

Geometry Regents & Ext. Quarterly Review

Name: _____

Geometry Quarterly 3 - Review

Honors : Do crossed out Questions

X What is the distance between points R(5,7) and S(-2,3)?

A) $\sqrt{65}$

B) $\sqrt{55}$

C) $\sqrt{25}$

D) $\sqrt{33}$

$$d = \sqrt{(5-(-2))^2 + (7-3)^2} \rightarrow \sqrt{(7)^2 + (4)^2} \quad \sqrt{49+16} = \sqrt{65}$$

X What is the equation of a line that passes through the point (5,-2) and has a slope of -3?

A) $y = 3x + 13$

B) $y = 3x - 13$

C) $y = -3x - 13$

D) $y = -3x + 13$

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

$$y + 2 = -3x + 15$$

$$y = -3x + 13$$

X Express in $y = mx + b$ form the equation of the line perpendicular to the line $2y - x = 10$ and passing through the point (-3,5).

$$2y - x = 10$$

$$\frac{2y}{2} = \frac{x+10}{2}$$

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

$$m = \frac{1}{2} \rightarrow -2$$

negative

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

$$y - 5 = -2x - 6$$

$$y = -2x - 1$$

4) If the length and width of a rectangle are 8 and 5, the length of a diagonal is

A) 89

B) $\sqrt{13}$

C) $\sqrt{89}$

D) $\sqrt{39}$



$$a^2 + b^2 = c^2$$

$$5^2 + 8^2 = x^2$$

$$25 + 64 = x^2$$

$$\sqrt{89} = \sqrt{x^2}$$

$$\sqrt{89} = x$$

X What are the coordinates of the midpoint of the line segment whose endpoints are (4,-2) and (-4,2)?

A) (0,0)

B) (-8,-4)

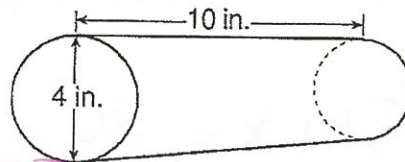
C) (8,0)

D) (0,4)

$$\left(\frac{4+(-4)}{2}, \frac{-2+2}{2} \right) \rightarrow \left(\frac{0}{2}, \frac{0}{2} \right)$$

6) What is the volume of the cylinder shown below? [Round your answer to the nearest cubic inch.]

Cylinder



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

$$V = \pi (2)^2 (10)$$

A) 502 in.³

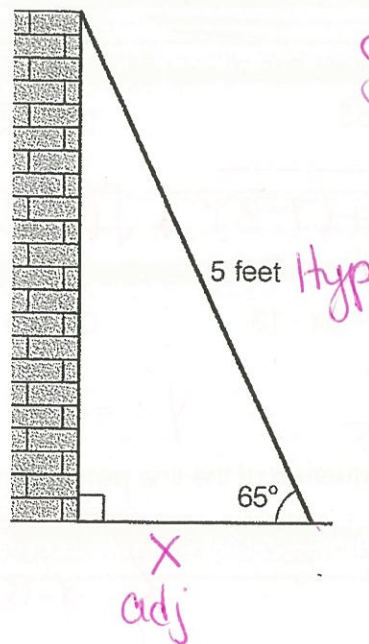
B) 126 in.³

C) 125 in.³

D) 42 in.³

$$V = 125.6637$$

- 7) As shown in the diagram below, a ladder 5 feet long leans against a wall and makes an angle of 65° with the ground. Find, to the nearest tenth of a foot, the distance from the wall to the base of the ladder. [Show all work.]



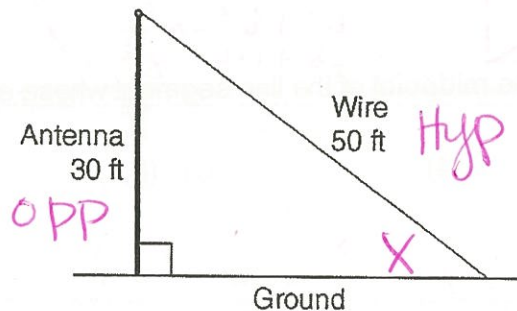
SOH CAHTOA

$$\cos 65 = \frac{x}{5}$$

$$x = 2.11309$$

2.1 feet

- 8) A communications company is building a 30-foot antenna to carry cell phone transmissions. As shown in the diagram below, a 50-foot wire from the top of the antenna to the ground is used to stabilize the antenna.



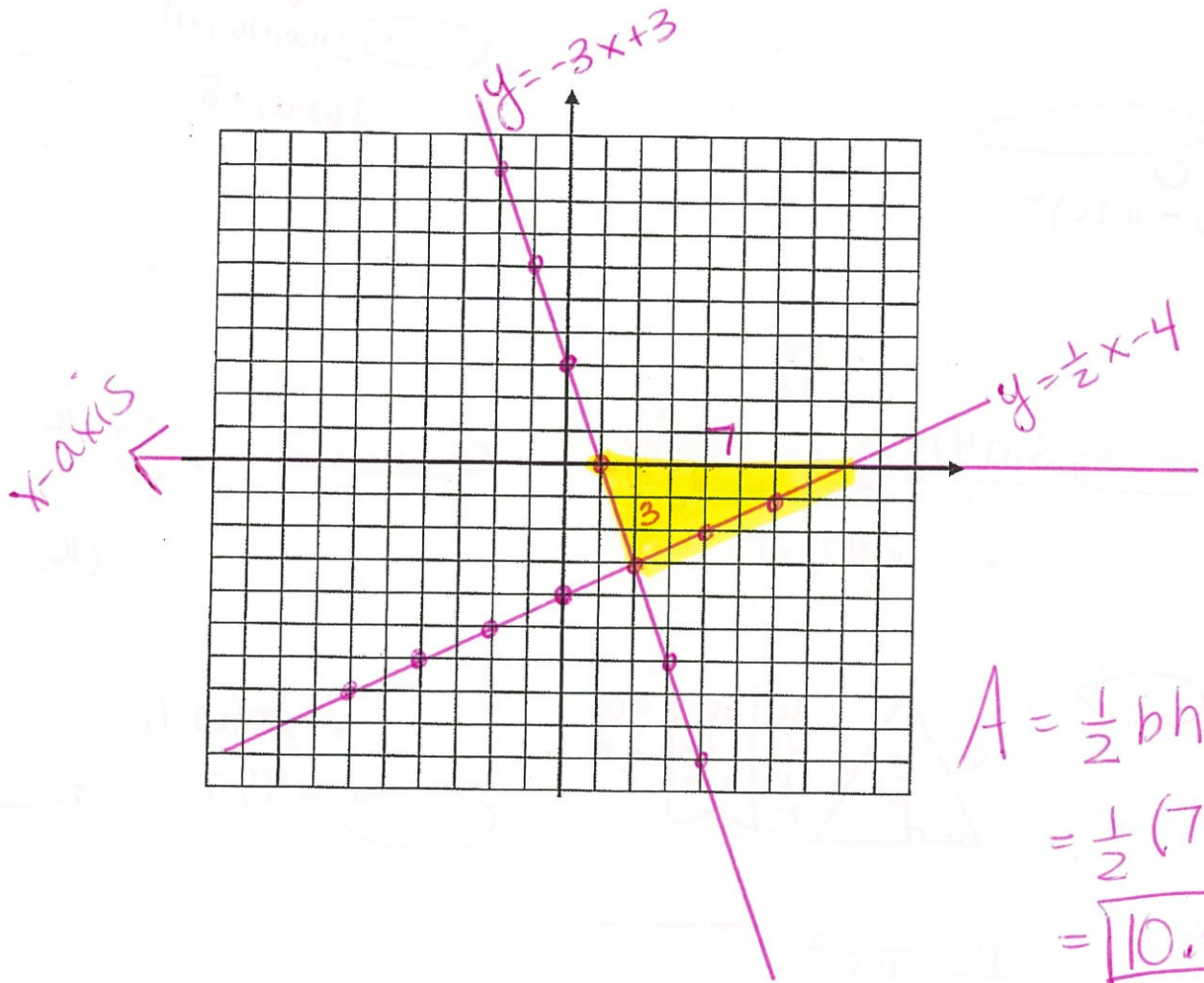
Find, to the nearest degree, the measure of the angle that the wire makes with the ground. [Show all work.]

$$\sin x = \frac{30}{50}$$

$$\text{2nd sin}(30 \div 50)$$

$$\sin^{-1}(30/50) = 37^\circ$$

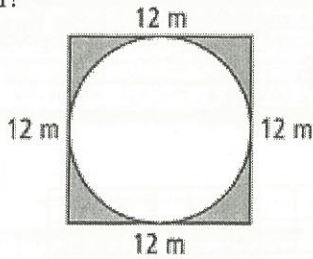
X. A triangle is formed by the intersection of three lines, $y = \frac{1}{2}x - 4$, $y = -3x + 3$ and the x-axis. On the accompanying grid, graph the three lines and find the area of the region formed by the three lines.



$$\begin{aligned} A &= \frac{1}{2}bh \\ &= \frac{1}{2}(7 \cdot 3) \\ &= \boxed{10.5} \end{aligned}$$

10. A figure consists of a square and a circle, as shown in the diagram.
If the length of a side of the square is 12, what is the area of the shaded region?

- A. $24 - 6\pi$
B. $144 - 12\pi$
C. $48 - 6\pi$
D. $144 - 36\pi$

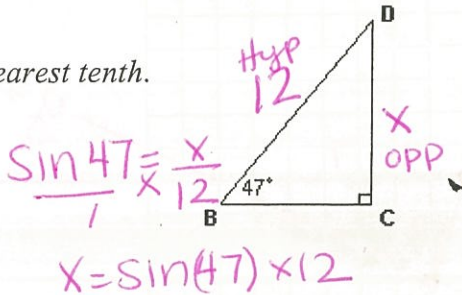


$\square - \circ$
 $12(12) - \pi(6)^2$

11. In right triangle BCD , $BD = 12$, $m\angle C = 90$, and $m\angle DBC = 47$.

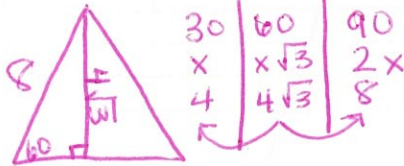
Find DC to the nearest tenth.

- A. 8.2
B. 8.8
C. 12.9
D. 16.4



12. The length of an altitude of an equilateral triangle is $4\sqrt{3}$. What is the side of the equilateral triangle.

- A. 8
B. $8\sqrt{3}$
C. 4
D. $2\sqrt{3}$



13. The area of a 240° sector of a circle with diameter 6cm is:

- A. $8\pi \text{ cm}^2$
B. $6\pi \text{ cm}^2$
C. $36\pi \text{ cm}^2$
D. $12\pi \text{ cm}^2$

$\frac{n^\circ}{360} \cdot \pi r^2$
 $\frac{240}{360} \cdot \pi (3)^2 = 6\pi$

14. Tim has a rectangular prism with a length of 10 centimeters, a width of 2 centimeters, and an unknown height. He needs to build another rectangular prism with a length of 5 centimeters and the same height as the original prism. The volume of the two prisms will be the same. Find the width, in centimeters, of the new prism.

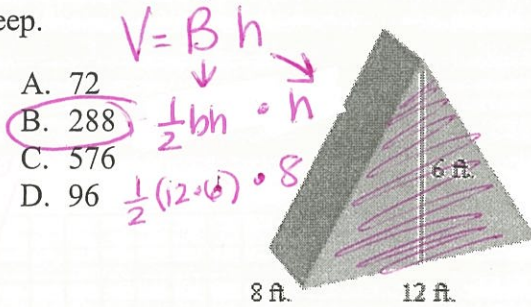
- A. 4 cm
B. 10 cm
C. 50 cm
D. 2 cm

$lwh = lwh$
 $10 \cdot 2 \cdot h = 5 \cdot w \cdot h$
 $20 = 5w$
 $4 = w$

15. A tent for a family of 6 is on sale.

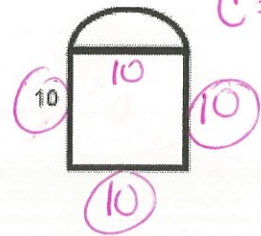
Find the volume of space inside the tent for the family to sleep.

- A. 72
B. 288
C. 576
D. 96



16. A backyard is in the shape of a square and a semicircle. Which expression represents the perimeter of the yard

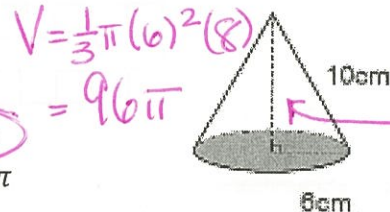
- A. $40 + 5\pi$
B. $30 + 5\pi$
C. $30 + 10\pi$
D. $30 + 25\pi$



$C = \pi d \div 2$
 $10\pi \div 2 = 5\pi$

17. In a cone, the radius of the circular base is 6cm and the slant height is 10cm. What is the volume of the cone?

- A. 60π
B. 20π
C. 96π
D. 288π

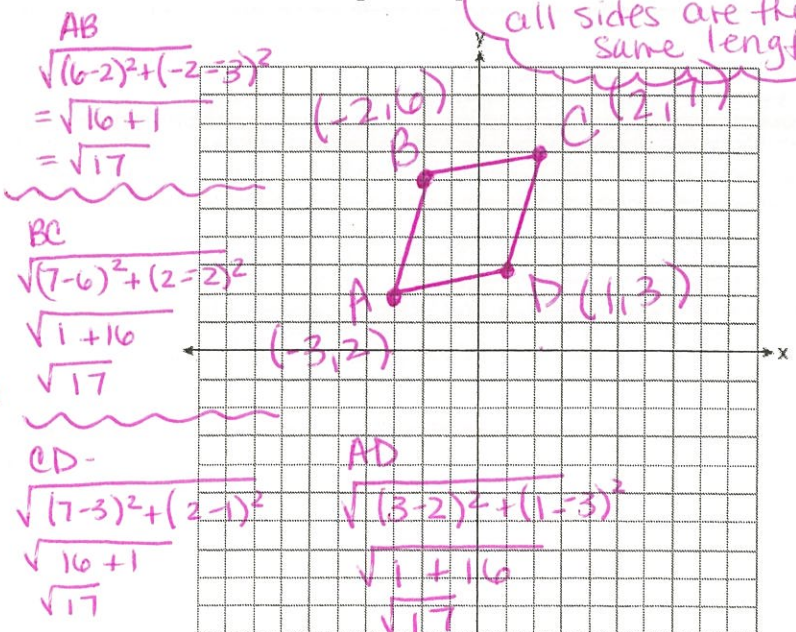


$3-4-5$
 $6 \cdot (8) \cdot 10$

- ~~X~~ The vertices of quadrilateral $ABCD$ have coordinates $A(-3,2)$, $B(-2,6)$, $C(2,7)$, and $D(1,3)$.

Prove that $ABCD$ is a rhombus. [The use of the set of axes below is optional.]

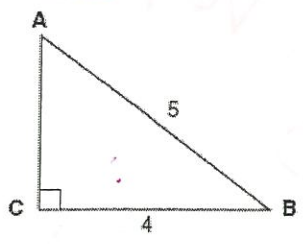
It is a rhombus because all sides are the same length



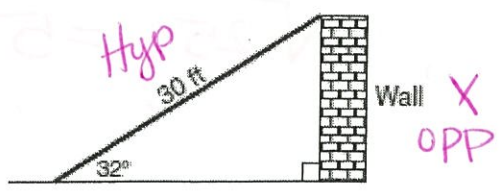
19. Which equation could be used to find the measure of one acute angle in the right triangle shown below?

SINCATO

- 1) $\sin A = \frac{4}{5}$
- 2) $\tan A = \frac{5}{4}$
- 3) $\cos B = \frac{5}{4}$
- 4) $\tan B = \frac{4}{5}$



20. The accompanying diagram shows a ramp leaning against a wall at a construction site.



If the ramp forms an angle of 32° with the ground, how high above the ground, to the nearest tenth, is the top of the ramp?

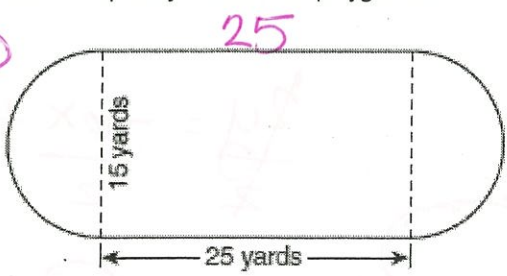
- 1) 15.9 ft
- 2) 18.7 ft
- 3) 25.4 ft
- 4) 56.6 ft

$\frac{\sin 32}{1} = \frac{x}{30}$
 $x = \sin(32) \cdot 30$

21. A playground in a local community consists of a rectangle and two semicircles, as shown in the diagram below.

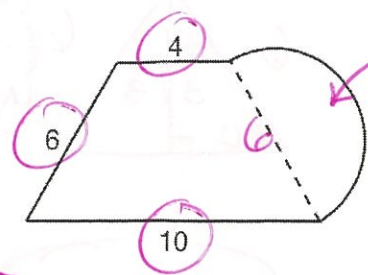
Which expression represents the amount of fencing, in yards, that would be needed to completely enclose the playground?

- 1) $15\pi + 50$
- 2) $15\pi + 80$
- 3) $30\pi + 50$
- 4) $30\pi + 80$



Full circle
 $C = \pi d$
 $C = \pi(15)$

22. What is the perimeter of the figure shown below, which consists of an isosceles trapezoid and a semicircle?



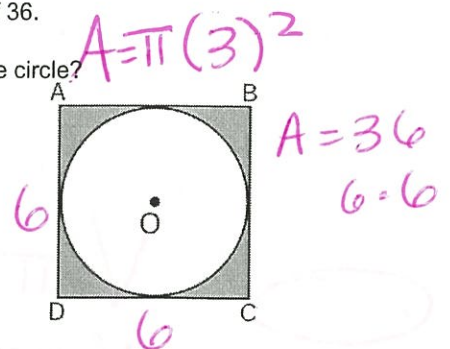
$\frac{1}{2}$ circle
 $C = \pi d \div 2$
 $6\pi \div 2$
 3π

- 1) $20 + 3\pi$
- 2) $20 + 6\pi$
- 3) $26 + 3\pi$
- 4) $26 + 6\pi$

23. In the diagram below, circle O is inscribed in square ABCD. The square has an area of 36.

What is the area of the circle?

- 1) 9π
- 2) 6π
- 3) 3π
- 4) 36π

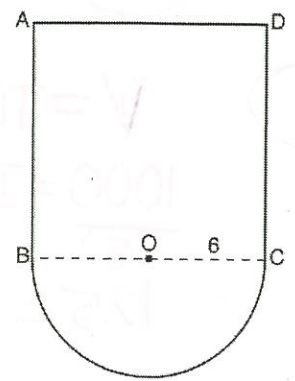


$A = \pi(3)^2$
 $A = 36$
 $6 = 6$

24. In the figure below, ABCD is a square and semicircle O has a radius of 6.

What is the area of the figure?

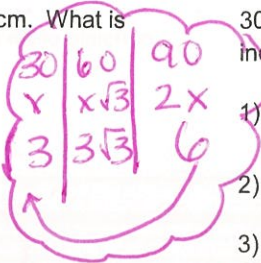
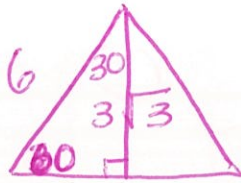
- 1) $36 + 6\pi$
- 2) $36 + 18\pi$
- 3) $144 + 18\pi$
- 4) $144 + 36\pi$



$\square + \circ$
 $lw + \frac{\pi r^2}{2}$
 $12 \cdot 12 + \frac{\pi(6)^2}{2}$
 $144 + 18\pi$

25. An equilateral triangle has a side of length 6 cm. What is the height of the equilateral triangle?

- 1) 3 cm
- 2) 4 cm
- 3) $3\sqrt{5}$ cm
- 4) $3\sqrt{3}$ cm



30. A box in the shape of a cube has a volume of 64 cubic inches. What is the length of a side of the box?

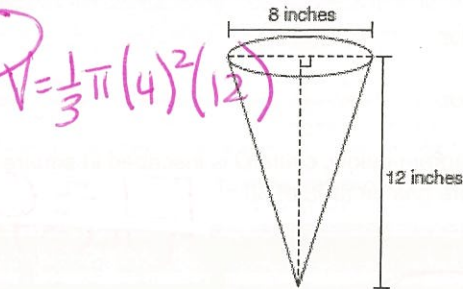
- 1) $21\frac{3}{4}$ in
- 2) 16 in
- 3) 8 in
- 4) 4 in

$$\sqrt[3]{64} = 4$$

26. In the diagram below, a right circular cone has a diameter of 8 inches and a height of 12 inches.

What is the volume of the cone to the nearest cubic inch?

- 1) 201
- 2) 481
- 3) 603
- 4) 804



$$V = \frac{1}{3}\pi(4)^2(12)$$

27. What is the volume, in cubic centimeters, of a cylinder that has a height of 15 cm and a diameter of 12 cm?

- 1) 180π
- 2) 540π
- 3) 675π
- 4) $2,160\pi$

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

$$V = \pi(6)^2(15)$$

28. A right circular cylinder has a volume of 1,000 cubic inches and a height of 8 inches. What is the radius of the cylinder to the nearest tenth of an inch?

- 1) 6.3
- 2) 11.2
- 3) 19.8
- 4) 39.8

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

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

$$125 = \pi r^2$$

$$\frac{125}{\pi} = r^2$$

$$\sqrt{\frac{125}{\pi}} = r$$

$$6.3 = r$$

29. The volume of a rectangular prism is 144 cubic inches. The height of the prism is 8 inches. Which measurements, in inches, could be the dimensions of the base?

- 1) 3.3 by 5.5
- 2) 2.5 by 7.2
- 3) 12 by 8
- 4) 9 by 9

$$V = Bh$$

$$144 = B \cdot 8$$

$$\frac{144}{8} = \frac{B \cdot 8}{8}$$

$$18 = B$$

area of base must be 18

What is the length of a line segment whose endpoints have coordinates (5,3) and (1,6)?

- 1) 5
- 2) 25
- 3) $\sqrt{17}$
- 4) $\sqrt{29}$

$$d = \sqrt{(5-1)^2 + (3-6)^2}$$

$$\sqrt{16 + 9}$$

$$\sqrt{25} = 5$$

In circle O, a diameter has endpoints (-5,4) and (3,-6). What is the length of the diameter?

- 1) $\sqrt{2}$
- 2) $2\sqrt{2}$
- 3) $\sqrt{10}$
- 4) $2\sqrt{41}$

$$d = \sqrt{(3-(-5))^2 + (-6-4)^2}$$

$$= \sqrt{64 + 100}$$

$$= \sqrt{164} = \sqrt{4 \cdot 41} = 2\sqrt{41}$$

What is the slope of a line perpendicular to the line whose equation is $2y = -6x + 8$?

- 1) -3
- 2) $\frac{1}{6}$
- 3) $\frac{1}{3}$
- 4) -6

$$2y = -6x + 8$$

$$\frac{2y}{2} = \frac{-6x + 8}{2}$$

$$y = -3x + 4$$

slope negative reciprocal is $\frac{1}{3}$

34. What is an equation of the line that passes through the point $(-2, 3)$ and is parallel to the line whose equation is $y = \frac{3}{2}x - 4$?

same slope

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

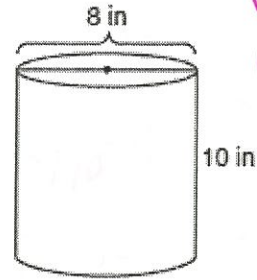
2) $y = \frac{-2}{3}x + \frac{5}{3}$

3) $y = \frac{3}{2}x$

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

$y - y_1 = m(x - x_1)$
 $y - 3 = \frac{3}{2}(x - (-2))$
 $y - 3 = \frac{3}{2}x + 3$
 $+3 \qquad +3$
 $y = \frac{3}{2}x + 6$

37. A storage container in the shape of a right circular cylinder is shown in the accompanying diagram.

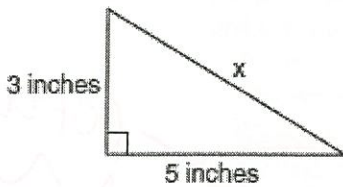


$V = \pi (4)^2 (10)$
 $V =$

What is the volume of this container, to the nearest hundredth?

- 1) 56.55 in^3 2) 125.66 in^3 3) 251.33 in^3 4) 502.65 in^3

35. What is the value of x , in inches, in the right triangle below?



$a^2 + b^2 = c^2$

1) $\sqrt{15}$

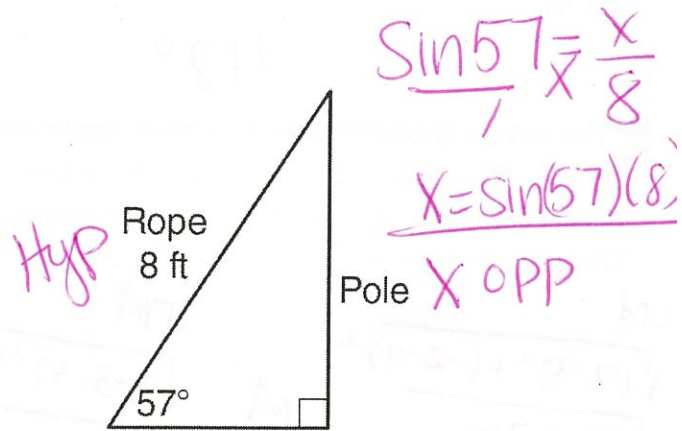
2) 8

3) $\sqrt{34}$

4) 4

$3^2 + 5^2 = x^2$
 $34 = x^2$
 $\sqrt{34} = x$

38. An 8-foot rope is tied from the top of a pole to a stake in the ground, as shown in the diagram below.



36. Line segment AB has endpoints $A(2, -3)$ and $B(-4, 6)$. What are the coordinates of the midpoint of \overline{AB} ?

1) $(-2, 3)$

2) $(-1, 1\frac{1}{2})$

3) $(-1, 3)$

4) $(3, 4\frac{1}{2})$

$(\frac{2 + (-4)}{2}, \frac{-3 + 6}{2})$
 $(\frac{-2}{2}, \frac{3}{2})$

If the rope forms a 57° angle with the ground, what is the height of the pole, to the nearest tenth of a foot?

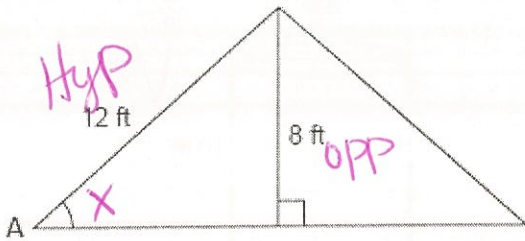
1) 4.4

2) 6.7

3) 9.5

4) 12.3

39. The center pole of a tent is 8 feet long, and a side of the tent is 12 feet long as shown in the diagram below.



If a right angle is formed where the center pole meets the ground, what is the measure of angle A to the nearest degree?

- 1) 34
- 2) 42
- 3) 48
- 4) 56

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

2nd sin (8/12)

42°

40. The vertices of quadrilateral JKLM have coordinates J(-3, 1), K(1, -5), L(7, -2), and M(3, 4). Prove that JKLM is a parallelogram. Prove that JKLM is *not* a rhombus. [The use of the set of axes below is optional.]

JK: $\sqrt{(1-(-3))^2 + (-5-1)^2} = \sqrt{16+36} = \sqrt{52}$

KL: $\sqrt{(7-1)^2 + (-2-(-5))^2} = \sqrt{36+9} = \sqrt{45}$

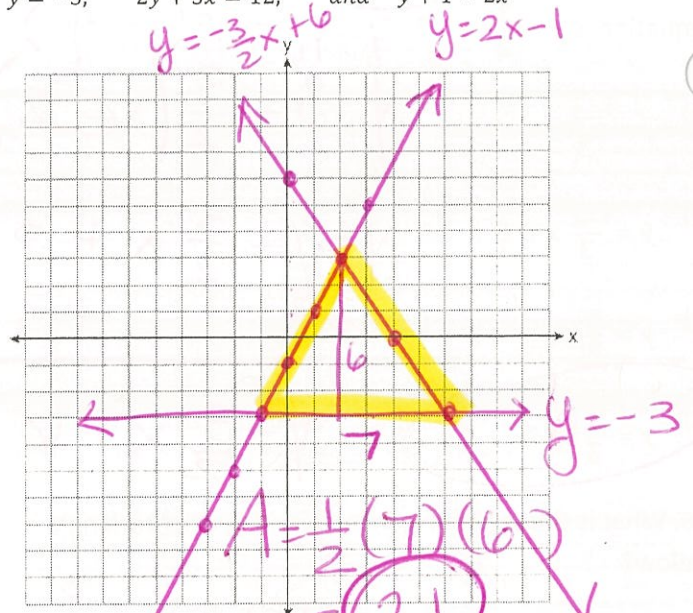
LM: $\sqrt{(7-3)^2 + (-2-4)^2} = \sqrt{16+36} = \sqrt{52}$

JM: $\sqrt{(3-(-3))^2 + (4-1)^2} = \sqrt{36+9} = \sqrt{45}$

Not a rhombus b/c not all sides are same length

41. Find the area of the figure formed by the intersection of:

$$y = -3, \quad 2y + 3x = 12, \quad \text{and} \quad y + 1 = 2x$$



42. In $\triangle ABC$, the complement of $\angle B$ is $\angle A$. Which statement is always true?

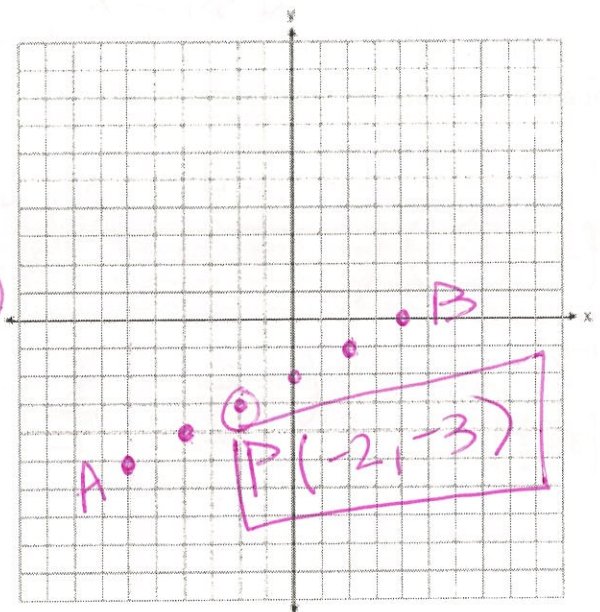
- 1 $\tan \angle A = \tan \angle B$
- 2 $\sin \angle A = \sin \angle B$
- 3 $\cos \angle A = \tan \angle B$
- 4 $\sin \angle A = \cos \angle B$

COFUNCTIONS

SKIP

The coordinates of the endpoints of \overline{AB} are $A(-6, -5)$ and $B(4, 0)$. Point P is on \overline{AB} . Determine and state the coordinates of point P , such that $AP:PB$ is 2:3.

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



Circumference $C = \pi(10)$

44. A jeweler needs to create perfectly circular bracelets out of wire. The bracelets each need to have a radius of 5 cm. What is the largest number of bracelets that can be made from 200 cm of wire?

$200 \div (10\pi) = 6.36 \rightarrow 6$

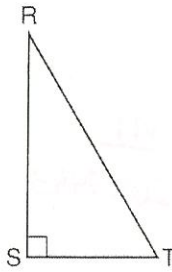
45. Which object is formed when right triangle RST shown below is rotated around leg RS

(1) a pyramid with a square base

(2) a right triangle

(3) an isosceles triangle

(4) a cone

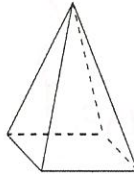


47. A student has a rectangular postcard that he folds in half lengthwise. Next, he rotates it continuously about the folded edge. Which three-dimensional object below is generated by this rotation?

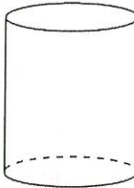
1)



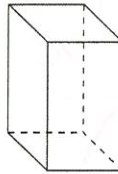
2)



3)



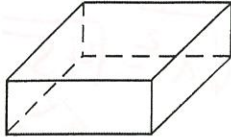
4)



46. Which figure can have the same cross section as a sphere?

circle

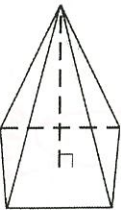
1)



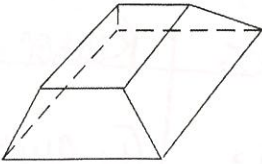
2)



3)



4)



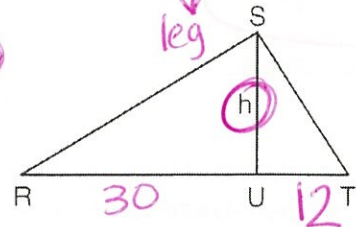
48. In $\triangle RST$ shown below, altitude \overline{SU} is drawn to \overline{RT} at U . If $SU = h$, $UT = 12$, and $RT = 42$, which value of h will make $\triangle RST$ a right triangle with $\angle RST$ as a right angle?

1) $6\sqrt{3}$

2) $6\sqrt{10}$

3) $6\sqrt{14}$

4) $6\sqrt{35}$



HLLS & SAAS

leg

altitude

$\frac{42}{-12} = \frac{30}{h}$

SAAS b/c altitude is involved.

$\frac{30}{h} = \frac{h}{12}$

$\sqrt{h^2} = \sqrt{360} \rightarrow \frac{\sqrt{36} \sqrt{10}}{6 \sqrt{10}}$

49. A hemispherical water tank has an inside diameter of 10 feet. If water has a density of 62.4 pounds per cubic foot, what is the weight of the water in a full tank, to the nearest pound?

1) 16,336

2) 32,673

3) 130,690

4) 261,381

$$\frac{\frac{4}{3} \pi r^3}{2} \quad D = \frac{m}{v}$$

$$\frac{\frac{4}{3} \pi (5)^3}{2} \quad 62.4 = \frac{m}{261.7993}$$

$$= 261.7993$$

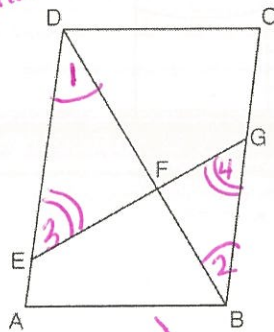
50. Given: Parallelogram $ABCD$, EFG , and diagonal \overline{DFB}

Prove:

a) $\triangle DEF \cong \triangle BGF$

b) $\frac{DE}{EF} = \frac{BG}{GF}$

c) $DE \cdot GF = EF \cdot BG$



51. The cross section of a regular pyramid contains the altitude of the pyramid.

The shape of this cross section is a

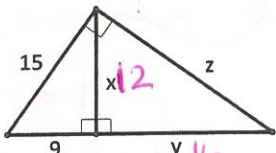
1) circle

2) square

3) triangle

4) Rectangle

52. Find the missing values. (If not a whole number, then round to two decimal places.)



$$x = 12 \quad y = 16 \quad z = 20$$

$$a^2 + b^2 = c^2$$

$$9^2 + x^2 = 15^2$$

$$x^2 = 144$$

$$x = 12$$

$$\frac{S}{A} = \frac{A}{S}$$

$$\frac{9}{12} = \frac{12}{y}$$

$$9y = 144$$

$$y = 16$$

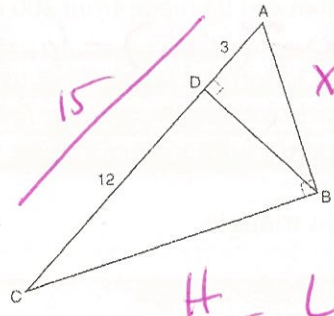
$$a^2 + b^2 = c^2$$

$$12^2 + 16^2 = c^2$$

$$400 = c^2$$

$$20 = c$$

53. In right triangle ABC shown in the diagram below, altitude \overline{BD} is drawn to hypotenuse \overline{AC} , $CD = 12$, and $AD = 3$. What is the length of \overline{AB} ?



1) $5\sqrt{3}$

2) 6

3) $3\sqrt{5}$

4) 9

$$\frac{H}{L} = \frac{L}{S}$$

$$\frac{15}{x} = \frac{x}{3}$$

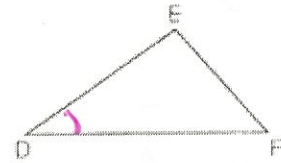
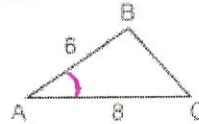
$$\sqrt{x^2} = \sqrt{45}$$

$3\sqrt{5}$

54.

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

$$\frac{6}{8} = 0.75$$



If $AB = 6$ and $AC = 8$, which statement will justify similarity by SAS?

- 1) $DE = 9$, $DF = 12$, and $\angle A \cong \angle D$
- 2) $DE = 8$, $DF = 10$, and $\angle A \cong \angle D$
- 3) $DE = 36$, $DF = 64$, and $\angle C \cong \angle F$
- 4) $DE = 15$, $DF = 20$, and $\angle C \cong \angle F$

$$\frac{9}{12} = 0.75 \checkmark$$

included \angle \checkmark

Statements | Reasons

1) $\square ABCD$
 \overline{EFG} , \overline{DFB} are diagonal

1) given

2) $\overline{AD} \parallel \overline{BC}$

2) opp sides of \square are \parallel .

3) $\angle 1 \cong \angle 2$
 $\angle 3 \cong \angle 4$

3) when 2 \parallel lines are crossed by trans, alt. int. \angle 's \cong

4) $\triangle DEF \sim \triangle BGF$

4) AA

5) $\frac{DE}{EF} = \frac{BG}{GF}$

5) CSSTP

6) $DE \cdot GF = EF \cdot BG$

6) In a proportion, Prod of means = Prod of exten

Quarterly Review: Density Questions

55. A shipping container is in the shape of a right rectangular prism with a length of 13 feet, a width of 9 feet, and a height of 11.5 feet. The container is completely filled with contents that weigh, on average, 0.33 pound per cubic foot. What is the weight of the contents in the container, to the nearest pound?

$$m = 444 \text{ pounds}$$

$$D = \frac{m}{V}$$

$$0.33 = \frac{m}{1345.5}$$

$$V = lwh$$

$$= 13(9)(11.5)$$

$$= 1345.5$$

56. A hemispherical tank is filled with water and has a diameter of 21 feet. If water weighs 62.4 pounds per cubic foot, what is the total weight of the water in a full tank, to the nearest pound?

$$V = \frac{\frac{4}{3}\pi r^3}{2} = \frac{\frac{4}{3}\pi (10.5)^3}{2} = 2424.5241$$

$$D = \frac{m}{V}$$

$$62.4 = \frac{m}{2424.524}$$

$$m = 151,290 \text{ pounds}$$

57. A shipping container is in the shape of a right rectangular prism with a length of 8.5 feet, a width of 13.5 feet, and a height of 4 feet. The container is completely filled with contents that weigh, on average, 0.68 pound per cubic foot. What is the weight of the contents in the container, to the nearest pound?

$$V = lwh$$

$$V = 8.5(13.5)(4)$$

$$V = 459$$

$$D = \frac{m}{V}$$

$$0.68 = \frac{m}{459}$$

$$m = 312 \text{ pounds}$$

58. A hemispherical tank is filled with water and has a diameter of 7 feet. If water weighs 62.4 pounds per cubic foot, what is the total weight of the water in a full tank, to the nearest pound?

$$V = \frac{\frac{4}{3}\pi r^3}{2} = \frac{\frac{4}{3}\pi (3.5)^3}{2} = 89.7971$$

$$D = \frac{m}{V}$$

$$62.4 = \frac{m}{89.7971}$$

$$m = 5603 \text{ pounds}$$

