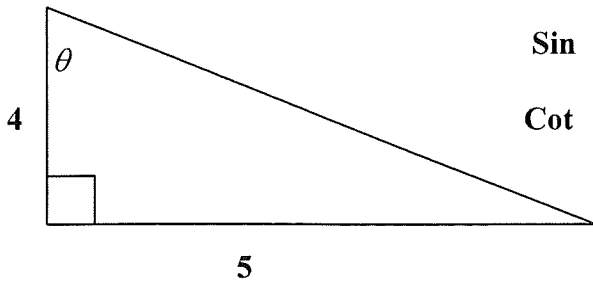


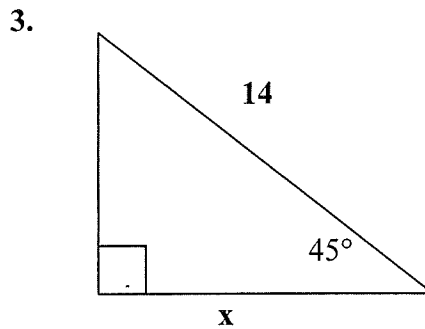
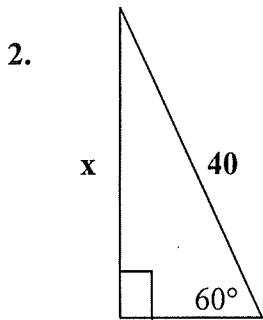
1. Find the six trigonometric ratios for  $\theta$ . Rationalize and simplify your ratios!!



$\sin \theta = \underline{\hspace{2cm}}$   $\cos \theta = \underline{\hspace{2cm}}$   $\tan \theta = \underline{\hspace{2cm}}$

$\cot \theta = \underline{\hspace{2cm}}$   $\csc \theta = \underline{\hspace{2cm}}$   $\sec \theta = \underline{\hspace{2cm}}$

In exercises 2-3, find the exact value of  $x$ . Rationalize and simplify.



2. \_\_\_\_\_

3. \_\_\_\_\_

In exercises 4-5, use the exact values of the trigonometric ratios for the special angles to find an acute angle,  $\theta$  in degrees, that is a solution of the given equation. Hint...draw a triangle.

4.  $\sin \theta = \frac{\sqrt{3}}{2}$

5.  $\cos \theta = \frac{1}{2}$

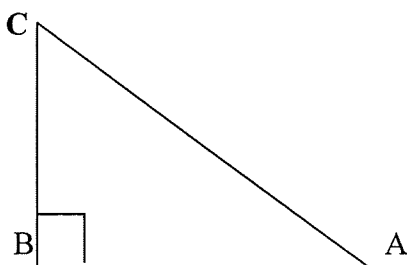
6.  $\cot \theta = \sqrt{3}$

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. Find side  $b$  in the figure below if  $\sin A = \frac{4}{9}$  and  $a = 8$ . (Hint: Draw another triangle)



7. \_\_\_\_\_

Find the exact values:

8.  $\sin \frac{3\pi}{4}$

8. \_\_\_\_\_

9.  $\cos \frac{\pi}{2}$

9. \_\_\_\_\_

10.  $\tan 5\pi$

10. \_\_\_\_\_

11.  $\cos \frac{17\pi}{6}$

11. \_\_\_\_\_

12. Find the sine, cosine, and tangent of  $\theta$  if (2, -9) is a point on the terminal side of  $\theta$ .

12.  $\sin \theta =$  \_\_\_\_\_

$\cos \theta =$  \_\_\_\_\_

$\tan \theta =$  \_\_\_\_\_

PreCalculus  
Test Chapter 6  
Calculator Portion

Name \_\_\_\_\_

Round all answers to the nearest thousandth. (3 places) Hint: Watch your calculator settings!!!!

1. Find the following:

a.  $\sin \frac{2\pi}{7}$

b.  $\tan 32$

c.  $\cos -20^\circ$

d.  $\csc 47^\circ$

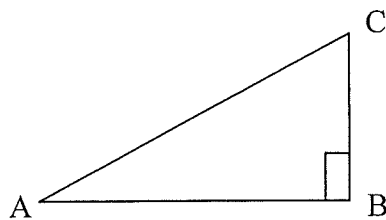
a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

d. \_\_\_\_\_

2. Use the figure to solve the triangle



given  $b=18$  and  $c=12$

$a=$  \_\_\_\_\_  $A=$  \_\_\_\_\_  $C=$  \_\_\_\_\_

3. What is  $\frac{7}{8}$  of a circle in a) degrees and b) radian measure. Simplify your answer.

3a. \_\_\_\_\_  
Degrees

b. \_\_\_\_\_  
Radians

4. What angle is not co-terminal with  $-543^\circ$ ?

a.  $-183^\circ$

b.  $177^\circ$

c.  $-903^\circ$

d.  $-723^\circ$

5. Find an angle in a) degrees and b) radians that is coterminal to  $-345^\circ$  between  $[0, 2\pi)$

a. \_\_\_\_\_  
Degrees

b. \_\_\_\_\_  
Radians

6. A 20 ft ladder leans against a building forming a  $58^\circ$  with the ground. The ladder begins to slide down the building, forming a  $48^\circ$  with the ground. Calculate how far the ladder slid down the building and how far was the ladder originally set from the building.

Draw a picture:

Show your work:

Answers:

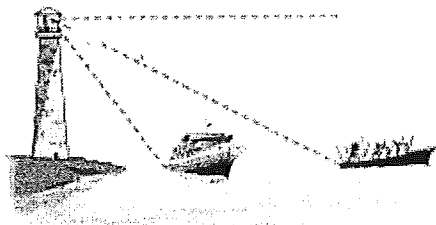
7. A tower is located 42 m. from a tall tree. From the top of the tower, the angle of elevation to the top of the tree is  $26^\circ$  and the angle of depression to the base of the tree is  $35^\circ$ . How tall to the nearest tenth of a meter is the tree?

Draw a picture:

Show your work:

Answers:

8. Two boats are observed from a lighthouse 55 m above the surface of a lake. The angle of depression to the boat closet the lighthouse is  $63^\circ$ , and the angle of depression to the second boat is  $35^\circ$ . How far apart (to the nearest tenth of a meter) are the boats?



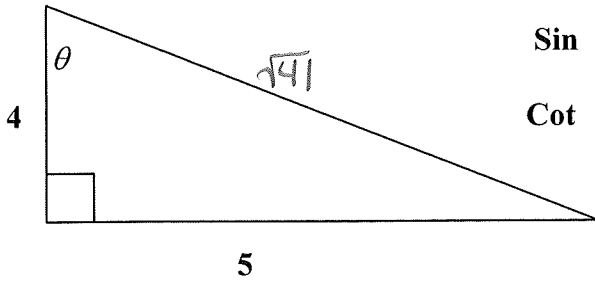
Show your work:

Answers:

9. The earth spins on its axis and makes one revolution every 24 hours. What is the speed in kilometers per hour of a point on the equator? Use 6400 kilometers for the earth's radius.

60

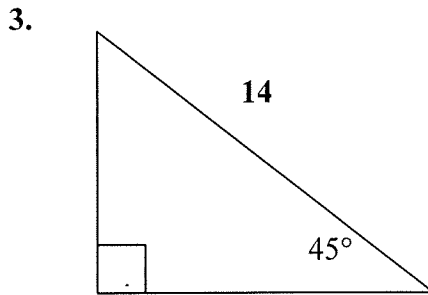
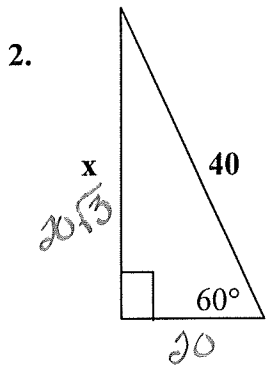
1. Find the six trigonometric ratios for  $\theta$ . Rationalize and simplify your ratios!!



$\sin \theta = \frac{5}{\sqrt{41}} = \frac{5\sqrt{41}}{41}$    
  $\cos \theta = \frac{4}{\sqrt{41}} = \frac{4\sqrt{41}}{41}$    
  $\tan \theta = \frac{5}{4}$    
  $\cot \theta = \frac{4}{5}$    
  $\csc \theta = \frac{\sqrt{41}}{5}$    
  $\sec \theta = \frac{\sqrt{41}}{4}$

$4^2 + 5^2 = c^2$   
 $16 + 25 = c^2$   
 $41 = c^2$      $c = \sqrt{41}$

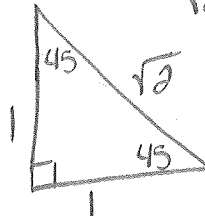
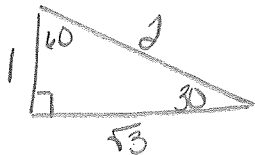
In exercises 2-3, find the exact value of x. Rationalize and simplify.



2.  $20\sqrt{3}$  +2

3.  $7\sqrt{2}$  +2

$x \frac{14}{\sqrt{2}} = \frac{14\sqrt{2}}{2} = 7\sqrt{2}$



In exercises 4-5, use the exact values of the trigonometric ratios for the special angles to find an acute angle,  $\theta$  in degrees, that is a solution of the given equation. Hint...draw a triangle.

4.  $\sin \theta = \frac{\sqrt{3}}{2}$

5.  $\cos \theta = \frac{1}{2}$

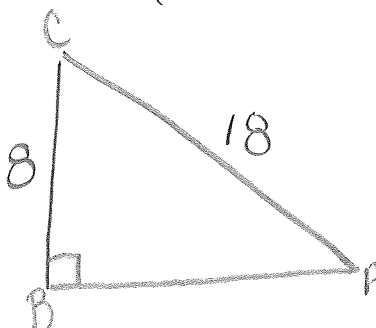
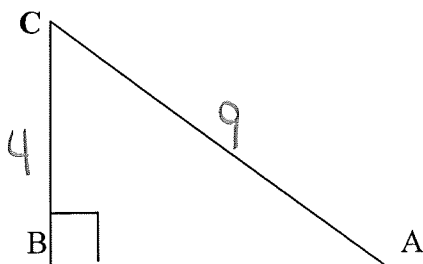
6.  $\cot \theta = \sqrt{3}$

4.  $60^\circ$  +1

5.  $60^\circ$  +1

6.  $30^\circ$  +1

7. Find side b in the figure below if  $\sin A = \frac{4}{9}$  and  $a = 8$ . (Hint: Draw another triangle)

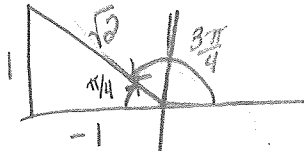


7.  $b = 18$  +2



Find the exact values:

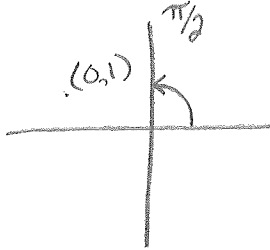
8.  $\sin \frac{3\pi}{4}$



$$\frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

8.  $\frac{\sqrt{2}}{2}$  +2

9.  $\cos \frac{\pi}{2}$

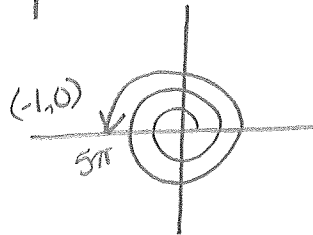


$$\cos = \frac{x}{r}$$

9. 0 +2

10.  $\tan 5\pi$

$$\begin{aligned} &5\pi \\ &-\frac{2\pi}{\pi} \\ &\frac{3\pi}{\pi} \\ &-\frac{2\pi}{\pi} \end{aligned}$$

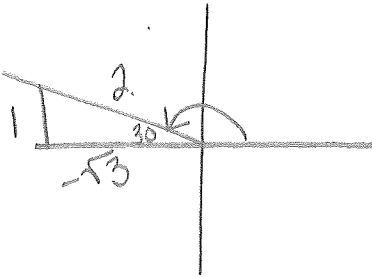


$$\tan = \frac{y}{x} = \frac{0}{-1}$$

10. 0 +2

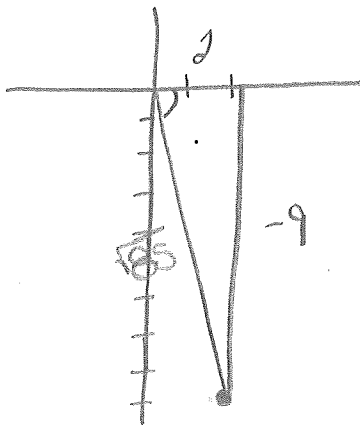
11.  $\cos \frac{17\pi}{6}$

$$2\frac{5}{6}\pi - 2\pi = \frac{5\pi}{6}$$



11.  $\frac{-\sqrt{3}}{2}$  +2

12. Find the sine, cosine, and tangent of  $\theta$  if  $(2, -9)$  is a point on the terminal side of  $\theta$ .



$$(2)^2 + (-9)^2 = c^2$$

$$4 + 81 = c^2$$

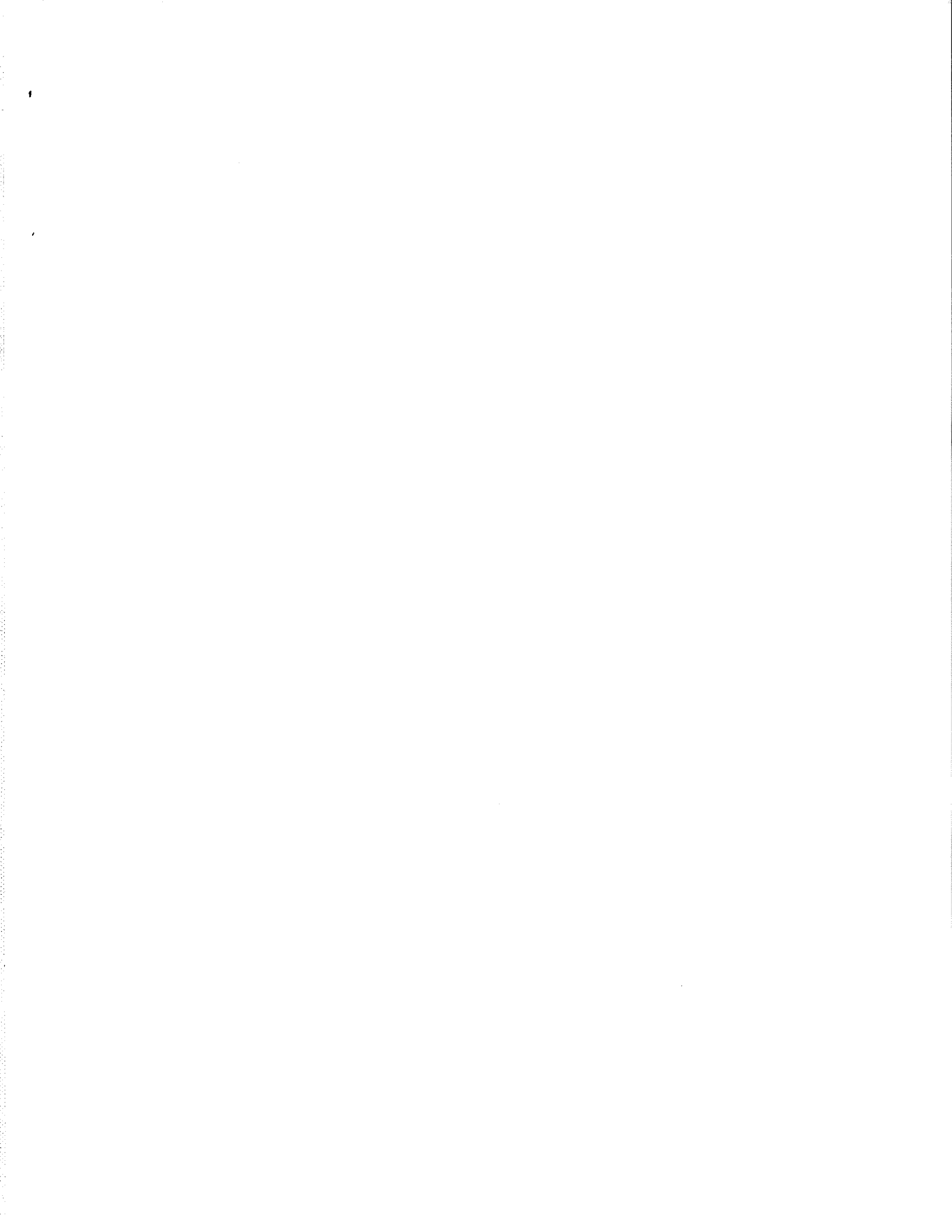
$$85 = c^2$$

$$\sqrt{85} = c$$

12.  $\sin \theta = \frac{-9}{\sqrt{85}} = \frac{-9\sqrt{85}}{85}$  +2

$\cos \theta = \frac{2}{\sqrt{85}} = \frac{2\sqrt{85}}{85}$  +2

$\tan \theta = \frac{-9}{2}$  +2





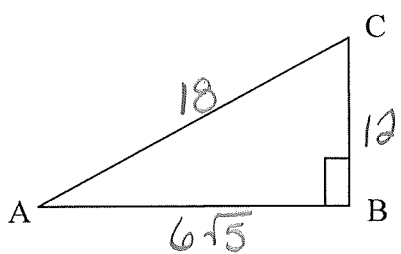
PreCalculus  
 Test Chapter 6  
 Calculator Portion

Name \_\_\_\_\_

Round all answers to the nearest thousandth. (3 places) Hint: Watch your calculator settings!!!!

1. Find the following: *a + b are radians c + d are degrees*
- a.  $\sin \frac{2\pi}{7}$       b.  $\tan 32$       c.  $\cos -20^\circ$       d.  $\csc 47^\circ$
- a. .782      b. .661      c. .940      d. 1.367 +4

2. Use the figure to solve the triangle



given  $b=18$  and  $c=12$

$\sin A = \frac{12}{18}$   
 $A = 41.8$

$a^2 + 12^2 = 18^2$   
 $a^2 + 144 = 324$   
 $a^2 = 180$   
 $a = \sqrt{180}$   
 $= 6\sqrt{5}$  +5

$90 - 41.8 = 48.2^\circ$

$a = \underline{6\sqrt{5}}$      $A = \underline{41.8^\circ}$      $C = \underline{48.2^\circ}$

3. What is  $\frac{7}{8}$  of a circle in a) degrees and b) radian measure. Simplify your answer.

$\frac{7}{8} \cdot 360 = 315^\circ$        $\frac{7}{8} \cdot 2\pi = \frac{7\pi}{4}$

a.  $315^\circ$  +1  
 Degrees

b.  $\frac{7\pi}{4}$  +1  
 Radians

4. What angle is not co-terminal with  $-543^\circ$ ?

a.  $-183^\circ$       b.  $177^\circ$       c.  $-903^\circ$       d.  $-723^\circ$

$$\begin{array}{r} -543 \\ +360 \\ \hline -183 \end{array}$$
      
$$\begin{array}{r} -543 \\ -360 \\ \hline -903 \end{array}$$

$$\begin{array}{r} +360 \\ \hline 177 \end{array}$$

5. Find an angle in a) degrees and b) radians that is coterminal to  $-345^\circ$  between  $[0, 2\pi)$

$$\begin{array}{r} -345 \\ +360 \\ \hline 15^\circ \end{array}$$
       $15 \cdot \frac{\pi}{180} = \frac{\pi}{12}$

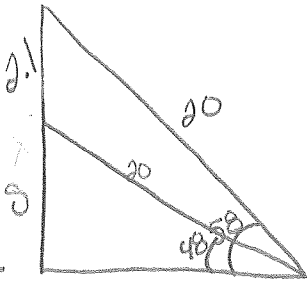
a.  $15^\circ$  +1  
 Degrees

b.  $\frac{\pi}{12}$  +1  
 Radians



6. A 20 ft ladder leans against a building forming a  $58^\circ$  with the ground. The ladder begins to slide down the building, forming a  $48^\circ$  with the ground. Calculate how far the ladder slid down the building and how far was the ladder originally set from the building.

Draw a picture:



Show your work:

$$\sin 58 = \frac{x}{20} \quad \sin 48 = \frac{s}{20}$$

$$x = 16.96 \quad s = 14.86$$

$$16.96 - 14.86 = 2.1 \text{ ft}$$

$$\cos 58 = \frac{y}{20}$$

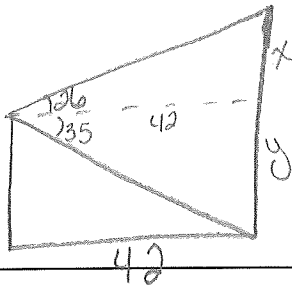
$$y = 10.6$$

Answers:

slid  $\rightarrow$  2.1 ft.  
set 10.6 ft  
from wall

7. A tower is located 42 m. from a tall tree. From the top of the tower, the angle of elevation to the top of the tree is  $26^\circ$  and the angle of depression to the base of the tree is  $35^\circ$ . How tall to the nearest tenth of a meter is the tree?

Draw a picture:



Show your work:

$$\tan 26 = \frac{x}{42} \quad \tan 35 = \frac{y}{42}$$

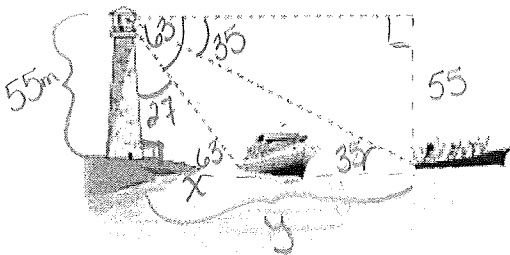
$$x = 20.5 \quad y = 29.4$$

$$20.5 + 29.4 = 49.9$$

Answers:

49.9 m

8. Two boats are observed from a lighthouse 55 m above the surface of a lake. The angle of depression to the boat closest the lighthouse is  $63^\circ$ , and the angle of depression to the second boat is  $35^\circ$ . How far apart (to the nearest tenth of a meter) are the boats?



Show your work:

$$\tan 63 = \frac{55}{x} \quad \tan 35 = \frac{55}{y}$$

$$x = 28.02 \quad y = 78.55$$

$$78.55 - 28.02 = 50.53$$

Answers:

50.5 m

9. The earth spins on its axis and makes one revolution every 24 hours. What is the speed in kilometers per hour of a point on the equator? Use 6400 kilometers for the earth's radius.

$$1 \text{ rev} = 2\pi r$$

$$\frac{1 \text{ rev}}{24 \text{ hr}} \rightarrow \theta$$

$$l = r\theta$$

$$= 6400 \cdot 2\pi$$

$$= 12800\pi \text{ km}$$

$$\frac{12800\pi \text{ km}}{24 \text{ hr}} = 1675.5 \frac{\text{km}}{\text{hr}}$$

