

Name: Website answers DUE: \_\_\_\_\_ HOUR: \_\_\_\_\_

## 2014/2015 Geometry Final Exam Review

1. In a large cube, the edges are 4 times as long as the edges of the small cube. The volume of the large cube is how many times the volume of the small cube?

64 times larger

2. Two containers in the shape of right circular cylinders are equal in height. The radius of the larger container is 3 times the radius of the smaller container. The volume of the larger container is how many times the volume of the smaller container?

9 times larger

3. In order to winterize her pool, Leah must remove one **fourth** of the water before putting the winter cover on. Her pool measures 5 feet deep, 10 feet wide and 25 feet long (rectangular prism). If the pool is completely filled at the end of the summer (prior to winterizing), how much water, in cubic feet, would she need to remove?

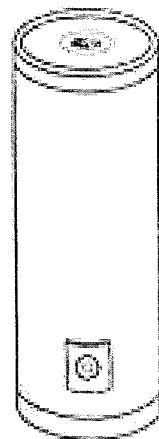
$V = 312.5 \text{ ft}^3$  removed

4. In order to winterize her pool, Leah must remove **half** of the water before putting the winter cover on. Her pool measures 5 feet deep, 10 feet wide and 25 feet long (rectangular prism). If the pool is completely filled at the end of the summer (prior to winterizing), how much water, in cubic feet, would she need to remove?

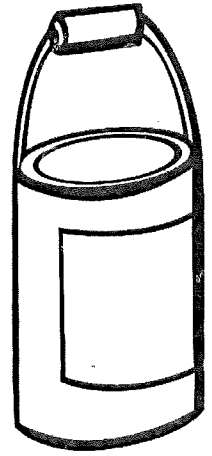
$V = 625 \text{ ft}^3$  removed

5. If a hot water tank, shown with the diameter of 5 feet and height of 13 feet, is filled with water, then the weight in pounds at room temperature, of the water inside the tank would be: (note: one cubic foot of water weighs approximately 62 lbs.)

$\approx 15,828.6 \text{ lbs}$

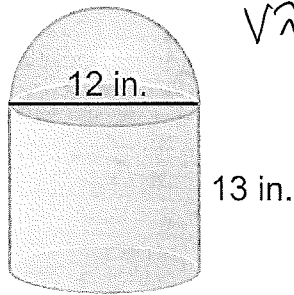


6. If a paint bucket, shown below with the diameter of 26 inches and length of 39 inches, is filled with paint, then the weight in pounds at room temperature, of the paint inside the take would be: (note: one cubic inch of paint weighs approximately 0.12 lbs.)



$$\approx 2,484.75 \text{ lbs}$$

7. Find the volume of the composite solid. Round your answer to the nearest tenth.

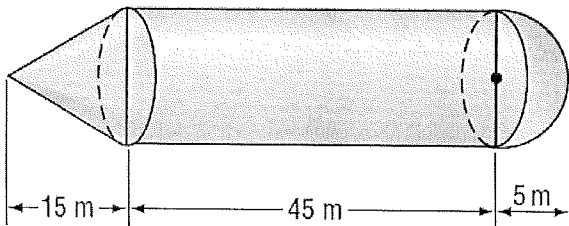


$$V \approx 1,922.7 \text{ in}^3$$

8. A box in the shape of a right rectangular prism has a volume of 60 cubic inches. The height of the box is 3 inches and the width is 4 inches. What is the length, in inches, of the box?

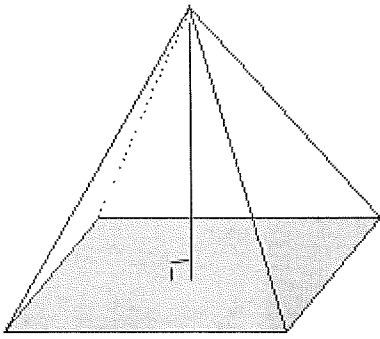
$$l = 5 \text{ in}$$

9. College engineering students designed an enlarged external fuel tank of a space shuttle as part of an assignment. The professor liked the design so much, that she decided to have the fuel tank constructed and used. How many cubic meters can the fuel tank hold?



$$V \approx 4,188.8 \text{ m}^3$$

10. The pyramid below has a rectangular base with side lengths of 24 inches and 18 inches it also has the volume of  $1728 \text{ in}^3$ . Find the height of the pyramid.



$$h = 12 \text{ in}$$

11. 12 ice cubes with 2 inch edges are stacked on a pan which is in the shape of a rectangular prism. It is 2 inches wide, 7 inches long and 1 inch deep. When the ice melts, will the ice's water overflow the pan?

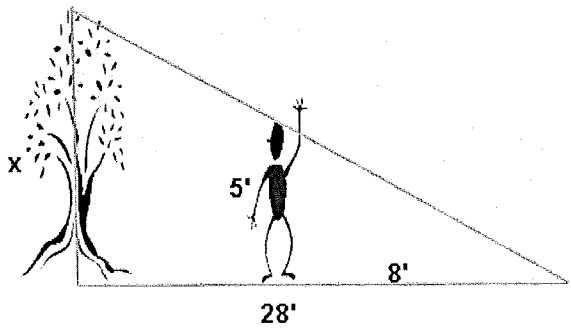
Yes

12. If a sphere filled with liquid has a radius of 8 inches, will the volume exceed the volume of a cone with the same radius but with a height 20 inches? Show the math you used to solve this question.

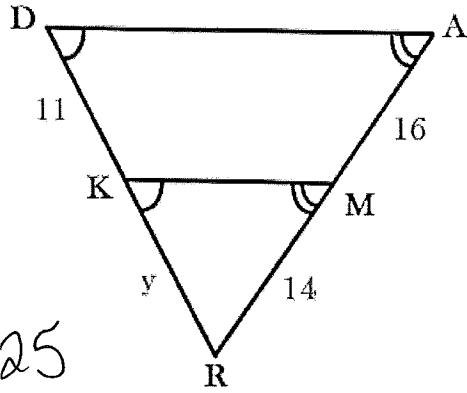
Yes

13. Find  $x$ .

$$x = 17.5$$

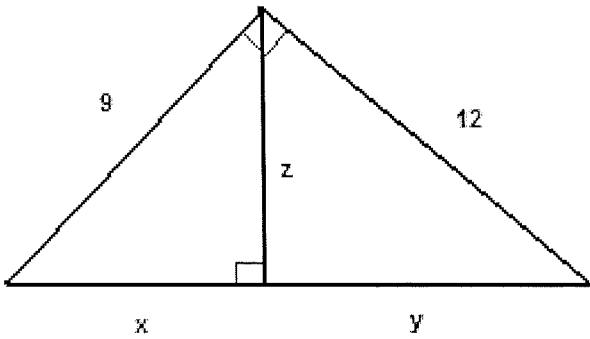


14. Find  $y$ .



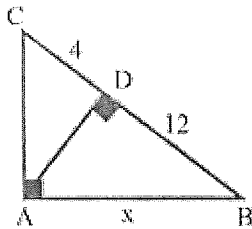
$$y = 9.625$$

15. A right triangle is shown below. Find the lengths  $x$ ,  $y$ , and  $z$ .



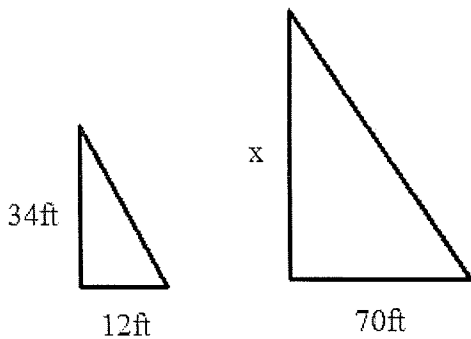
$$\begin{aligned} x &= 5.4 \\ y &= 9.6 \\ z &= 7.2 \end{aligned}$$

16. Find  $x$ .



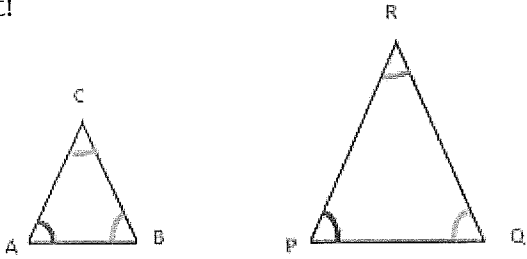
$$x = 8\sqrt{3}$$

17. Find  $x$ .



$$x = 198.\bar{3} \text{ ft}$$

18.  $\triangle ABC \sim \triangle PQR$ . If  $\angle P = 50^\circ$ ,  $\angle Q = 60^\circ$ ,  $\angle R = 70^\circ$ , find  $x$  if  $\angle B = 4x^\circ$ . Mark the picture first!



$$x = 15$$

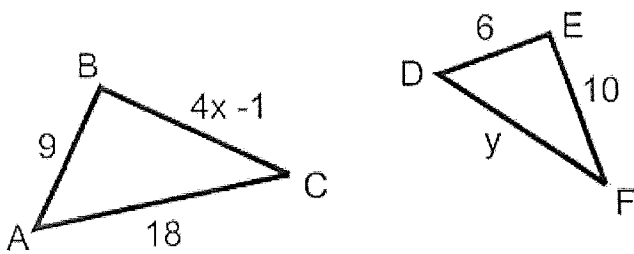
19. A 6-foot tall teacher casts a 4-foot shadow. If a tree next to him casts a 35 ft shadow, how tall is the tree?

$$x = 52.5 \text{ ft}$$

20. A 96-ft building casts a 50-ft shadow. If a tourist next to the building is casting a 2.6-ft shadow, how tall is the tourist? Round to the nearest whole number.

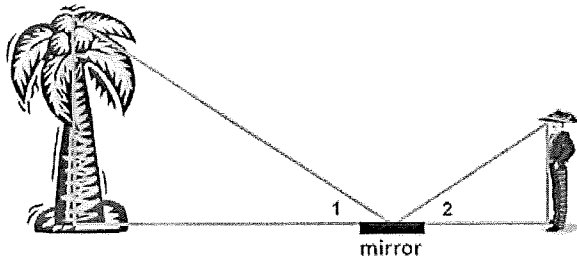
$$x = 5.0 \text{ ft}$$

21. If  $\triangle ABC \sim \triangle DEF$ , find the perimeter of  $\triangle ABC$ .



$$P = 42 \text{ units}$$

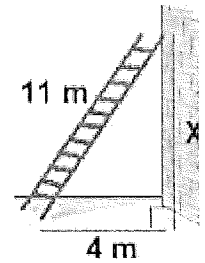
22. Antonio stands so that he can see the top of a palm tree in a mirror placed on the ground between them. The mirror is 4 ft from his feet and 25 ft from the base of the tree. Antonio's eyes are 5.5 ft off the ground. How high is the palm tree? Round to the nearest tenth.



$$x = 34.4 \text{ ft}$$

23. A ladder 11m long is leaning against a building. The base of the ladder is 4m from the base of the building. How high up the wall does the ladder reach?

$$x = \sqrt{105} \text{ m}$$



24. A 50ft ladder reaches up to a 3<sup>rd</sup> story window in order to rescue a little girl from a burning building. The base of the ladder is 35ft from the base of the building. How high is the window?

$$x = 5\sqrt{51} \text{ ft}$$

25. State whether the following sets of measures represent the sides of a right triangle.

a) 20, 48, 52 YES

b) 9, 40, 41 YES

c) 21, 21, 31 NO

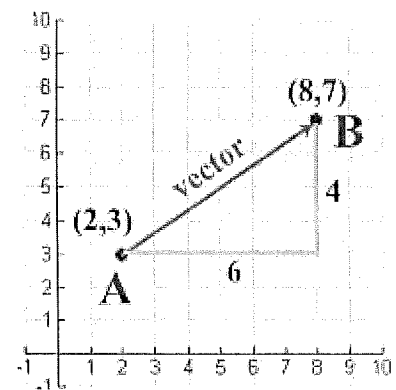
d) 12, 34, 37 NO

26. Write the component form of the vector and find the magnitude and direction of the vector.

comp. form:  $\langle 6, 4 \rangle$

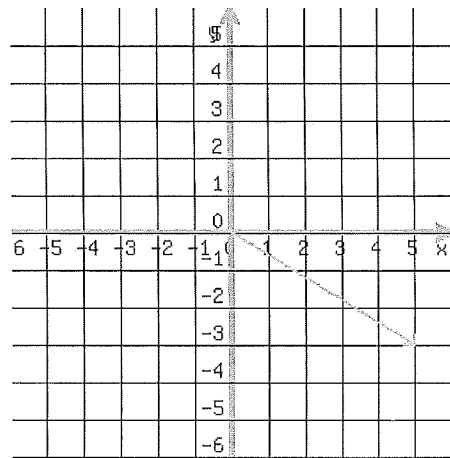
magnitude:  $2\sqrt{13}$

direction:  $\theta = 33.7^\circ$



27. Write the component form of the vector and find the magnitude and direction of the vector.

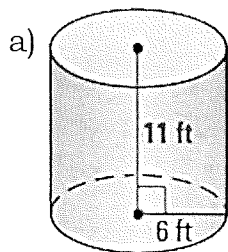
comp. form:  $\langle 5, -3 \rangle$   
 magnitude:  $\sqrt{34}$   
 direction:  $\theta = 329^\circ$



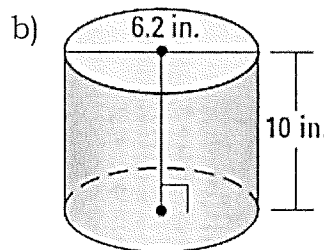
28. Find the component form of vector MN with M(1, 2) and N(4, 6).

$\langle 3, 4 \rangle$

29. Find the surface area of the right cylinder. Keep your answers in terms of pi.

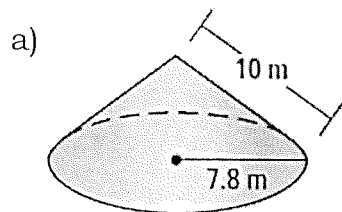


$SA = 204\pi \text{ ft}^2$

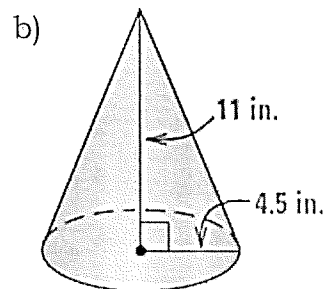


$SA = 81.22\pi \text{ in}^2$

30. Find the surface area of the cones below. Round to the nearest tenth.

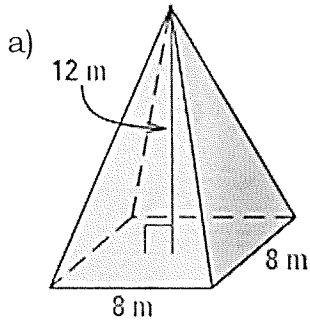


$SA \approx 436.2 \text{ m}^2$

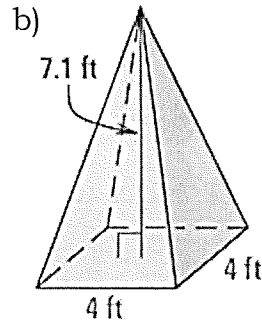


$SA = 231.8 \text{ in}^2$

31. Find the surface area of the square pyramid. Round your answer to the nearest tenth.

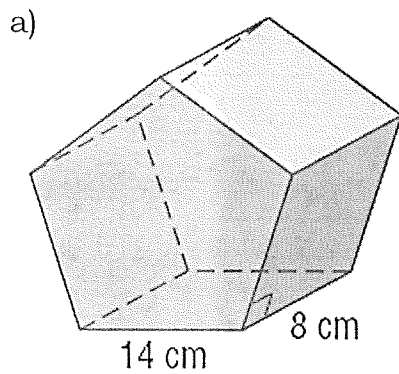


$$SA = 265.6 \text{ m}^2$$

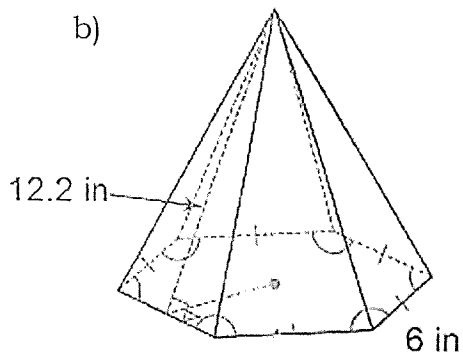


$$SA = 75.2 \text{ ft}^2$$

32. Find the surface area of the figures below. The bases are regular polygons. Round to the nearest whole number.



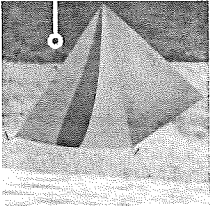
$$SA = 1,233 \text{ cm}^2$$



$$SA = 313 \text{ in}^2$$

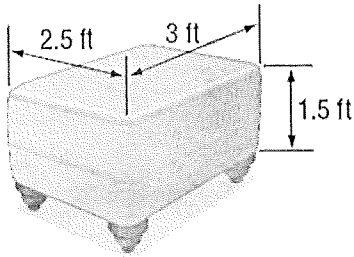


33. A camping tent made of nylon is seen below in the shape of a square pyramid. If the triangular panels are 10 feet wide and 7 feet tall, how much material will it take to make the tent, including the base?



$$240 \text{ ft}^2$$

34. Jill wants to have her ottoman, shown below, reupholstered. Find the surface area that will be reupholstered.



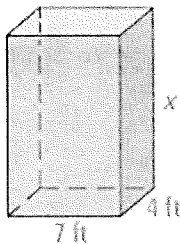
$$24 \text{ ft}^2$$

35. A library has an aquarium in the shape of a rectangular prism. The base is 6 feet by 2.5 feet, and the height is 4 feet. How many square feet of glass was used to build the aquarium?

$$83 \text{ ft}^2$$

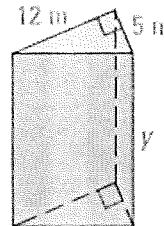
36. Solve for the variable given the surface area  $S$  of the right prism. Round to the nearest tenth.

a)  $S = 298 \text{ ft}^2$



$$x = 11 \text{ ft}$$

b)  $S = 870 \text{ m}^2$



$$y = 27 \text{ m}$$

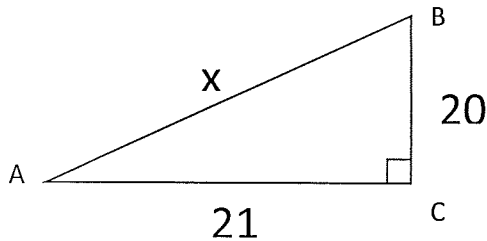
37. Timmy is flying a kite. The length of the string is 37 feet. The kite gets caught on the top of a tree that is perpendicular to the ground. Timmy is 10 feet from the tree's base. How tall is the tree?

$$x = 3\sqrt{141} \text{ ft}$$

38. Give an example of three measures that could represent the sides of a right triangle. Prove or explain why these measures work.

$$3, 4, 5$$

39. Consider the triangle ABC, shown below. Use the Pythagorean Theorem to find the missing side. Then find all trig ratios below and simplify all answers.



$$x = \underline{29}$$

$$\sin \angle A = \underline{\frac{20}{29}}$$

$$\cos \angle A = \underline{\frac{21}{29}}$$

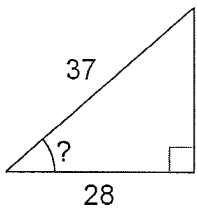
$$\tan \angle A = \underline{\frac{20}{21}}$$

$$\sin \angle B = \underline{\frac{21}{29}}$$

$$\cos \angle B = \underline{\frac{20}{29}}$$

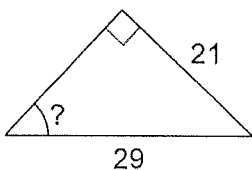
$$\tan \angle B = \underline{\frac{21}{20}}$$

40. Find the measure of the missing angle.



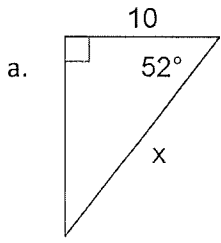
$$\theta = 40.8^\circ$$

41. Find the measure of the missing angle.

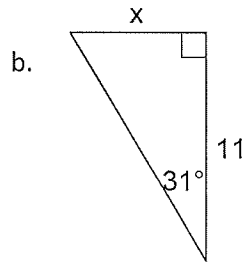


$$\theta \approx 46.4^\circ$$

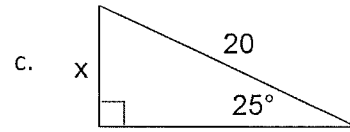
42. Solve to find each missing side. Round to the nearest tenth.



$$x \approx 16.2$$



$$x \approx 6.6$$

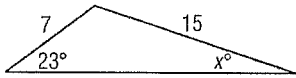


$$x \approx 8.5$$

43. Hannah is looking up at the top of a building at a  $75^\circ$  with the ground. She is standing 36 feet from the building. How tall is the building? Round answer to the nearest tenth.

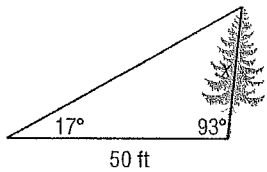
$$x = 134.4 \text{ ft}$$

44. Find  $x$  to the nearest degree.



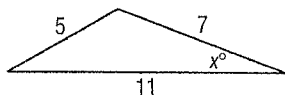
$$x = 10.5^\circ$$

45. A tree grew at a  $3^\circ$  slant from the vertical. At a point 50 feet from the tree, the angle of elevation to the top of the tree is  $17^\circ$ . Find the length of the tree to the nearest tenth of a foot.



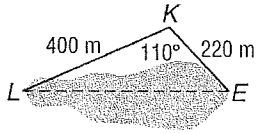
$$x = 15.6 \text{ ft}$$

46. Find  $x$  to the nearest degree.



$$x \approx 20^\circ$$

47. To approximate the length of a pond, a surveyor walks 400 meters from point  $L$  to point  $K$ , then turns and walks 220 meters from point  $K$  to point  $E$ . If  $m\angle LKE = 110^\circ$ , find the length  $LE$  of the pond to the nearest tenth of a meter.



$$x = 518.3 \text{ m}$$

48. Solve  $\triangle PQR$  for  $r = 22$ ,  $p = 51$ , and  $m\angle Q = 96^\circ$ . Round angle measures to the nearest degree and side measures to the nearest tenth.

$$q = 57.6$$

$$\angle P = 56^\circ$$

$$\angle R = 28^\circ$$

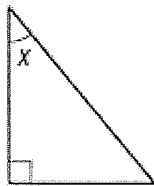
49. Solve Triangle PQR, given that:  $m\angle P = 89^\circ$ ,  $p = 16$ ,  $r = 12$ .

$$q = 10.7$$

$$\angle R = 49^\circ$$

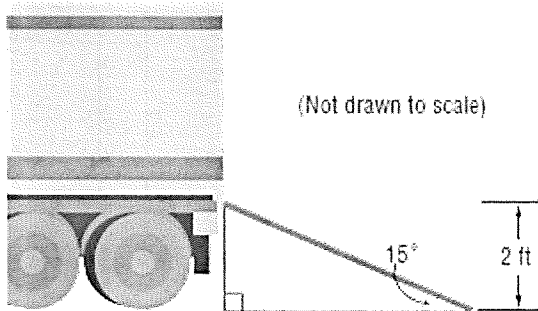
$$\angle Q = 42^\circ$$

50. In the figure, if  $\cos x = \frac{20}{29}$ , what are  $\sin x$  and  $\tan x$ ?



- A  $\sin x = \frac{29}{21}$  and  $\tan x = \frac{29}{21}$
- B  $\sin x = \frac{21}{29}$  and  $\tan x = \frac{20}{21}$
- C  $\sin x = \frac{29}{21}$  and  $\tan x = \frac{21}{20}$
- D  $\sin x = \frac{21}{29}$  and  $\tan x = \frac{21}{20}$

51. **TRUCKS** The tailgate of a moving truck is 2 feet above the ground. The incline of the ramp used for loading the truck is  $15^\circ$  as shown. Find the length of the ramp to the nearest tenth of a foot.

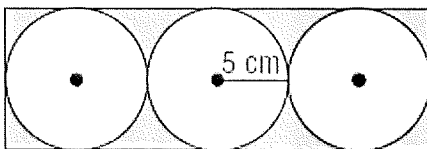


Kelly and Jackie are debating the correct length of the ramp that the movers need in order to move their stuff to their new place. Who is reasoning correctly? Explain who is showing the correct work in complete sentences, support your answer with mathematical vocabulary.

Jackie's Work	Kelly's Work
$\sin 15^\circ = \frac{2}{x}$ $x \sin 15^\circ = 2$ $x = \frac{2}{\sin 15^\circ}$ $x = 7.7 \text{ ft}$	$\tan 15^\circ = \frac{2}{x}$ $x \tan 15^\circ = 2$ $x = \frac{2}{\tan 15^\circ}$ $x = 7.5 \text{ ft}$

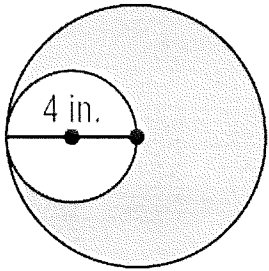
Jackie

52. A gardener installs 3 sprinklers in a rectangular plot. Each sprinkler waters a circular region with a radius of 5 cm, as shown below. No portion of the plot is watered by more than 1 sprinkler. What is the approximate area of the portion of the plot that is NOT watered by a sprinkler? Round to the nearest tenth.



$$A = 64.4 \text{ cm}^2$$

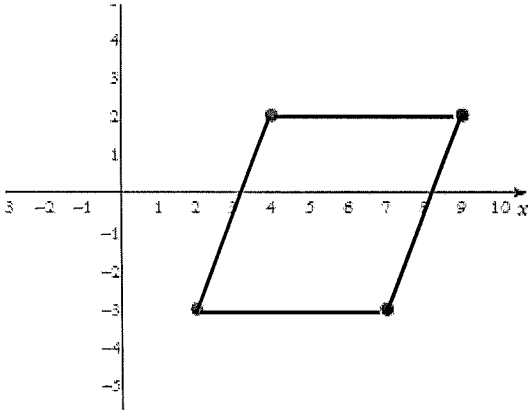
53. The figure below shows two tangent circles where the 4-inch diameter of the smaller circle is equal to the radius of the larger circle. What percent of the larger circle is shaded?



$$75\%$$

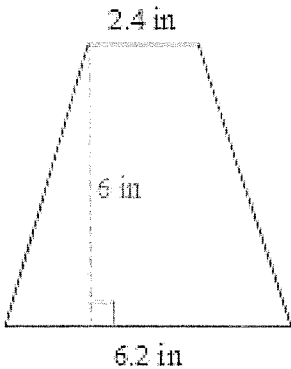
54. Given the coordinates of the vertices below, find the area of the parallelogram.

A(2,-3), B(7,-3), C(9,2), D(4,2)



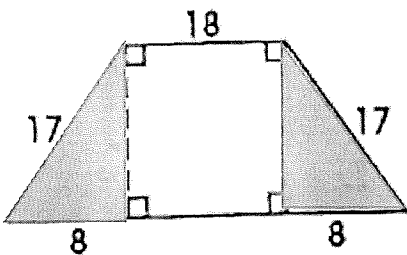
$$A = 25 \text{ units}^2$$

55. Find the area of the trapezoid.



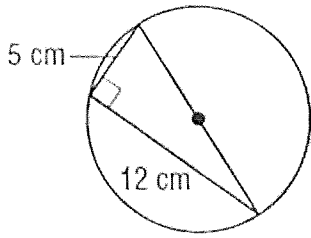
$$A = 25.8 \text{ in}^2$$

56. The trapezoid below is divided into 2 triangles and 1 rectangle. Lengths are given in inches. What is the shaded area?



$$A_s = 120 \text{ in}^2$$

57. What is the area of the circle?



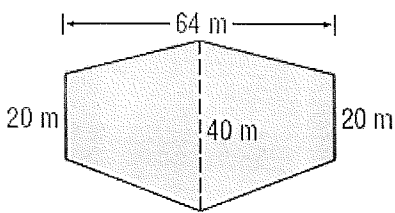
$$A = 42.25\pi \text{ cm}^2$$

$$A \approx 132.7 \text{ cm}^2$$

58. Find the area of a circle if the circumference is  $20\pi$ .

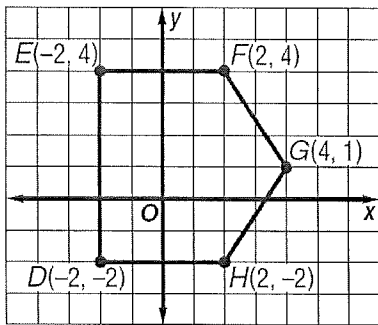
$$A = 100\pi \text{ units}^2$$

59. Roy is fencing his tomato garden to protect it from rabbits and deer. If the diagram provided below is his tomato garden, what is the area of the garden to be fenced, in square meters?



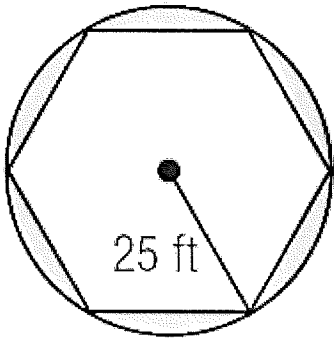
$$A = 1,920 \text{ m}^2$$

60. Find the area of the following figure.



$$A = 30 \text{ units}^2$$

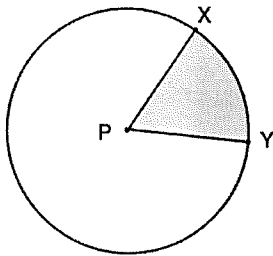
61. Find the area of the circle and the area of the shaded region.



area of the circle: 1,963.5 ft<sup>2</sup>

area of the shaded region: 339.7 ft<sup>2</sup>

62. The length of arc  $XY$  of the following circle is equal to  $\frac{1}{8}$  of the circumference of Circle P. The arc length is  $3\pi$  meters. Find the radius, the central angle, and the area of the shaded sector. Round to the nearest tenth.



Radius = 12 m

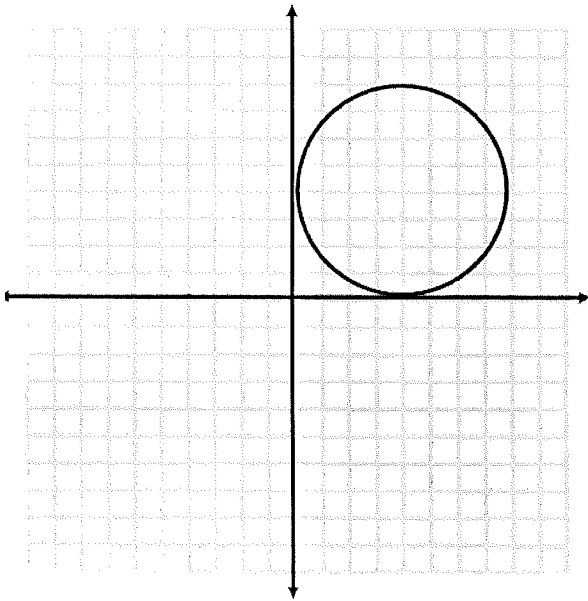
Central Angle = 45°

Sector Area = 56.5 m<sup>2</sup>



63. The circle below is graphed from the equation  $(x - 4)^2 + (y - 4)^2 = 16$ .

- Graph and write an equation of another circle which is tangent to the one given.
- Graph and write an equation of a third circle which is NOT tangent to the circle given, nor the circle from part a, and has a center at the origin.



Answers Vary!  
EXAMPLE ANSWERS:  
a)  $(x-4)^2 + (y+1)^2 = 1$   
b)  $x^2 + y^2 = 1$

Find the length of each arc. Round your answer to the nearest tenth.

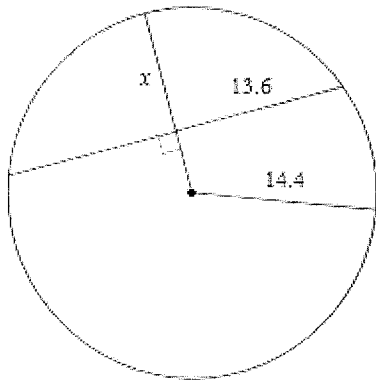
64. Radius = 13 mi and the central angle is  $45^\circ$

$$3.25\pi \text{ mi} \approx 10.2 \text{ mi}$$

65. If the ratio of the circumference of two circles is 4:7, what is the ratio of their radii?

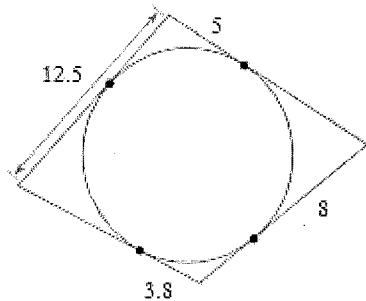
$$4:7$$

66. Find the length of the segment indicated. Round your answer to the nearest tenth if necessary.



$$x = 9.7 \text{ units}$$

67. Find the perimeter of the polygon. Assume lines which appear to be tangent are tangent.

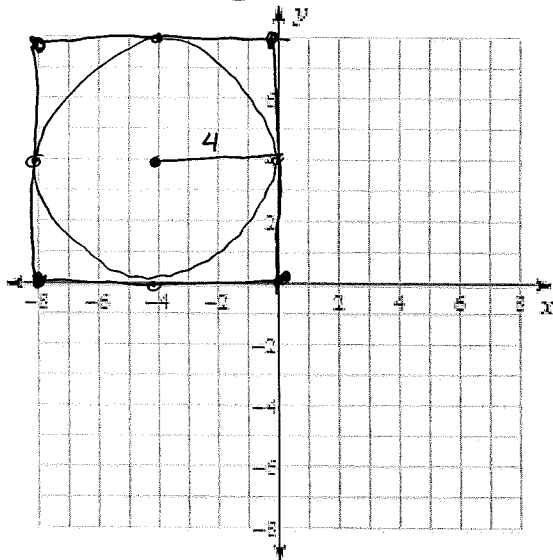


$$P = 48.6 \text{ units}$$

68. Use the information below to answer the questions which follow.

The points of a square are  $(0,0)$ ,  $(-8,0)$ ,  $(-8,8)$ , and  $(0,8)$ .

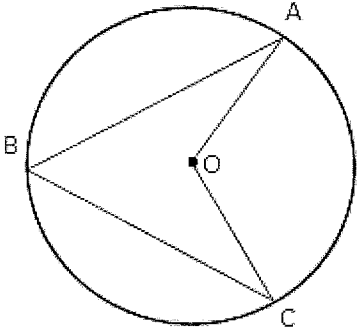
1. Graph the square.
2. Write the equation of a circle that would be inscribed inside this square.



$$\begin{aligned} \text{Center: } &(-4, 4) \\ r &= 4 \\ (x+4)^2 + (y-4)^2 &= 16 \end{aligned}$$

69. If  $AB = BC$ , and  $\angle ABC = 60^\circ$ :

- What is the measure of  $\angle AOC$ ?  $120^\circ$
- If  $\text{arc } \widehat{AC} = 126^\circ$ , what is the measure of  $\widehat{AB}$ ?  $m\widehat{AB} = 117^\circ$



70. Given:  $EB$  is a diameter of circle  $G$ .

True or False? If false, correct the statement to make it true.

- $\angle BGC = 72^\circ$  False
- $AE \parallel CD$  False
- $\angle GED = \angle GDC + \angle RUE$
- $\angle DGC = 54^\circ$  False
- $\overline{ED} \cong \overline{AG}$  False
- $\overline{AE} \cong \overline{CD}$  TRUE

