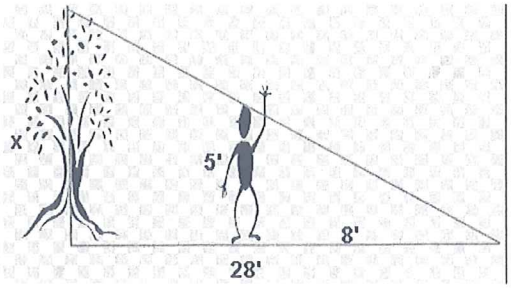
Name: Key DUE: _____ HOUR: _____

**2015/2016 Geometry Final Exam Review**

1. Find x.

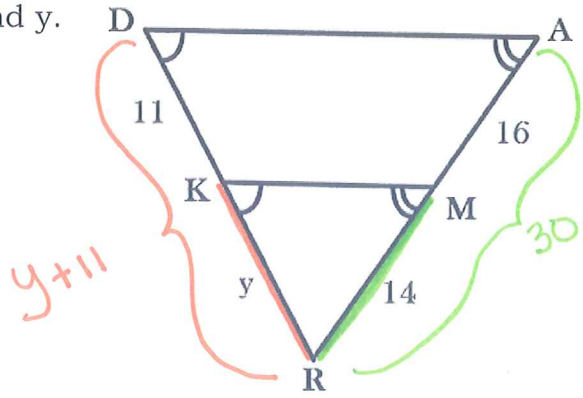



$\frac{x}{5} = \frac{28}{8}$

$8x = 140$

x = 17.5'

2. Find y.




$\frac{14}{30} = \frac{y}{y+11}$

$14(y+11) = 30y$

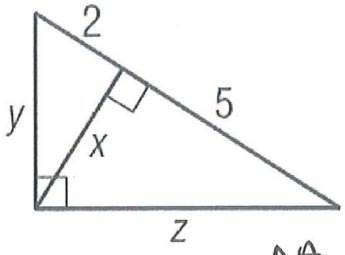
$14y + 154 = 30y$

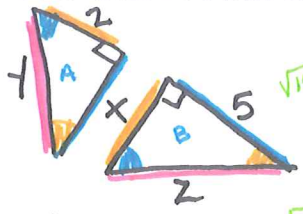
$154 = 16y$

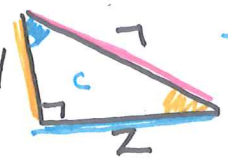
$9.625 = y$

y = 9.6

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




Find x:

$\frac{\Delta A}{\Delta B}$ $\frac{x}{5} = \frac{2}{x}$

$x^2 = 10$ $x = \sqrt{10}$

Find y

$\frac{\Delta A}{\Delta C} = \frac{y}{7} = \frac{2}{y}$

$y^2 = 14$ $y = \sqrt{14}$

Find z


pyth. thm.

$\sqrt{14}^2 + z^2 = 7^2$

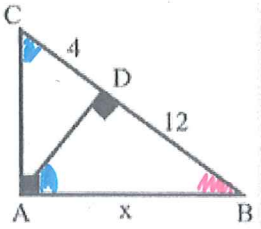
$14 + z^2 = 49$

$z^2 = 35$

$z = \sqrt{35}$

x = $\sqrt{10}$ y = $\sqrt{14}$ z = $\sqrt{35}$

4. Find x.




$\frac{x}{12} = \frac{16}{x}$

$x^2 = 192$

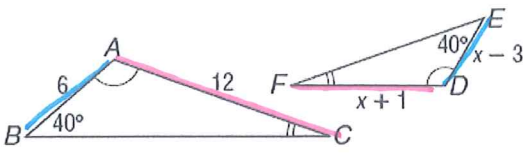
$x = \sqrt{192} \approx 13.9$

OR

$8\sqrt{3}$

x = $8\sqrt{3}$

5. Find x.




$\frac{x+1}{12} = \frac{x-3}{6}$

$6(x+1) = 12(x-3)$

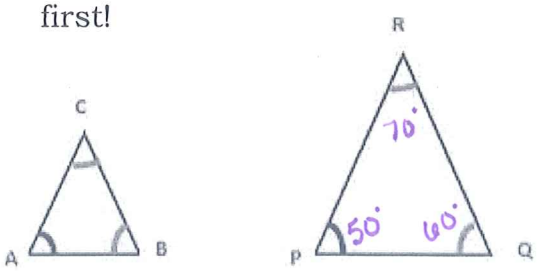
$6x + 6 = 12x - 36$

$6 = 6x - 36$

$42 = 6x \quad x = 7$

x = 7

6. $\Delta ABC \sim \Delta PQR$. *If* $< P = 50°, < Q = 60°, < R = 70°$, *find* $x$ *if* $< B = 4x°$. Mark the picture first!

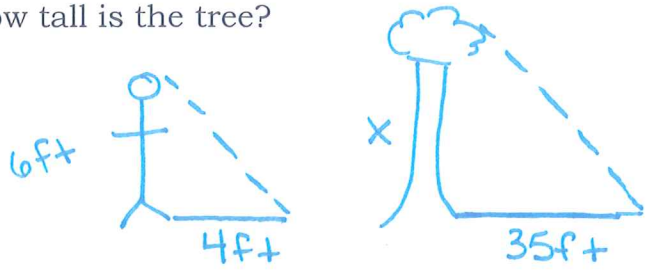



$\angle B \cong \angle Q$

$4x = 60$

$x = 15°$

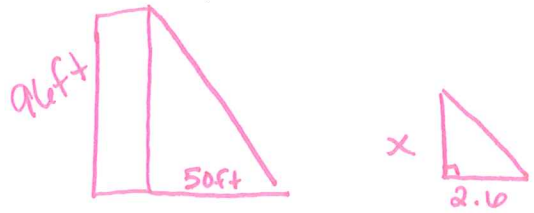
7. A 6-foot tall teacher casts a 4-foot shadow. If a tree next to him casts a 35 ft shadow, how tall is the tree?




$\frac{x}{6} = \frac{35}{4}$

x = 52.5 ft tall

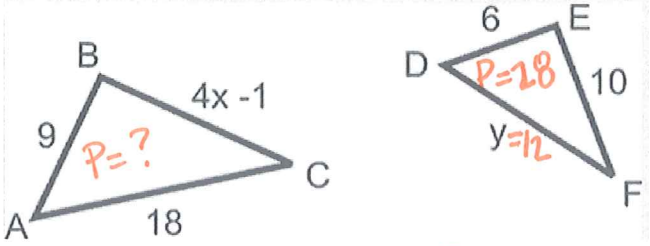
8. A 96-ft building casts a 50-ft shadow. If a tourist next to the building is casting a 2.6-ft shadow, how tall is the tourist? Round to the nearest whole number.




$\frac{x}{96} = \frac{2.6}{50}$

x = 5.0 ft tall

9. If $\Delta ABC \sim \Delta DEF$, *find the perimeter of* $\Delta ABC$.




Method 1

Find x then find perimeter

Find x

$\frac{6}{9} = \frac{10}{4x-1}$

$6(4x-1) = 9 \cdot 10$

$24x - 6 = 90$

$24x = 96$

$x = 4$

Perimeter: $9 + 18 + 4(4) + 1$

P = 42 units

method 2 Find y then PR = SLR

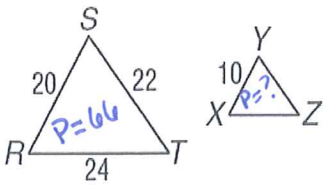
Find y $\frac{6}{9} = \frac{y}{18}$

$y = 12$

$\frac{6}{9} = \frac{28}{P}$

P = 42 units

10. If $\Delta RST \sim \Delta XYZ$, *find the perimeter of* $\Delta XYZ$.

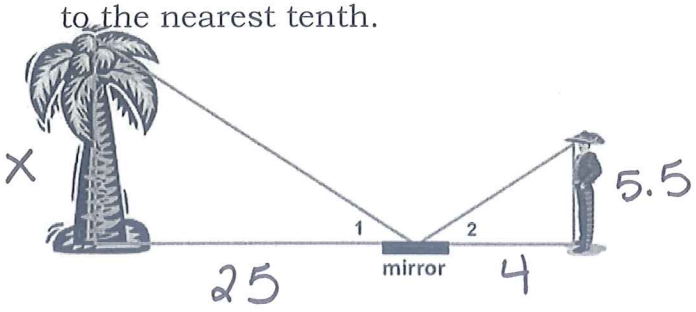



$\frac{66}{x} = \frac{20}{10}$

$\frac{660}{20} = \frac{20x}{20}$

Perimeter: 33units

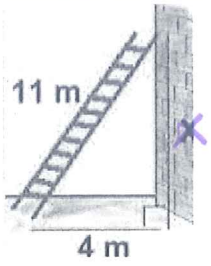
11. Antonio stands so that he can see the top of a palm tree in a mirror placed on the ground between them. The mirror is 4ft from his feet and 25 ft from the base of the tree. Antonio's eyes are 5.5 ft off the ground. How high is the palm tree? Round to the nearest tenth.




$\frac{x}{5.5} = \frac{25}{4}$

$x = 34.4$ft

12. 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?

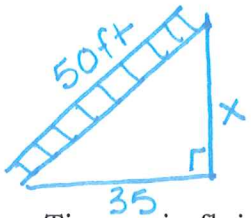



$4^2 + x^2 = 11^2$

$\sqrt{x^2} = \sqrt{105}$m

The ladder reaches $\sqrt{105}$m or 10.2m up the wall

13. A 50ft ladder reaches up to a 3rd 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?




$x^2 + 35^2 = 50^2$

$x^2 = 1275$

$x = \sqrt{1275}$

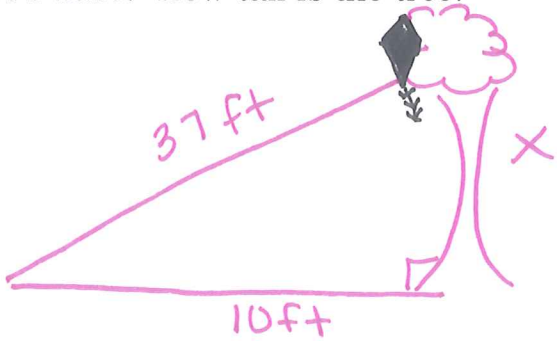
$x = \sqrt{1275}$

Simplified

$x = 5\sqrt{51}$ft

$x \approx 35.7$ft

14. 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?




$x^2 + 10^2 = 37^2$

$x^2 + 100 = 729$

$\sqrt{x^2} = \sqrt{629}$

$x = \sqrt{629}$ft or $3\sqrt{141}$ft

$x \approx 25.1$ft tall

15. 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 (converse of Pyth. thm)

because they follow the Pythagorean Theorem which only works for the Right $\triangle$s.

$3^2+4^2=5^2$

$25=25$ ☺

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

a) 20, 48, 52 yes

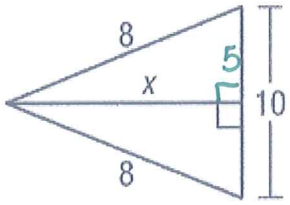
b) 9, 40, 41 yes

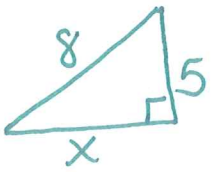
c) 21, 21, 31 NO

d) 12, 34, 37 NO

Check using Pythagorean Theorem!

17. Find x.



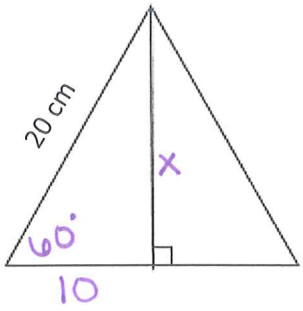

$x^2+5^2=8^2$

$x^2+25=64$

$x^2=39$

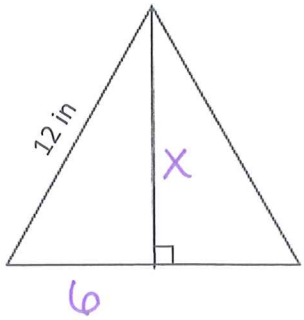
$x=\sqrt{39}\approx 6.2$

18. Find the altitude of an equilateral triangle whose sides are 20 cm long.



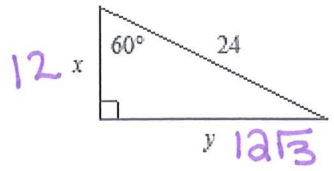

$x=10\sqrt{3}$ cm

19. Find the altitude of an equilateral triangle whose sides are 12 in long.




$x=6\sqrt{3}$ in

20. Find $x$ and $y$.



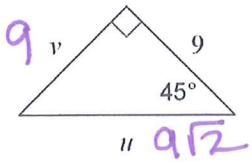

a. $x = 24\sqrt{3}, y = 24$

b. $x = 12\sqrt{3}, y = 12$

c. $x = 24, y = 24\sqrt{3}$

(d.) $x = 12, y = 12\sqrt{3}$

21.



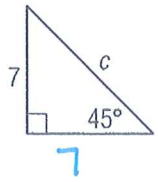

(A) $u = 9\sqrt{2},\ v = 9$

B) $u = \dfrac{9\sqrt{3}}{2},\ v = 18\sqrt{2}$

C) $u = 9,\ v = 9\sqrt{2}$

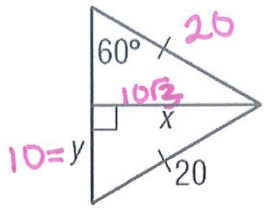
D) $u = 18\sqrt{2},\ v = \dfrac{9\sqrt{3}}{2}$

22. Find $c$.



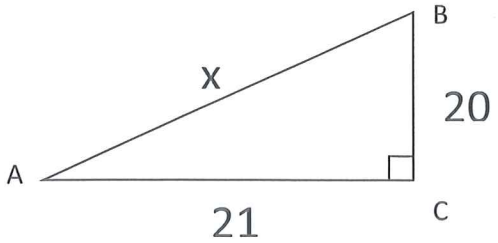

c = 7√2

23. Find x.




x = 10√3 y = 10

24. 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.



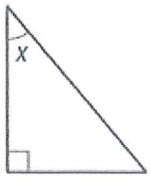

$21^2 + 20^2 = x^2$

X= 29 by pyth. Thm

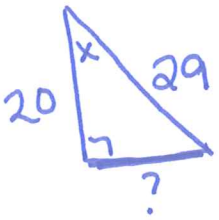
sin ∠ A = 20/29 cos ∠ A = 21/29 tan ∠ A = 20/21

sin ∠ B = 21/29 cos ∠ B = 20/29 tan ∠ B = 21/20

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




$\cos x = \frac{adj}{hyp}$ ← ① place these lengths on your triangle




② Find missing side by pyth thm.

$?^2 + 20^2 = 29^2$

$? = 21$

A ~~$\sin x = \frac{29}{21}$ and $\tan x = \frac{29}{21}$~~

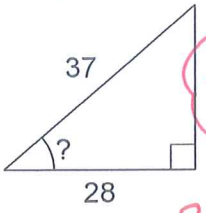
B $\sin x = \frac{21}{29}$ and ~~$\tan x = \frac{20}{21}$~~

~~C $\sin x = \frac{29}{21}$ and $\tan x = \frac{21}{20}$~~

D $\sin x = \frac{21}{29}$ and $\tan x = \frac{21}{20}$

26. Find the measure of the missing angle.

a.

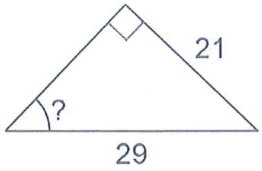



$\theta \approx 40.8°$

$\cos\theta = \frac{28}{37}$

$\theta = \cos^{-1}\left(\frac{28}{37}\right)$

b.

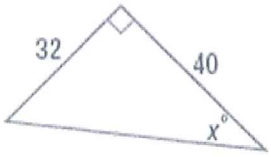



$\sin\theta = \frac{21}{29}$

$\theta = \sin^{-1}\left(\frac{21}{29}\right)$

$\theta \approx 46.4°$

c.



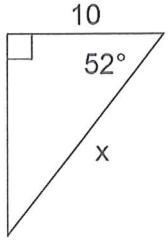

$\tan x = \frac{32}{40}$

$x = \tan^{-1}\left(\frac{32}{40}\right)$

$x \approx 38.7°$

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

a.



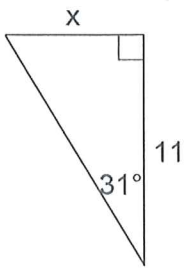

$\cos(52) = \frac{10}{x}$

$x \cdot \cos(52) = 10$

$x = \frac{10}{\cos(52)}$

$x \approx 16.2$

b.

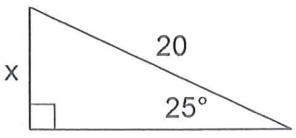



$\tan(31) = \frac{x}{11}$

$11 \cdot \tan(31) = x$

$x \approx 6.6$

c.

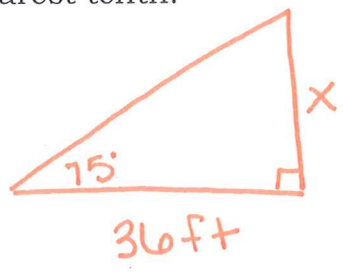



$\sin(25) = \frac{x}{20}$

$20 \cdot \sin(25) = x$

$x \approx 8.5$

28. Hannah is looking up at the top of a building at a 75° with the ground. She is standing 36 feet from the building. How tall is the building? Round answer to the nearest tenth.



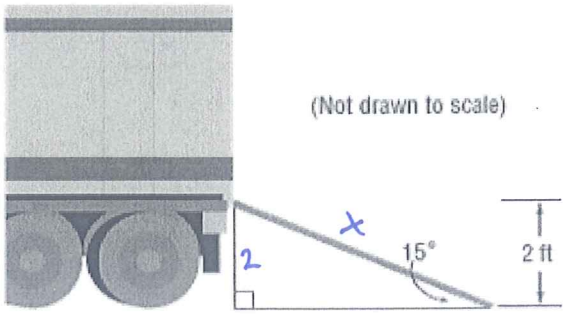

$\tan(75) = \frac{x}{36}$

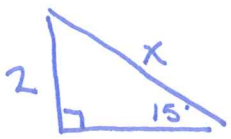
$36 \cdot \tan(75) = x$

$x \approx 134.4$ ft tall

29.

**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° as shown. Find the length of the ramp to the nearest tenth of a foot.




$\sin(15) = \frac{2}{x}$

$x \sin(15) = 2$

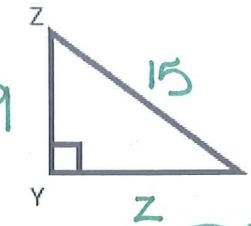
$x = \frac{2}{\sin(15)}$

$x = 7.7$ ft

30. If the sin (x) = $\frac{9}{15}$, what is the cos (x)? $= \frac{adj}{hyp.}$

$\sin x = \frac{OP}{hyp}$

Find z by pyth. thm




$z^2 + 9^2 = 15^2$

$z = 12$

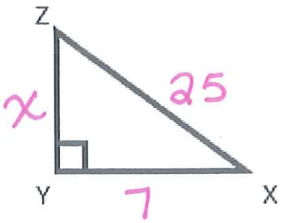
$\cos(x) = \frac{12}{15} = \frac{4}{5}$

31. If the cos(x) = $\frac{7}{25}$, what is the sin (x)?

$x^2 + 7^2 = 25^2$

$x^2 = 576$

$x = 24$




$\sin x = \frac{24}{25}$

32. 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.

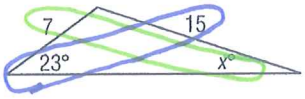
| Jackie's Work | Kelly's Work |
|---|---|
| $\sin 15° = \frac{2}{x}$<br>$x \sin 15° = 2$<br>$x = \frac{2}{\sin 15°}$<br>$x = 7.2\ ft$ $x = 7.7$ ft | $\tan 15° = \frac{2}{x}$<br>$x \tan 15° = 2$<br>$x = \frac{2}{\tan 15°}$<br>$x = 7.5\ ft$ |

This goes with #29

Jackie is correct because you are given the opposite + hypotenuse

***33 – 37.) For the next six questions, use the Law of Cosines*** $(a^2 = b^2 + c^2 - 2bc \cdot \cos A)$ ***or the Law of Sines*** $\left(\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}\right)$

33. Find $x$ to the nearest degree.




Law of Sines

$\frac{7 \cdot \sin(23)}{15} = \frac{\sin x}{7} \cdot 7$

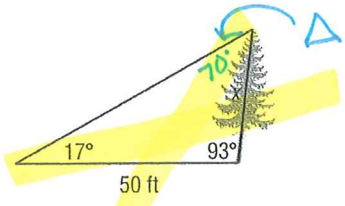
$\frac{7 \cdot \sin(23)}{15} = \sin x$

$x = \sin^{-1}\left(\frac{7 \cdot \sin(23)}{15}\right)$

$x = 10.5°$

Round to $x = 11°$

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




$\Delta$ sum

Law of Sines

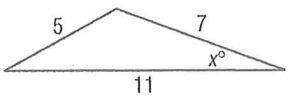
$\frac{\sin(70)}{50} = \frac{\sin(17)}{x}$

$x \sin(70) = 50 \cdot \sin(17)$

$x = \frac{50 \cdot \sin(17)}{\sin(70)}$

$x \approx 15.6$ ft

35. Find $x$ to the nearest degree.




Law of Cosines $5^2 = 11^2 + 7^2 - 2 \cdot 11 \cdot 7 \cos x$

$25 = 170 - 154 \cos x$

$-170 \quad -170$

$\frac{-145}{-154} = \frac{-154 \cos x}{-154}$

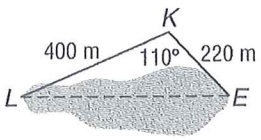
$\frac{-145}{-154} = \cos x$

$\cos x = \frac{-145}{-154}$

$x = \cos^{-1}\left(\frac{-145}{-154}\right)$

$x \approx 20°$

36. 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 $m\square LKE = 110$, find the length $LE$ of the pond to the nearest tenth of a meter.

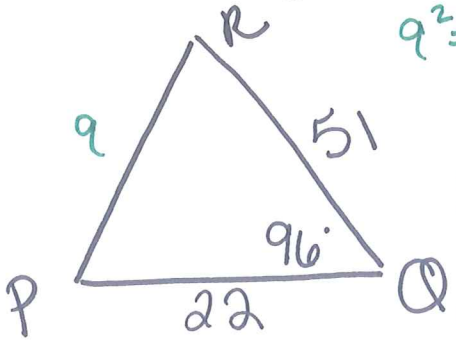



$x^2 = 400^2 + 220^2 - 2 \cdot 400 \cdot 220 \cos(110)$

$x = \sqrt{400^2 + 220^2 - 2 \cdot 400 \cdot 220 \cos(110)}$

$x \approx 518.3\text{ m}$

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




$q^2 = 51^2 + 22^2 - 2 \cdot 51 \cdot 22 \cos(96)$

$q = 57.6$

$q = 57.6$

$\frac{\sin P}{51} = \frac{\sin(96)}{57.6}$

$\angle P = \sin^{-1}\left(\frac{51 \cdot \sin(96)}{57.6}\right)$

$\angle P = 62°$

Then use $\triangle$ sum

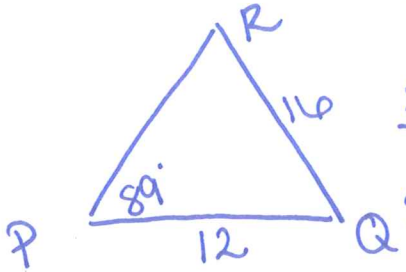
$62 + 96 + R = 180$

$\angle R = 22°$

$\angle P = 62°$

$\angle R = 22°$

38. Solve Triangle PQR, given that: $m\angle P = 89°, p = 16, r = 12$.




Find $\angle R$

$\frac{\sin R}{12} = \frac{\sin(89)}{16}$

$\sin^{-1}\left(\frac{12 \cdot \sin(89)}{16}\right)$

$\angle R = 49°$

$\triangle$ sum to find $\angle Q$.

$49 + 89 + Q = 180$

$\angle Q = 42°$

$\angle R = 49°$

$\angle Q = 42°$

Find $q$

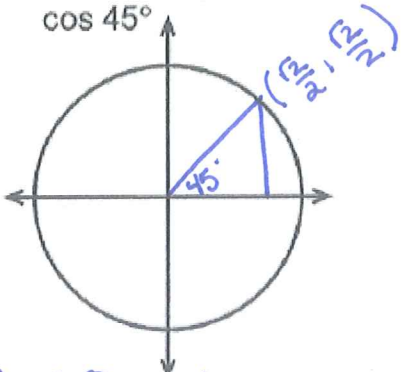
$\frac{\sin(42)}{q} = \frac{\sin(89)}{16}$

$q = 10.7$

$q = 10.7$

**Give the exact measurements for the following.**

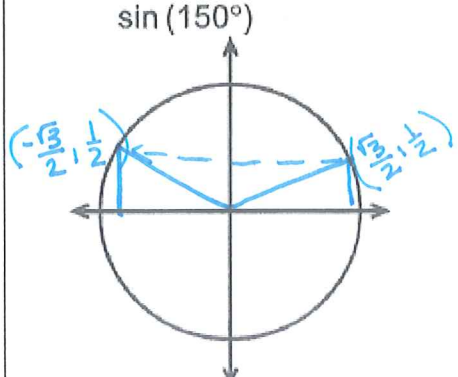
39.




$\cos\theta = x$

$\cos 45 = \frac{\sqrt{2}}{2}$

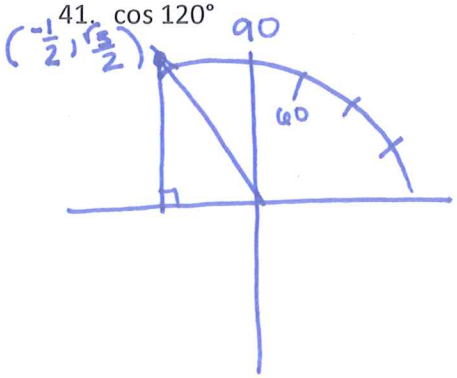
40.




$\sin\theta = y$

$\sin(150) = \frac{1}{2}$

41. cos 120°




$\cos\theta = x$

$\cos(120) = -\frac{1}{2}$

42. Given: EB is a diameter of circle G.

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

a. <BGC = $72^0$ → <BGC = 36°

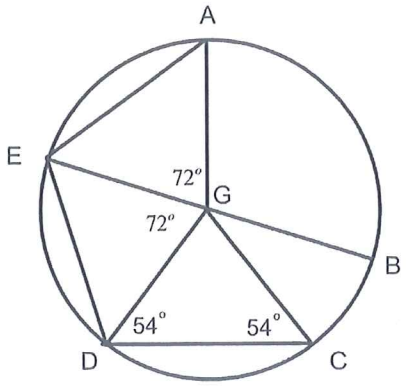
b. AE // CD → AE ≅ CD

c. <GED = < GDC TRUE!

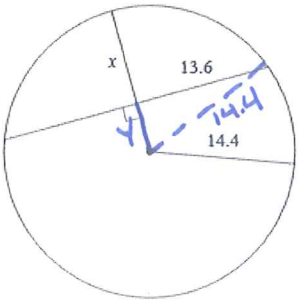
d. <DGC = $54^0$ → <DGC = 72°

e. $\overline{ED} \cong \overline{AG}$ EG ≅ AG

f. $\overline{AE} \cong \overline{CD}$ TRUE!




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




Radius = 14.4

Find y 1st

$y^2 + 13.6^2 = 14.4^2$

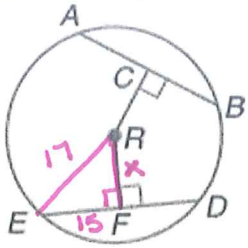
$y^2 = 22.4$

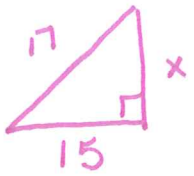
$y = 4.7$

$x = 14.4 - 4.7$

$x = 9.7$ units

44. In circle $R$, $CR = RF$, and $ED = 30$ and the radius is 17. Find of RF.



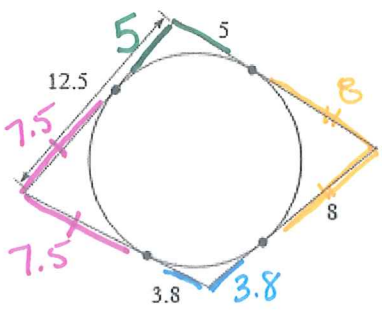




$x^2 + 15^2 = 17^2$

$x^2 = 64$

RF = 8

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



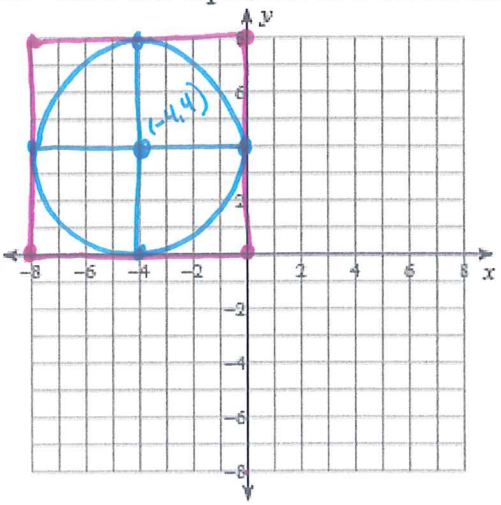

P = 48.6 units

Fixed! :)

46. 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.




Center $(-4,4)$ ($h$ $k$)

$r=4$

$(x-h)^2+(y-k)^2=r^2$

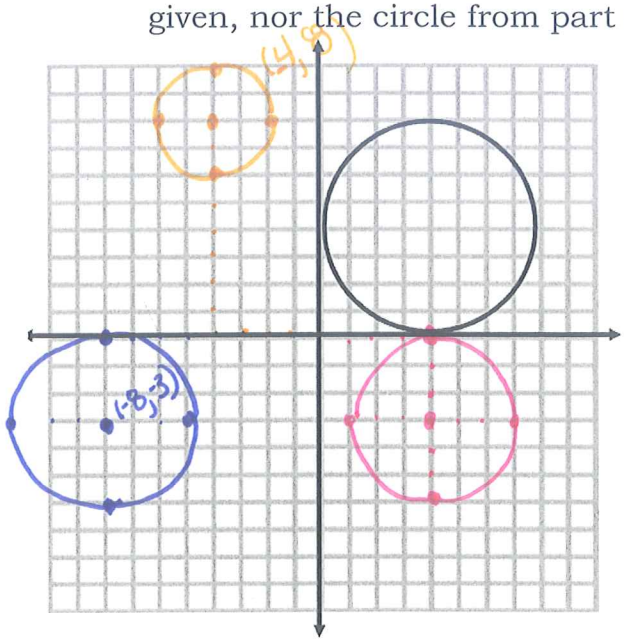
$(x--4)^2+(y-4)^2=4^2$

$\boxed{(x+4)^2+(y-4)=16}$

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

a. Graph and write an equation of another circle which is tangent to the one given.

b. 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.




oops → this is not tangent

a.) multiple answers.

Example ( $r=3$ $(-8,-3)$ )

$(x+8)^2+(y+3)^2=9$

a.) IS Tangent in Pink

$r=3$ $(4,-3)$

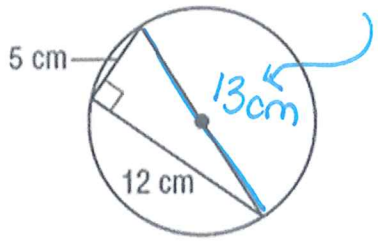
$\boxed{(x-4)^2+(y+3)^2=9}$

b.) not tangent

$(-4,8)$ $r=2$

$\boxed{(x+4)^2+(y-8)^2=4}$

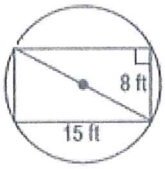
48. What is the area of the circle?




by pyth. thm
$d = 13cm$
$r = 7.5cm$

$A = \pi r^2$
$A = \pi (7.5)^2$
$A = 42.25\pi$
$A \approx 132.7 cm^2$

49. What is the area of the circle?




$d = 17$
$r = 8.5$

$A = \pi r^2$
$A = \pi (8.5)^2$
$A = 72.25\pi ft^2$
$A \approx 226.98 ft^2$

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

$C = 20\pi$ $r = 10$
$d\pi = 20\pi$
$d = 20$

$A = \pi 10^2$

$A = 100\pi$ units$^2$
$A \approx 314.2$ units$^2$

51. Find the area of a circle is the circumference is $6\pi$.

$C = 6\pi$ $r = 3$
$d\pi = 6\pi$
$d = 6$

$A = \pi 3^2$
$A = 9\pi$

$A = 9\pi$ units$^2$
$A = 28.3$ units$^2$

52. Find the length of the arc. Round your answer to the nearest tenth.
Radius = 13 mi and the central angle is $45^0$

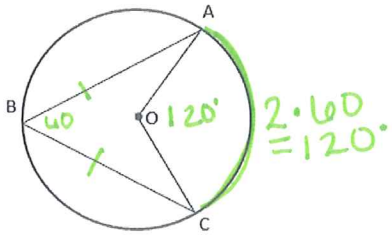
$l = \frac{a}{360} 2\pi r$ $l = \frac{45}{360} 2\pi \cdot 13$

$l = 10.2$ mi

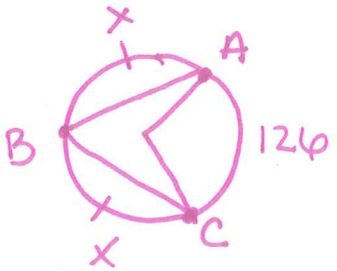
53. If the ratio of the circumference of two circles is 4:7, what is the ratio of their radii?

4:7

54. If AB = BC, and <ABC = $60^0$:
a. What is the measure of <AOC?
b. If $\overset{\frown}{AC} = 126^0$, what is the measure of $\overset{\frown}{AB}$?

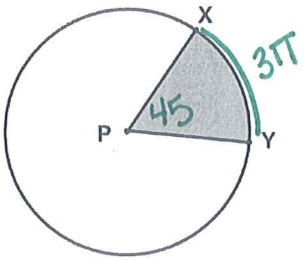



a.) $120^\circ$
$2 \cdot 60 = 120^\circ$




b.) $x + x + 126 = 360$
$2x = 234$
$x = 117$
b.) $\overset{\frown}{AB} = 117^\circ$

55. 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.




$3\pi = \frac{a}{360} d\pi$

$3\pi = \frac{45}{360} d\pi$

$3 = \frac{45}{360} d$

$d = 24m$

$r = 12m$

$a = \frac{1}{8} 360$

$a = 45°$

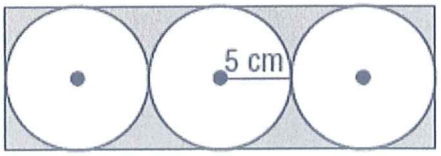
Radius = 12m

Central Angle = 45°

Sector: $\frac{45}{360} \pi 12^2$

Sector Area = $56.5m^2$

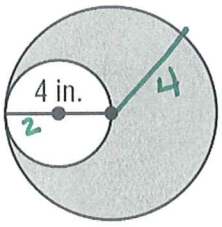
56. A gardener installs 3 sprinklers in a rectangular plot. Each sprinkler waters a circular region with a radius of 5 cm, as shown below. No portion of the plot is watered by more than 1 sprinkler. What is the approximate area of the portion of the plot that is NOT watered by a sprinkler? Round to the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




$A_s = 30 \times 10 - 3\pi 5^2$

$A_s = 64.4 cm^2$

57. 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?




$A_s$ = Big - little

$A_s = \pi 4^2 - \pi 2^2$

$A_s = 12\pi$

$A_s = 37.7 in^2$

$A_T = \pi 4^2$

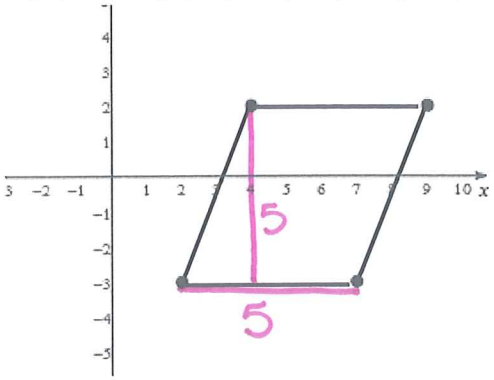
$A_T = 16\pi$

$A_T = 50.3 in^2$

$P(S) = \frac{37.7}{50.3} \approx 75\%$

58. 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)

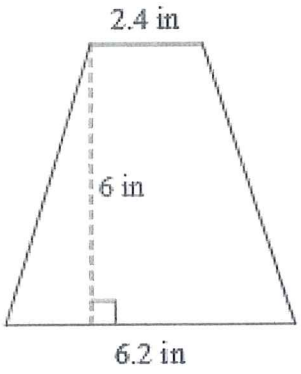



$A = b \cdot h$

$A = 5 \cdot 5$

$A = 25 units^2$

59. Find the area of the trapezoid.

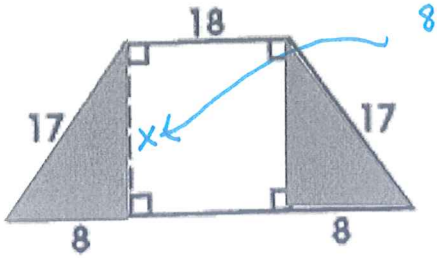



$A = \frac{1}{2}h(b_1 + b_2)$

$A = \frac{1}{2}6(6.2 + 2.4)$

$A = 25.8\ in^2$

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



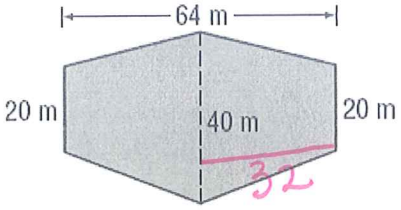

$8^2 + x^2 = 17^2$

$x = 15$

$A_S = 2(\frac{1}{2}8 \times 15)$

$A_S = 120\ in^2$

61. 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?

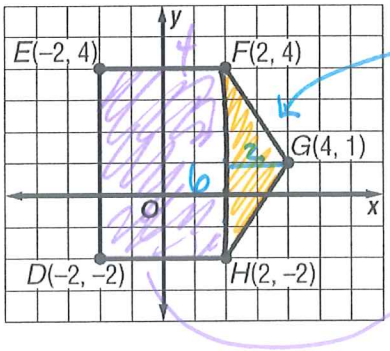



$2(\frac{1}{2}h(b_1 + b_2))$

$A = 2\frac{1}{2}32(40 + 20)$

$A = 1920 m^2$

62. Find the area of the following figure.



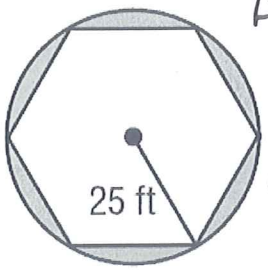

$\frac{1}{2} 6 \times 2$

$+$

$6 \times 4$

$A = 30 units^2$

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




$A_S = \pi 25^2 - 6 \cdot \frac{1}{2} 25 \times 25 \sin(60)$

$A_S = 339.7 ft^2$

$A_T = \pi 25^2$

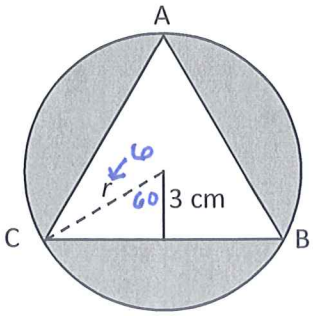
$A_T = 1963.5 ft^2$

area of the circle: $1963.5 ft^2$

area of the shaded region: $339.7 ft^2$

64. Answer the questions below. Round to the nearest tenth.
The area of equilateral triangle ABC is 46.8 cm².

a. Find the radius of the circle, *r*.




radius of circle: 6 cm

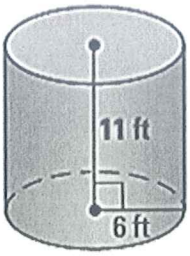
b. Find the area of the shaded region.

$A_S = \pi 6^2 - 3 \cdot \frac{1}{2} 6 \cdot 6 \sin(120)$

area of the shaded region: $66.3 cm^2$

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

a)



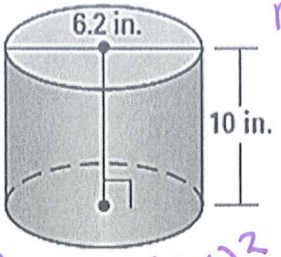

$SA = 2\pi 6^2 + 2\pi 6 \cdot 11$

$SA = 204\pi ft^2$

OR

$SA = 640.9 ft^2$

b)




$r = 3.1 in$

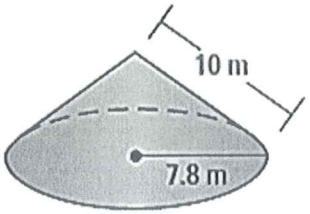
$SA = 2\pi (3.1)^2 + 2\pi (3.1)(10)$

$SA = 81.22\pi in^2$

$SA = 255.2 in^2$

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

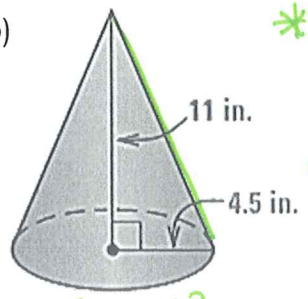
a)




$SA = \pi (7.8)^2 + \pi (7.8) 10$

$SA = 436.2 m^2$

b)




* Find Slant height *

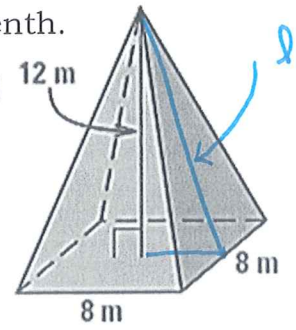
$11^2 + 4.5^2 = l^2$

$l = 11.9 in$


$SA = \pi (4.5)^2 + \pi (4.5)(11.9)$

$SA \approx 231.8 in^2$

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

a) 

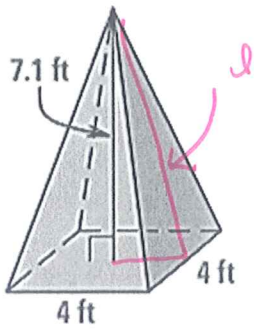

$\ell$ 


$12^2+4^2=\ell^2$

$\ell = 12.6$ m

$SA = 8\times8 + 4(\frac{1}{2}8\times12.6)$

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

b) 


$\ell$

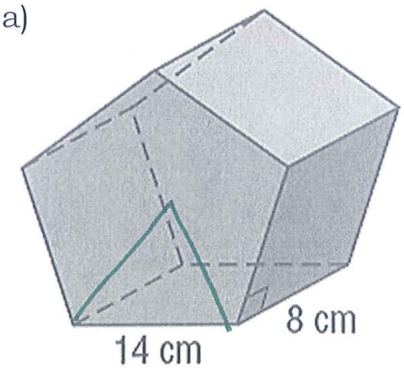
$2^2+7.1^2=\ell^2$

$\ell = 7.4$ ft

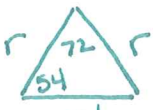
$SA = 4\times4 + 4(\frac{1}{2}4\times7.4)$

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

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

a) 


Area of the base



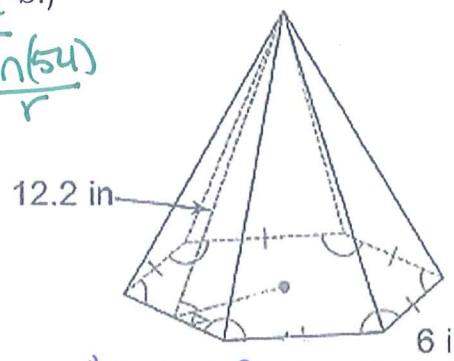

$\frac{\sin(72)}{14} = \frac{\sin(54)}{r}$

$r = 11.9$cm

$SA = 2(5\frac{1}{2}11.9\times11.9\sin(72)) + 5(8\cdot14)$

$SA = 1233.2\text{cm}^2$

$SA \approx 1233\text{cm}^2$

b.) 

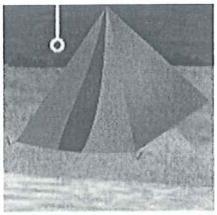

Area of the base

$r = 6$ $\quad 6\frac{1}{2}6\cdot6\sin(60)$

$SA = 6\frac{1}{2}6\cdot6\sin(60) + 6\frac{1}{2}6\times12.2$

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

69. 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?

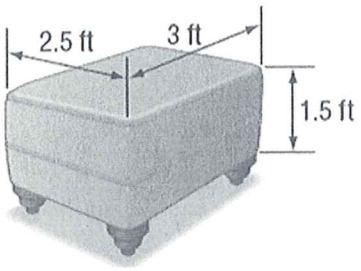


$4\frac{1}{2}10\times7 + 10\times10$

240 $\text{ft}^2$ of material is needed to make the tent.

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

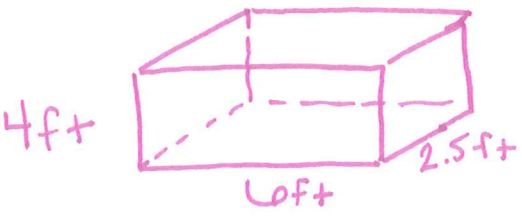
No bottom!!




SA: $2.5 \times 3$
$+ 2(1.5 \times 2.5)$
$+ 2(1.5 \times 3)$

$24\ ft^2$ to cover

71. 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?

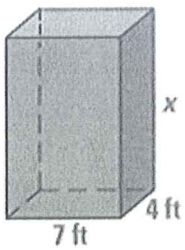



$2(4 \times 2.5)$
$+ 2(4 \times 6)$
$+ 6 \times 2.5$ ← no top base because we must feed fish.

$SA = 83 ft^2$ of glass.

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

a) $S = 298\ ft^2$



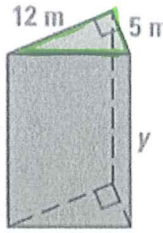

$22x + 56 = 298$

$x = 11 ft$

$2(7 \times 4)$
$+ 2(x \cdot 4)$
$2(x \cdot 7)$

$SA = 298$

b) $S = 870\ m^2$





← find 1st!

$12^2 + 5^2 = x^2$

$x = 13 m$

$2 \frac{1}{2} 12 \times 5$
$+ 13 \cdot y$
$+ 5 \cdot y$
$+ 12 \cdot y$
$870$

$30y + 60 = 870$

$y = 27 m$

73. 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?

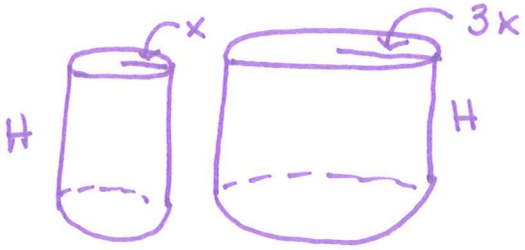
$SLR = \frac{1}{4}$

$VR = \left(\frac{1}{4}\right)^3$

$V = \frac{1}{64}$

64 times larger

74. 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? * These




$V_S = \pi x^2 \times H = x^2 \pi H$

$V_L = \pi (3x)^2 \times H = 9x^2 \pi H$

$\therefore$ 9 times larger

75. 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. 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?

$V = B \cdot H$

$V = (25 \times 10)5$

$V = 1250 ft^3$

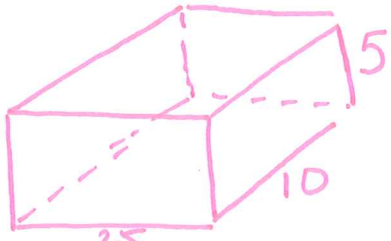
Want only one fourth!

$B = 25 \times 10$

$H = 5$

$\frac{1}{4}V = \frac{1}{4}(1250)$

$V = 312.5 ft^3$




76. 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. 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?

Same idea as #75 but this time it is half

$\frac{1}{2}V = \frac{1}{2}(1250)$

$V = 625 ft^3$

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

Radius = 2.5ft

$V = B \cdot H \quad B = \pi r^2$

$B = \pi (2.5)^2$

$H = 13 ft$

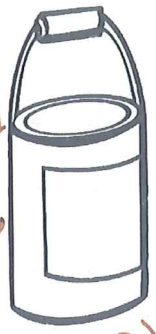
$V = (\pi\, 2.5^2) \cdot 13$

$V = 255.3 ft^3$

Final Answer!

Weight $(255.3)(62) \approx 15828.6$ lbs

78. 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.)



$r = 13in$

$h = 39in$

$B = \pi 13^2$

$V = B \cdot H$

$V = \pi 13^2 \times 39$

$V = 20706.24\ in^3$

Weight: $20,706.24 \times .12$

Final Answer

2,484.75 lbs

(Not a "Real life" question, why?)

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


$V = \frac{1}{2}$ sphere + cylinder

$V = \frac{1}{2}\left(\frac{4}{3}\pi r^3\right) + \pi r^2 \cdot H$

$V = \frac{1}{2}\left(\frac{4}{3}\pi 6^3\right) + \pi 6^2 \cdot 13$

$V \approx 1922.7\ in^3$

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

$V = l \cdot w \cdot h$

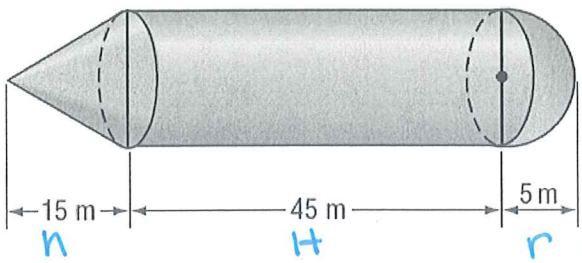
$V = l \cdot 4 \cdot 3$

$\frac{60}{12} = \frac{12l}{12}$

$l = 5in$

81. 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?

↖ means volume



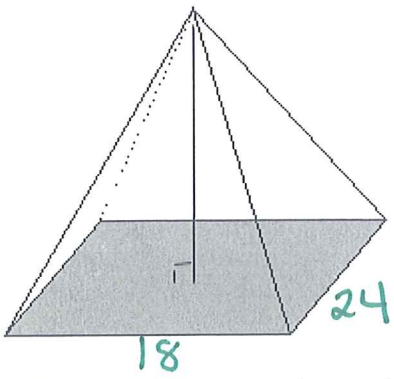

$V =$ cone $+ \frac{1}{2}$ sphere + cylinder

$V = \frac{1}{3}\pi r^2 \cdot h + \frac{1}{2}\left(\frac{4}{3}\pi r^3\right) + \pi r^2 H$

$V = \frac{1}{3}\pi 5^2 \cdot 15 + \frac{1}{2}\left(\frac{4}{3}\pi 5^3\right) + \pi 5^2 \cdot 45$

$V \approx 4188.8 m^3$

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



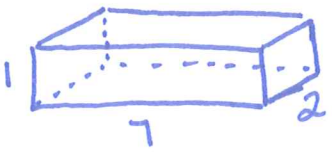

$V = \frac{1}{3} B \cdot h$

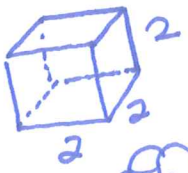
$1728 = \frac{1}{3}(24 \times 18)h$

$1728 = 144h$

$12in = h$

83. 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?



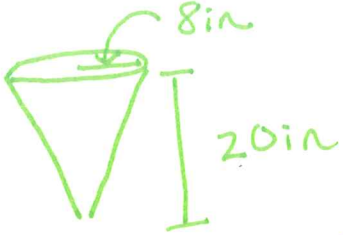

$V_{cube} = (2 \cdot 2)2$

$V_{cube} = 8 in^3 \times 12$ cubes $= 96 in^3$

$V_{Prism} = (2 \times 7)1 = 14 in^3$

The water will overflow because the volume is larger than the pan

84. 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.


$V_{sphere} = \frac{4}{3}\pi 8^3$

$V_{sphere} = 2144.7 in^3$

$V_{cone} = \frac{1}{3}\pi 8^2 \cdot 20$

$V_{cone} = 1340.4 in^3$

The volume of the sphere will exceed the cone because the volume of the sphere is larger than the volume of the cone by $804.3 in^3$