramid $\quad V = \frac{1}{3}\ell wh$

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

Cone $\quad V = \frac{1}{3}\pi r^2 h$