Name: Key DUE: _____ HOUR: _____

2014/2015

ACC Geometry Final Exam Review

Show all work and circle all answers.

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?

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

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

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?

* These are Not similar *

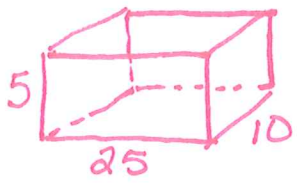
9 times larger

$\ell x \Rightarrow R = 3x$, $r = x$

$h = h$

Plug in and see

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. 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?



$V = (25 \times 10)5$

$V = 1250\ ft^3$ is the total

$\frac{1}{4}$ of the total

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

$V = 312.5\ ft^3$ 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. 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?

$V = B \cdot H$

$V_{Total} = (25 \times 10)5$

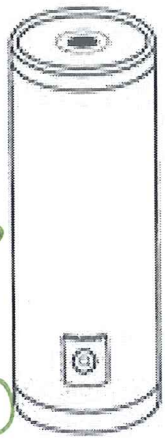
$V_{Total} = 1250\ ft^3$

V to be removed is

$\frac{1}{2}\ 1250$

$V = 625\ ft^3$ to be removed

5. 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.)



$r = 2.5$ ft

$V = B \cdot H$

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

$V = \pi (2.5)^2 \times 13$

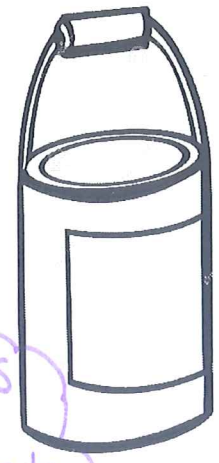
$V \approx 255.3 \text{ ft}^3$

To find Weight of H_2O

255.3×62

Approx = 15,828.6 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.)



$r = 13$ in $\quad h = 39$ in

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

$V = 20706.24$

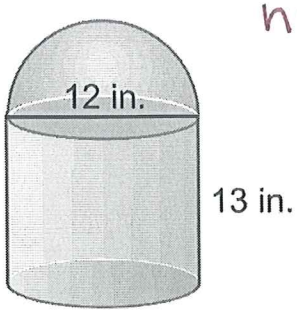
Weight:

20706.24×0.12

Weight: 2484.75 lbs

Yikes! A huge bucket of paint

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



$r = 6$ in

$h = 13$ in

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

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

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

$V \approx 1922.7 \text{ in}^3$

8. 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?

$V = B \cdot h$

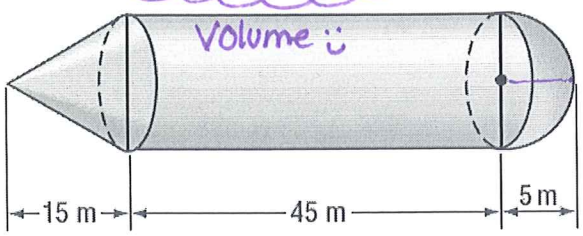
$60 = 4l \cdot 3$

$60 = 12l$

$l = 5$ in

You must be able to do the algebra questions + work backward.

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?



$r = 5m$
$h = 15m$
$H = 45m$

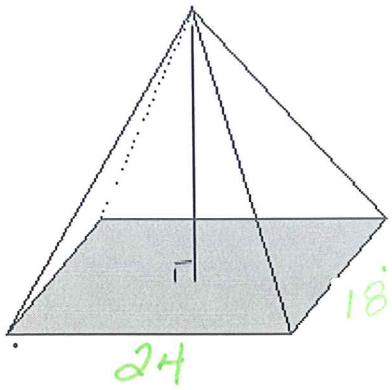
V = Cone + Cylinder + $\frac{1}{2}$ Sphere

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

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

$V \approx 4188.8\ m^3$

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



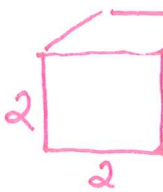
$V = \frac{1}{3} B \cdot h$

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

$1728 = 144h$

$h = 12$ 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?

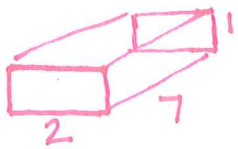


$V = (2 \cdot 2)2$

$V = 8\ in^3$

$\times 12$ cubes

$V = 96\ in^3$



$V = (7 \times 2) \times 1$

$V = 14\ in^3$

* Looking for a reason *

Yes, the volume of the water will overflow the pan because the volume is larger.

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.

$r = 8in$

$V_S = \frac{4}{3}\pi 8^3$

$V_S = 2144.7 in^3$

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

$V_C = 1340.4 in^3$

The volume of the sphere will exceed the volume of the cone by approx. $804.3 in^3$

13. If a right circular cylinder has a radius of 4 inches and a surface area of 112π square inches, what is the height of the cylinder in inches? $r = 4$

$SA = 2\pi r^2 + 2\pi rh$

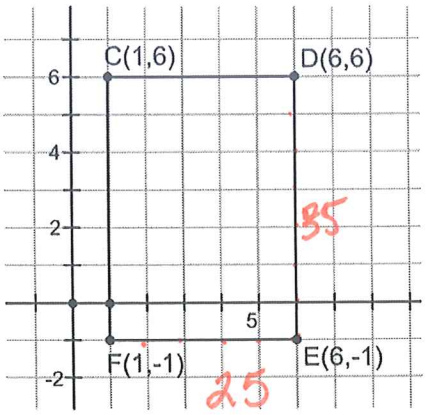
$112\pi = 2\pi 4^2 + 2\pi 4 \cdot h$

$112\pi = 32\pi + 8\pi h$

$\frac{80\pi}{8\pi} = \frac{8\pi h}{8\pi}$

$h = 10 in$

14. Find the area of the image, in square units, if the pre-image (given below) is dilated by a scale factor of 5.

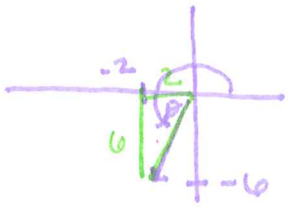


New $l = 25$ $w = 35$

$A = l \cdot w$

$A = 875 units^2$

15. Find the magnitude and direction for the vector < -2, -6>.

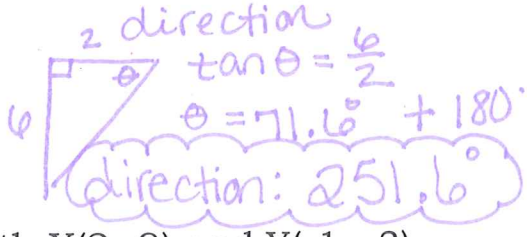


magnitude

$2^2 + 6^2 = m^2$

$\sqrt{40} = m$

$2\sqrt{10} = |\vec{m}|$



direction

$\tan\theta = \frac{6}{2}$

$\theta = 71.6° + 180°$

direction: 251.6°

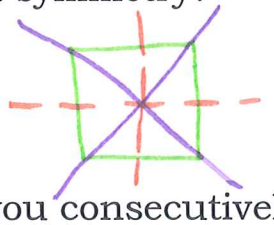
16. Write the component form of vector XY with X(2,-9) and Y(-1, -3).

$\langle -1-2, -3--9 \rangle$

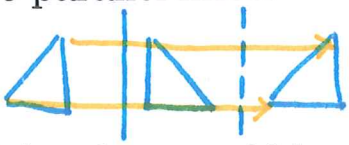
$\langle -3, 6 \rangle$

17. What figure(s) have four lines of symmetry?

Square

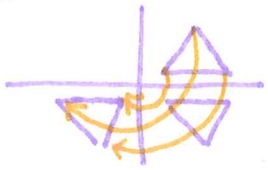


18. Explain what would happen if you consecutively reflected a pre-image over two parallel lines.



translation

19. Explain what would happen if you consecutively reflected a pre-image over two perpendicular lines.



rotation

20. Rotate X(-1,-9) 90 degrees counterclockwise about the origin.

$(x,y) \rightarrow (-y,x)$ $(9,-1)$

21. Rotate X(-1,-9) 90 degrees clockwise about the origin.

$(x,y) \rightarrow (y,-x)$ $(-9,1)$

22. Rotate X(-1,-9) 180 degrees about the origin.

$(x,y) \rightarrow (-x,-y)$ $(1,9)$

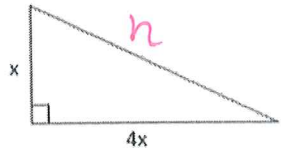
23. If the image of point X'(-1,-9) and the pre-image is X(6,-3) name the translation rule in point notation.

Started: $(6,-3)$ $(x,y) \rightarrow (x-6, y-7)$

Ended: $(-1,-9)$

down 7, left 6

24. Find the length of the hypotenuse of this right triangle.

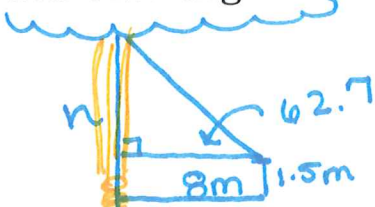


$x^2 + (4x)^2 = h^2$

$17x^2 = h^2$

$h = x\sqrt{17}$

25. The altitude of the base of a cloud formation is called the ceiling. To find the height of the ceiling one night, a meteorologist directed a spotlight vertically at the clouds. Using a theodolite placed 8 meters from the spotlight and 1.5 meters above the ground, he knew the angle of elevation was 62.7 degrees. How high is the ceiling?



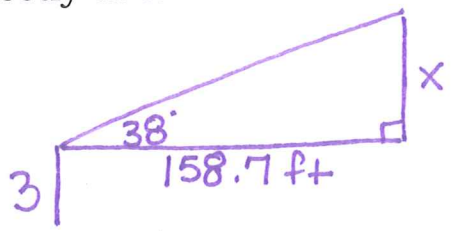
$\tan(62.7) = \frac{h}{8}$

$h = 15.5$

$+1.5$

altitude is 17m high

26. A digital camera with a panoramic lens is described as having a view with an angle of elevation of 38 degrees. If the camera is on a 3 foot tripod aimed directly at a monument 158.7 feet away, how tall is the monument?

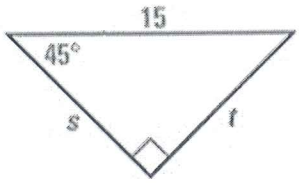


$\tan(38) = \frac{x}{158.7}$

$x = 124.0 + 3$

$h = 127 ft$

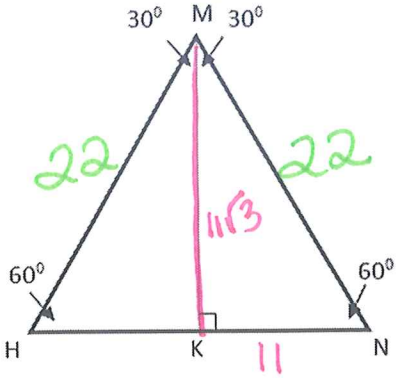
27. Find the variable.



$s = 7.5\sqrt{2}$

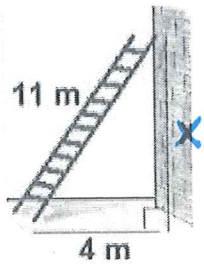
$t = 7.5\sqrt{2}$

28. If the sides of the equilateral triangle are 22 cm, find the height KM, of the triangle.



$KM = 11\sqrt{3}\ cm$

29. A. 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?

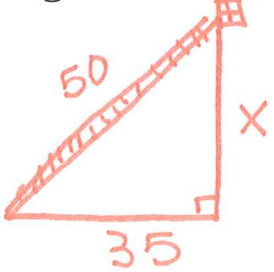


$4^2 + x^2 = 11^2$

$\sqrt{105} = x$

$x = \sqrt{105}\ m$

B. 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?



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

$x^2 = 1275$

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

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

a) 20, 48, 52 Yes!

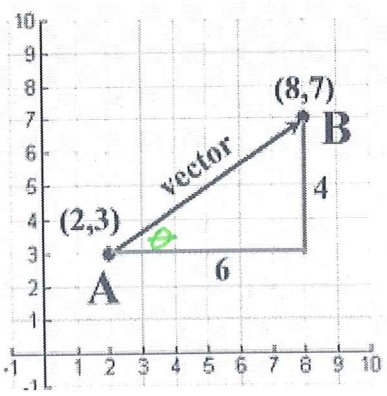
b) 9, 40, 41 Yes!

c) 21, 21, 31 X

d) 12, 34, 37 X

Check for the Pythagorean Theorem

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



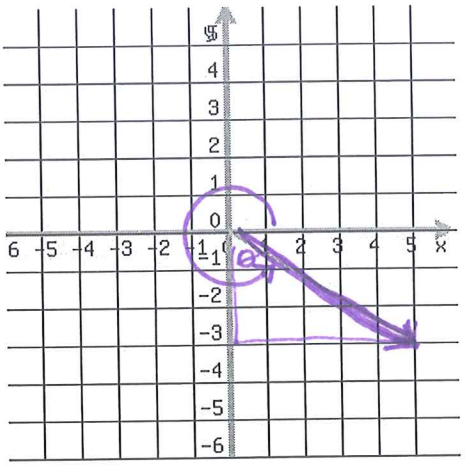
Component $\langle 6, 4 \rangle$

magnitude: $6^2 + 4^2 = 2\sqrt{13}$ ← $\sqrt{52}$

direction: $\theta = 33.7°$

$\tan\theta = \frac{4}{6}$

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



$\langle 5, -3 \rangle$ component

magnitude: $\sqrt{34}$

direction: $\theta + 270 = 329.0°$

$\tan\theta = \frac{5}{3}$

$\theta = 59.0$

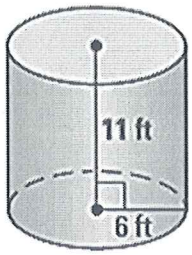
33. Find the component form of vector MN with M(1, 2) and N(4, 6).

$\langle 3, 4 \rangle$ component form

34. Find the surface area of the right cylinder. $SA = 2\pi r^2 + 2\pi rh$

Keep your answers in terms of pi.

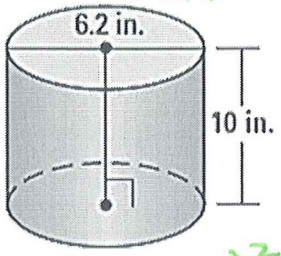
a)



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

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

b) $r = 3.1$

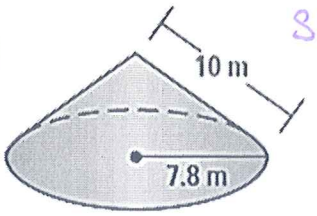


$SA = 2\pi(3.1)^2 + 2\pi(3.1)10$

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

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

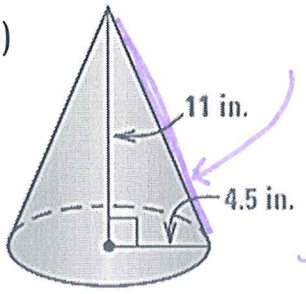
a) $SA = \pi r^2 + \pi r \ell$



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

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

b)



ℓ find slant height 1st

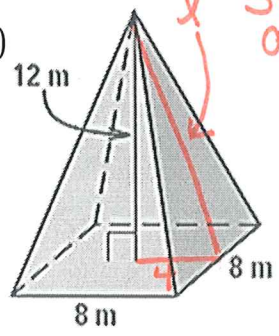
$\ell = 11.9$ by pyth. thm

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

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

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

a)



ℓ SA means add up all areas of the faces for a Pyramid.

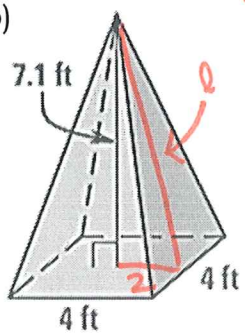
Find ℓ by pyth. thm

$\ell = \sqrt{160} \approx 12.6$

$SA = 8 \times 8 + 4(\frac{1}{2} 8 \times 12.6)$

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

b)



Find Slant height 1st by pyth. thm

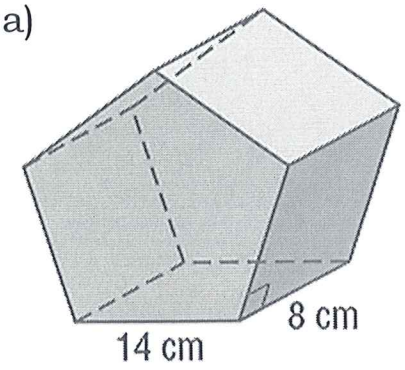
$\ell = 7.4 \text{ ft}$

$SA = 4 \times 4 + 4(\frac{1}{2} 4 \times 7.4)$

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

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

a)



Area of the base

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

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

$r = 11.9\text{cm}$

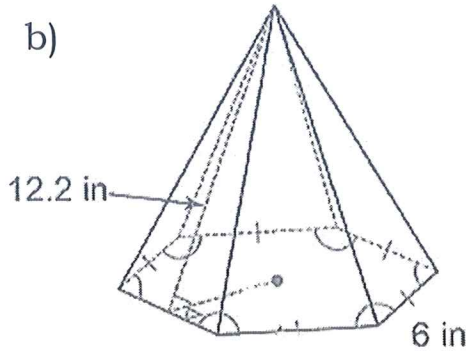
$B = 5\frac{1}{2}(11.9)^2\sin(72)$

$SA = 2\left(5\frac{1}{2}(11.9)^2\sin(72)\right)$ ← 2 pentagons

$5(8 \times 14)$ ← 5 rectangles

$SA \approx 1233.4\text{cm}^2$

b)



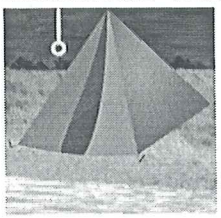
Area of the base

$B = 6\frac{1}{2}6^2\sin(60)$

$SA = 6\frac{1}{2}6^2\sin(60) + 6\left(\frac{1}{2}6 \times 12.2\right)$

$SA \approx 313.1\text{in}^2$

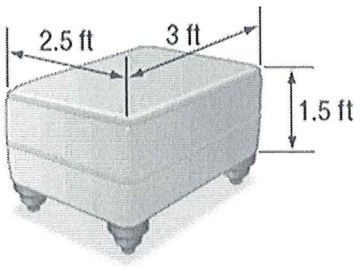
38. A camping tent made of nylon is seen below in the shape of a square pyramid. If the triangular panels are 10 feet wide and 7 feet tall, how much material will it take to make the tent, including the base?



$4\left(\frac{1}{2}10 \times 7\right) + 10 \times 10$

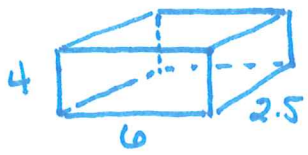
240 ft^2 of material is needed to make the tent

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



SA: 2.5×3
$2(1.5 \times 3)$
$2(1.5 \times 2.5)$
$24 ft^2$ to be reupholstered

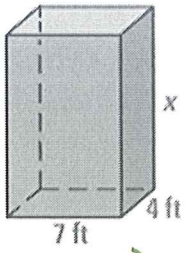
40. A library has an aquarium in the shape of a rectangular prism. The base is 6 feet by 2.5 feet, and the height is 4 feet. How many square feet of glass was used to build the aquarium? → in order to put fish in it glass cannot cover the top.



$2(4 \times 6)$
$2(4 \times 2.5)$
6×2.5
$= 83 ft^3$ of glass to make aquarium

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

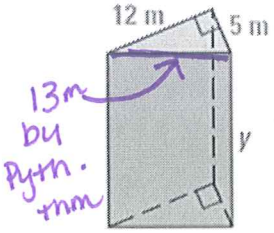
a) $S = 298 \text{ ft}^2$



$22x + 56 = 298$
$22x = 242$
$x = 11 ft$

$+2(7 \cdot x) = 14x$
$2(4 \cdot x) = 8x$
$+2(7 \times 4) = 56$
$298 ft^2$

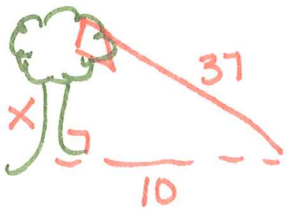
b) $S = 870 \text{ m}^2$



$2(\frac{1}{2} 12 \times 5)$
$+ 13y$
$+ 5y$
$+ 12y$
$870 m^2$

$30y + 60 = 870$
$30y = 810$
$y = 27m$

42. 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?



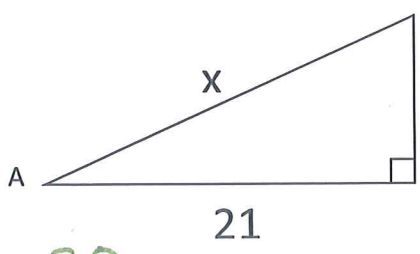
$x^2 + 10^2 = 37^2$
$x^2 = 1269$
$x = 3\sqrt{141} ft$

43. 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 because

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

44. 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.



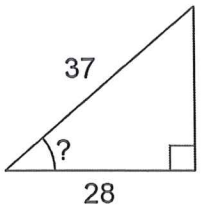
Soh cah toa

X= 29 pyth. thm

sin ∠ A = $\frac{o}{h} = \frac{20}{29}$ cos ∠ A = $\frac{a}{h} = \frac{21}{29}$ tan ∠ A = $\frac{o}{a} = \frac{20}{21}$

csc ∠ B = $\frac{h}{o} = \frac{29}{21}$ sec ∠ B = $\frac{h}{a} = \frac{29}{20}$ cot ∠ B = $\frac{a}{o} = \frac{20}{21}$

45. Find the measure of the missing angle.

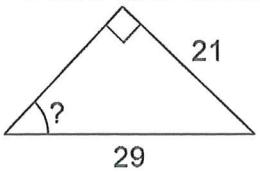


$\cos\theta = \frac{28}{37}$

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

$\theta \approx 40.8°$

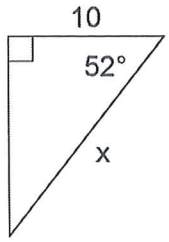
46. Find the measure of the missing angle.



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

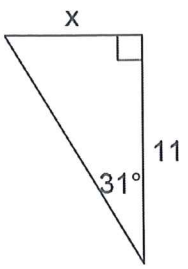
$\theta \approx 46.4°$

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

a. 

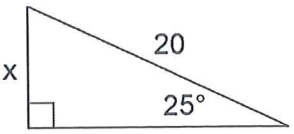
$\cos(52) = \frac{10}{x}$

$x \approx 16.2$

b. 

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

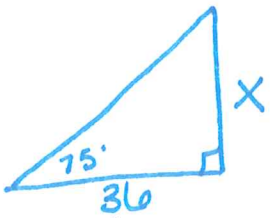
$x \approx 6.6$

c. 

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

$x \approx 8.5$

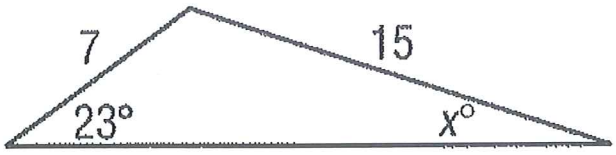
48. Hannah is looking up at the top of a building at a 75° with the ground. She is standing 36 feet from the building. How tall is the building? Round answer to the nearest tenth.



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

$x = 134.4$ ft tall

49. Find x to the nearest degree.

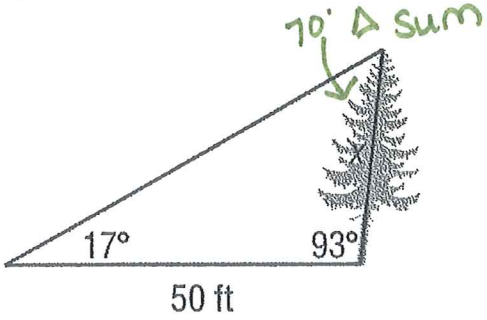


$\frac{\sin A}{a} = \frac{\sin B}{b}$ $\sin x = \frac{7\sin(23)}{15}$

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

$x \approx 10.5°$

50. 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.

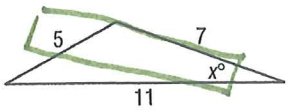


$\frac{\sin(17)}{x} = \frac{\sin(70)}{50}$

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

$x = 15.6$ ft

51. Find x to the nearest degree.



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

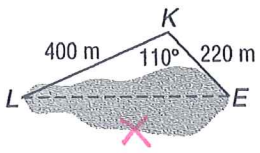
$25 = 170 - 154 \cos x$ ← NOT like terms!

$-145 = -154 \cos x$

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

$x \approx 19.7 \rightarrow \boxed{x \approx 20°}$

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



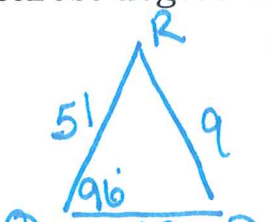
$x^2 = 400^2 + 220^2 - 2 \cdot 220 \cdot 400 \cos(110°)$

$x = \sqrt{\text{all of the above}}$

$x \approx 518.3\text{m}$

Find all things missing!

53. 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.



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

$\boxed{q \approx 57.6}$

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

$\angle P = 55.8°$

$\boxed{\angle P \approx 56°}$

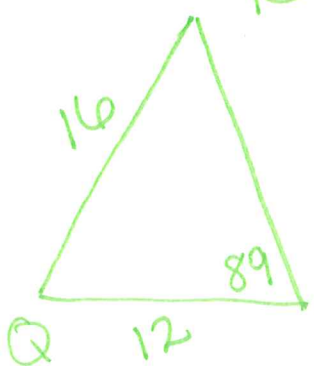
$\therefore$ by Δ sum

$\boxed{\angle R \approx 28°}$

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

R

Find $\angle R$ 1st!



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

$\boxed{\angle R \approx 49°}$

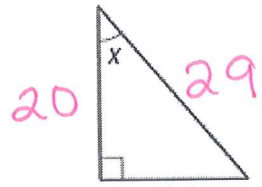
$\therefore$ by Δ sum

$\boxed{\angle Q \approx 42°}$

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

$\boxed{q \approx 10.7}$

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



a
h
$\sin x = \frac{21}{29}$
$\tan x = \frac{21}{20}$
Find by pyth thm!

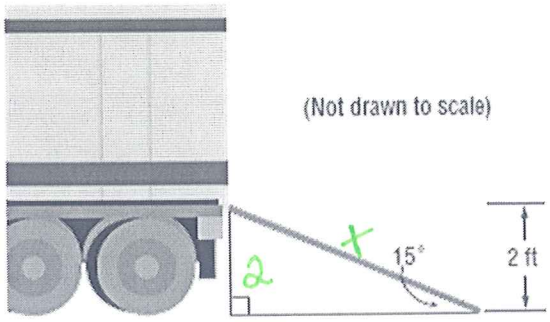
A $\sin x = \frac{29}{21}$ and $\tan x = \frac{29}{21}$

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 $\tan x = \frac{21}{20}$

56. **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.

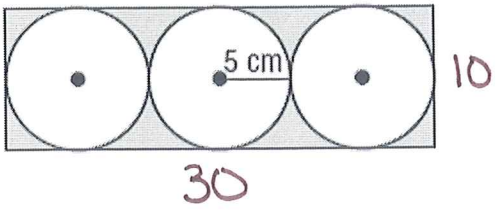


Kelly and Jackie are debating the correct length of the ramp that the movers need in order to move their stuff to their new place. Who is reasoning correctly? Explain who is showing the correct work in complete sentences, support your answer with mathematical vocabulary.

Jackie's Work	Kelly's Work
$\sin 15° = \frac{2}{x}$ $x \sin 15° = 2$ $x = \frac{2}{\sin 15°}$ $x = 7.2\ ft$	$\tan 15° = \frac{2}{x}$ $x \tan 15° = 2$ $x = \frac{2}{\tan 15°}$ $x = 7.5\ ft$

Jackie is correct the height is 2 as the op side + x is the hypot.

57. 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.

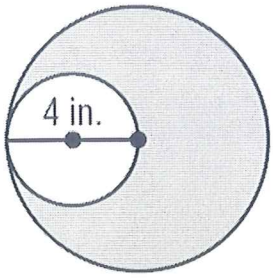


$A_S = 30 \times 10 - 3\pi 5^2$

$A_S = 300 - 75\pi$

$A_S \approx 64.4 cm^2$

58. 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?



$A_S = \text{Big} - \text{little}$ ($\pi 4^2$, $\pi 2^2$)

$A_S = 16\pi - 4\pi$

$A_S = 12\pi \text{ in}^2$

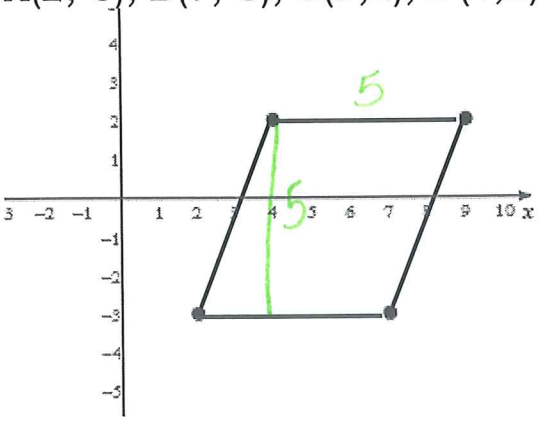
$A_T = 16\pi \text{ in}^2$

The percent shaded is found by:

$\frac{12\pi}{16\pi} = 75\%$

59. 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)

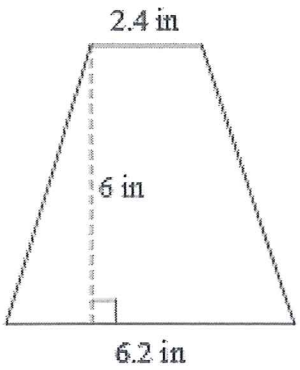


$A = b \cdot h$

$A = 5 \cdot 5$

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

60. Find the area of the trapezoid.

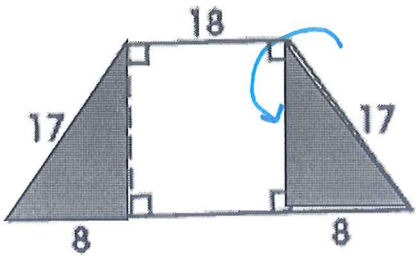


$A = \frac{1}{2}(b_1 + b_2)h$

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

$A = 25.8 in^2$

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



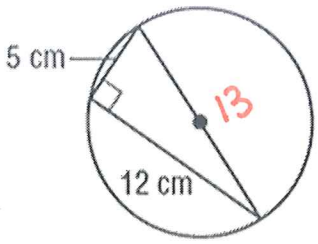
$8^2 + h^2 = 17^2$

$h = 15$

$A_s = 2\,\frac{1}{2}\,15 \times 8$

$A_s = 120 in^2$

62. What is the area of the circle?



$r = 6.5 cm$

$A = \pi 6.5^2$

$A = 42.25\pi\ cm^2$

$A = 132.7 cm^2$

63. Find the area of a circle is the circumference is 20π.

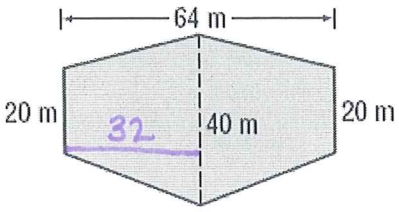
$C = 20\pi$

$20\pi = 2\pi r$

$10 = r$

$A = 100\pi\ units^2$

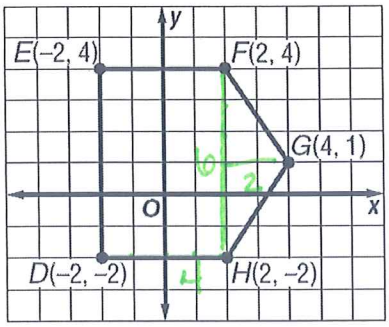
64. Roy is fencing his tomato garden to protect it from rabbits and deer. If the diagram provided below is his tomato garden, what is the area of the garden to be fenced, in square meters?



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

$A = 1920 m^2$

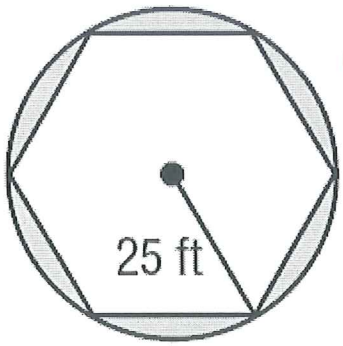
65. Find the area of the following figure.



$4 \times 6 + \frac{1}{2} 6 \times 2$

$A = 30 units^2$

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



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

$A_S = 339.7$

$A_T = \pi 25^2$

$A_T = 625\pi \, ft^2$

area of the circle: $339.7 \, ft^2$

Flip Answers

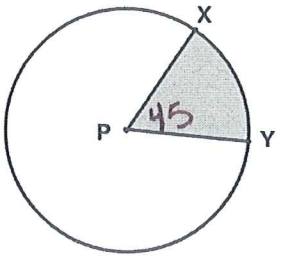
area of the shaded region: $1963.5 ft^2$

67. 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 3π meters. Find the radius, the central angle, and the area of the shaded sector. Round to the nearest tenth.

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

$3\pi = \frac{1}{8} d\pi$

$d = 24m$



Radius = 12m

$\frac{1}{8}360$ Central Angle = 45°

$A_s = \frac{45}{360}\pi 12^2$

$A_s = 18\pi m^2$

Sector Area = $18\pi m^2$

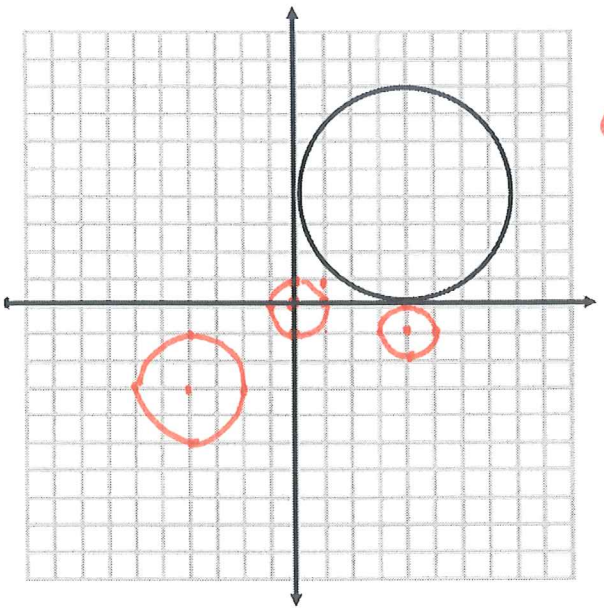
$A_s = 56.5m^2$

68. The circle below is graphed from the equation

$(x-4)^2 + (y-4)^2 = 16.$ (4,4) $r=4$

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.



So Many options!

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.

69. Radius = 13 mi and the central angle is 45^0

Recall arc length

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

$\ell = \frac{45}{360} 26\pi$

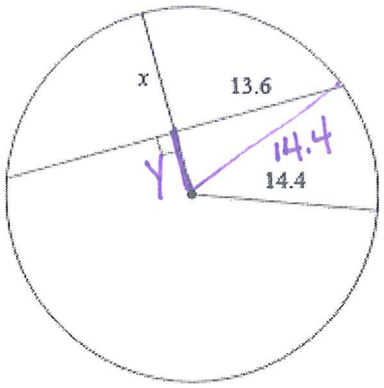
$\ell = 3.25\pi$ mi

$\ell = 10.2$ mi

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

4:7

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



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

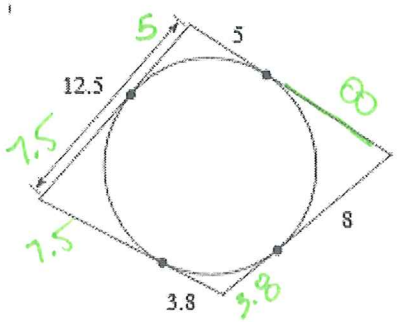
$y^2 = 22.4$

$y = 4.7$

$x = 14.4 - 4.7$

$x = 9.7$

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

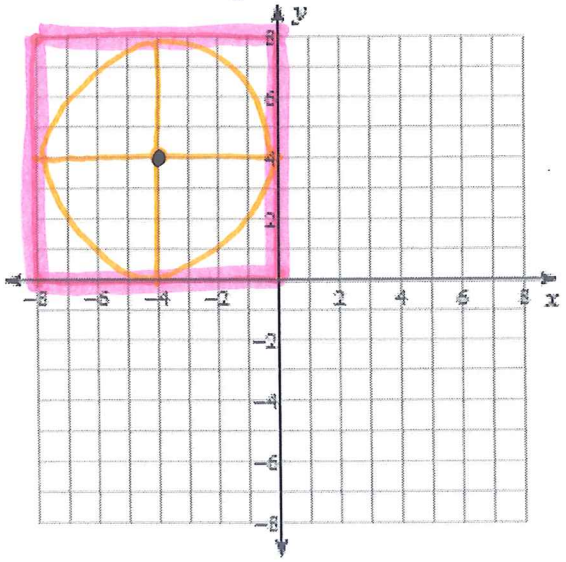


$P = 48.6$

73. 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)

$r = 4$

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

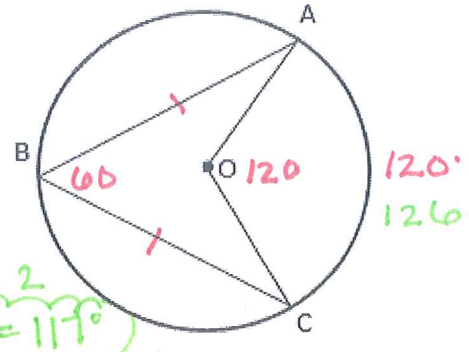
74. If AB = BC, and <ABC = 60°:

a. What is the measure of <AOC? 120°

b. If arc $\overset{\frown}{AC}$ = 126°, what is the measure of $\overset{\frown}{AB}$?

360 − 126 = 234° cut into 2 ≅ parts

$m\overset{\frown}{AB} = 117°$



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

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

c. <BGC = 72° → $m\angle BGC = 36°$

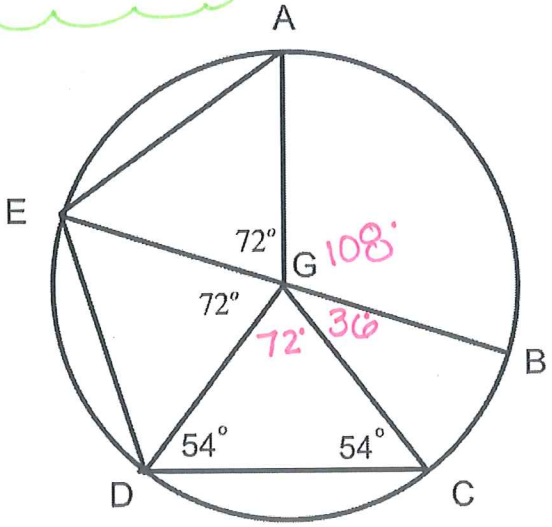
d. AE // CD → $\overline{AE} \cong \overline{CD}$

e. <GED = < GDC True!

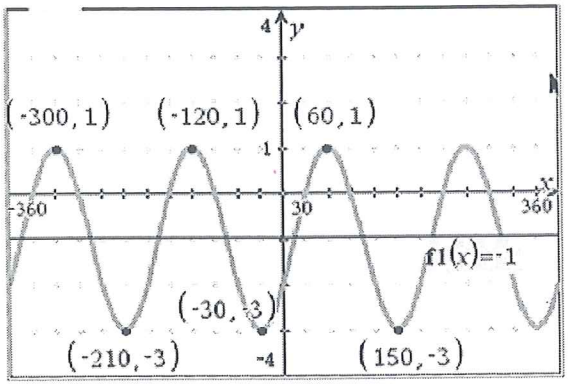
f. <DGC = 54° → $m\angle DGC = 72°$

g. $\overline{ED} \cong \overline{AG}$ → $\overline{EB} \cong \overline{AG}$

h. $\overline{AE} \cong \overline{CD}$ True!



76. Which function does ***not*** represent this graph?



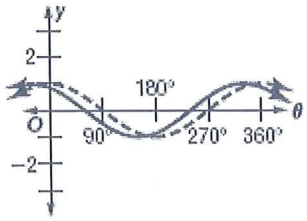
a. $y = 2\cos 2(\theta + 120) - 1$

b. $y = 2\cos 2(\theta - 60) - 1$

c. $y = -2\cos 2(\theta + 30) - 1$

d. $y = -2\cos 2(\theta - 210) - 1$

77. Which equation is graphed?



left 30°

a. $y = \sin(\theta + 30°)$

b. $y = \sin(\theta - 30°)$

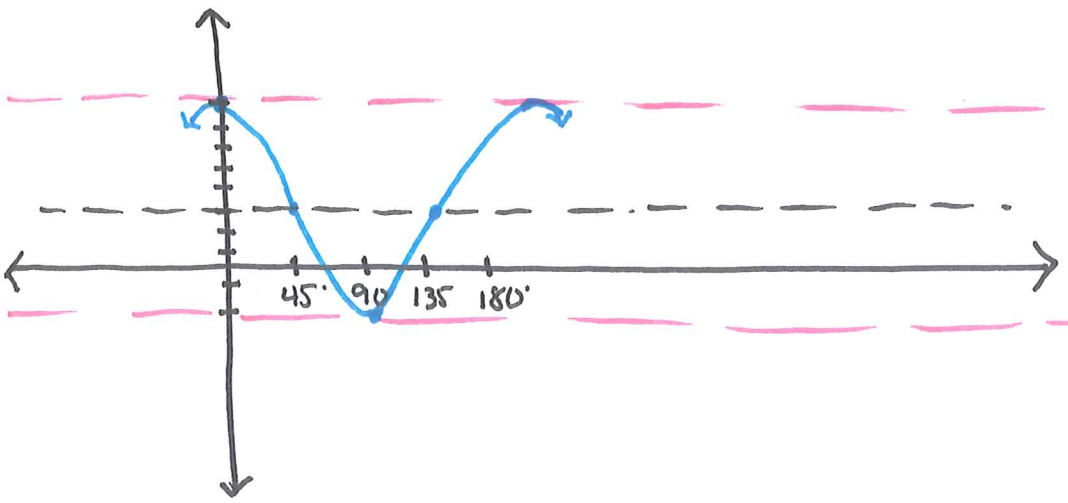
c. $y = \cos(\theta + 30°)$

d. $y = \cos(\theta - 30°)$

78. Graph the function $y = 5\cos 2\theta + 3$.

360 ÷ 2

Amp: 5 Period: 180 VS: up 3 PS: None

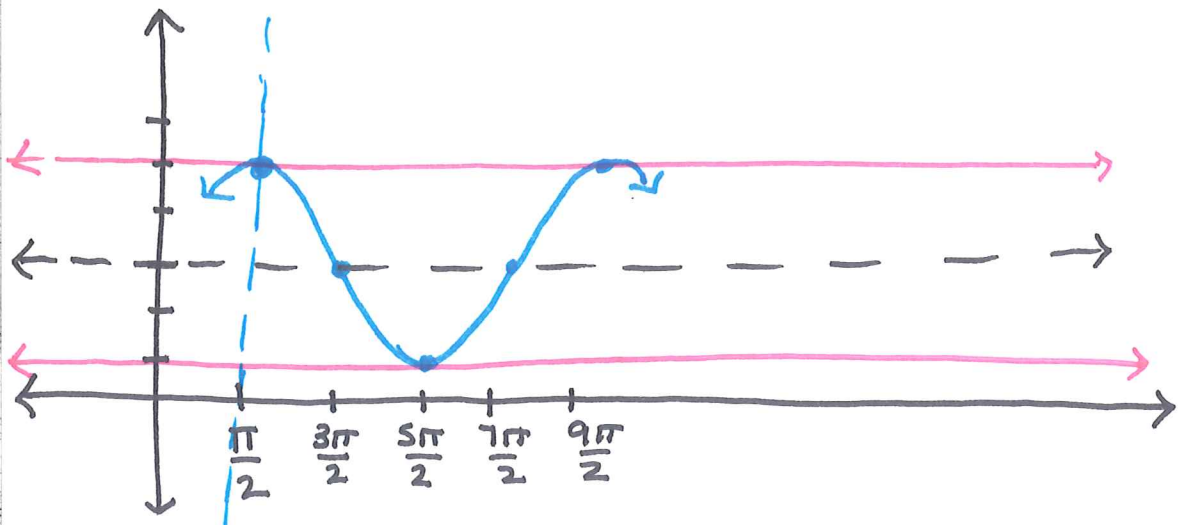


0 90 180 270 360

0 45 90 135 180

79. Graph the function $y = 2\cos\frac{1}{2}(\theta - \frac{\pi}{2}) + 3$

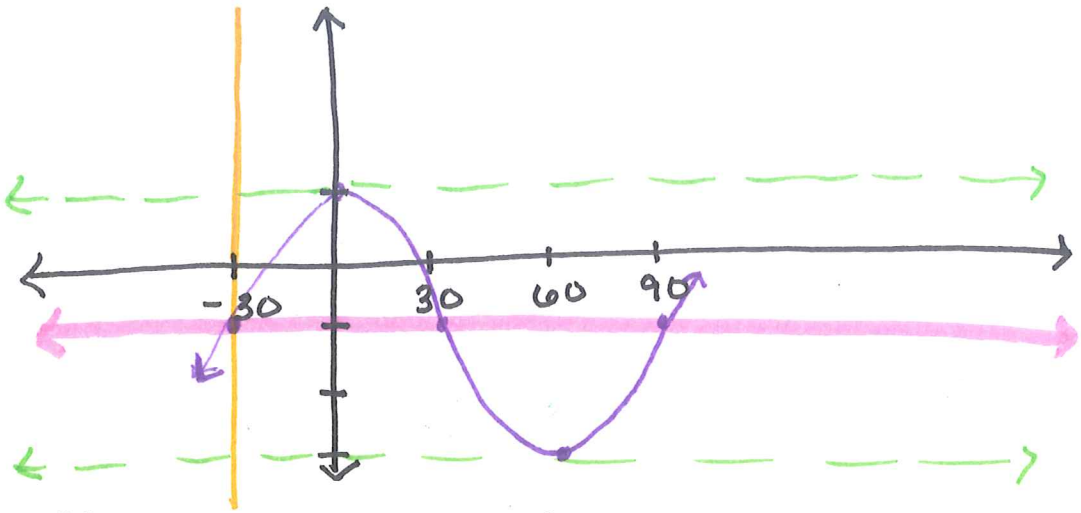
Amp: 2 Period: 4π VS: up 3 PS: Right $\frac{\pi}{2}$



0	π	2π	3π	4π
$\frac{\pi}{2}$	$\frac{3\pi}{2}$	$\frac{5\pi}{2}$	$\frac{7\pi}{2}$	$\frac{9\pi}{2}$

80. Graph the function $y = 2\sin 3(\theta + 30°) - 1$

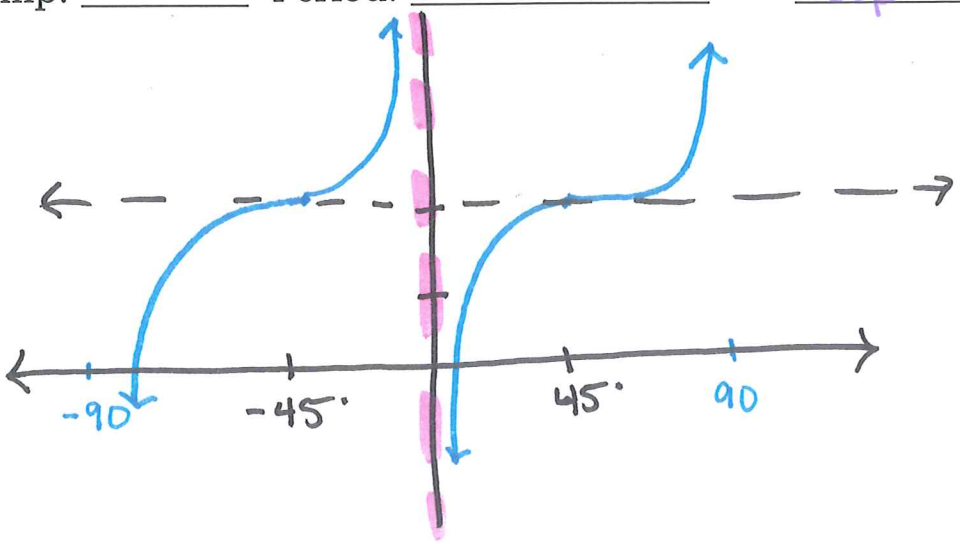
Amp: 2 Period: 120° VS: down 1 PS: left 30



0	90	180	270	360
0	30	60	90	120
-30	0	30	60	90

81. Graph the function $y = \tan 2(\theta + 45°) + 2$

Amp: _____ Period: 90° VS: up 2 PS: left 45



0	90	180
-45	45	90
-45	0	45

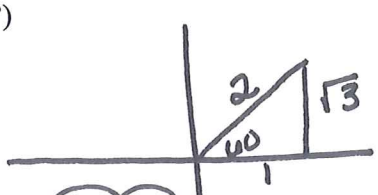
82. **Convert each degree measure in radians and each radian measure in degrees. Show work!**

a. $\frac{2\pi}{9}$ $\frac{2\pi}{9} \cdot \frac{180}{\pi}$ $40°$ **b.** 315° $\frac{315}{1} \cdot \frac{\pi}{180}$ $\frac{7\pi}{4}$

83. **For questions a and b, find the exact value of each trigonometric function without using the unit circle.**

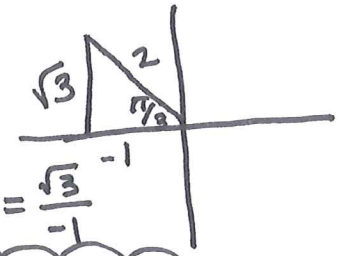
A.) Sketch the triangle
B.) Show the reference angle
C.) Right angle
D.) Side lengths

a.) cos (–300°)



$\cos(-300) = \frac{1}{2}$

b.) $\tan \frac{2\pi}{3}$



$\tan \frac{2\pi}{3} = \frac{\sqrt{3}}{-1}$

$\tan \frac{2\pi}{3} = -\sqrt{3}$

For #92-98 Show your work or explain how you arrived at your answer by use of the Unit Circle.

84. $\cos(810°)$ Answer: 0

85. $\csc(120°)$ Answer: $\frac{2\sqrt{3}}{3}$

86. $\tan(-90°)$ Answer: undefined

87. $\cos\left(-\frac{3\pi}{4}\right)$. Answer: $\frac{-\sqrt{2}}{2}$

88. $\sin\left(-\frac{\pi}{6}\right)$. Answer: $\frac{-1}{2}$

89. $\sin \frac{19\pi}{6}$ Answer: $\frac{-1}{2}$

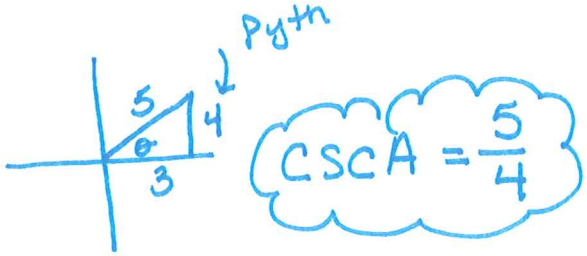
90. $\sin(-225°)$ Answer: $\frac{\sqrt{2}}{2}$

91. $3(\sin 120°)(\cos 120°)$

$3\left(\frac{\sqrt{3}}{2} \cdot \frac{-1}{2}\right) = \frac{-3\sqrt{3}}{4}$

Answer: $\frac{-3\sqrt{3}}{4}$

92. If $\cos A = \frac{3}{5}$, in quadrant I, find $\csc A$ $= \frac{h}{o}$



93. Complete the unit circle.