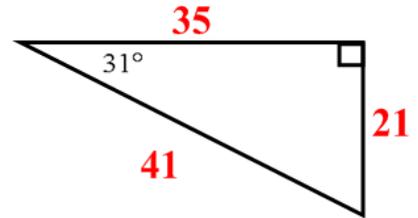
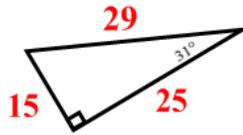
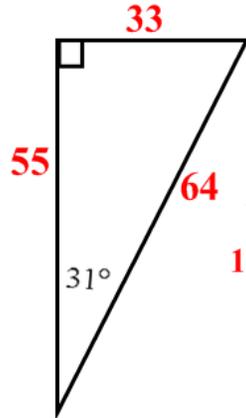
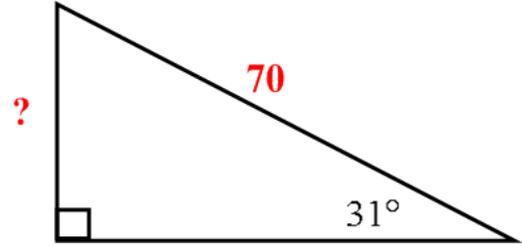
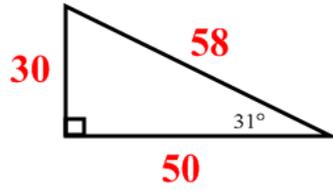


# 8.4 Basic Trigonometric Functions

Write your questions here!

## Trigonometric Ratios!

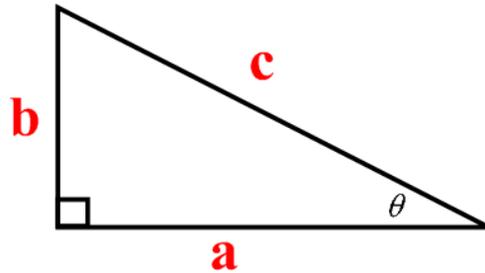


## Basic Trigonometric Functions

$\sin \theta =$

$\cos \theta =$

$\tan \theta =$



$\sin =$

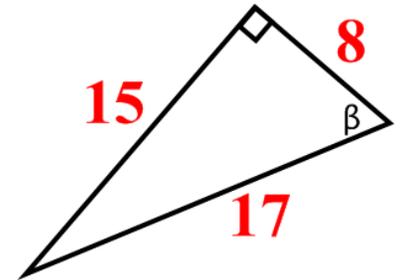
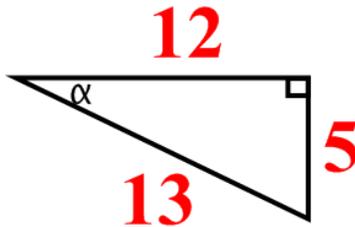
$\cos =$

$\tan =$

$\sin \alpha =$

$\cos \alpha =$

$\tan \alpha =$

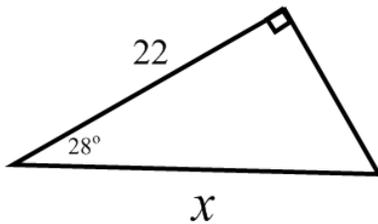


$\sin \beta =$

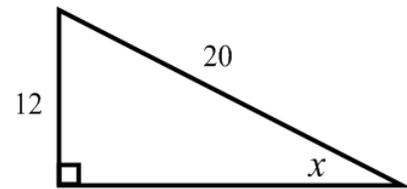
$\cos \beta =$

$\tan \beta =$

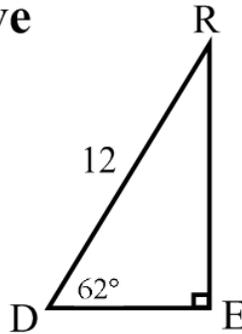
**Find missing side.**



**Find missing angle.**



**Solve**



## Angle of Elevation

Airplane takes off with an angle of elevation of  $62^\circ$  and raises to an altitude of 1500 ft.

How far is the plane from the airport via ground distance?

## Angle of Depression

Line of Sight

Mr. Brust looks out his window with an angle of depression of  $32^\circ$  to and sees two kids fighting.

He decides to break up the fight if it is less than 50 meters away.

If his window is 28 meters from the ground, will he break up the fight?

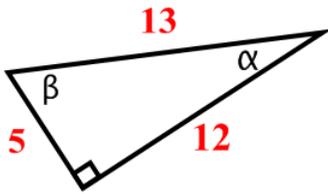
## SUMMARY:

Now,  
summarize  
your notes  
here!



Find the value of the trig functions indicated.

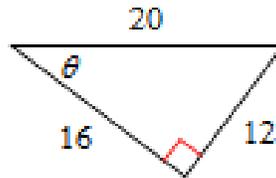
1.



$$\sin \alpha =$$

$$\tan \beta =$$

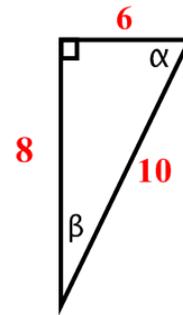
2.



$$\cos \theta =$$

$$\tan \theta =$$

3.



$$\sin \alpha =$$

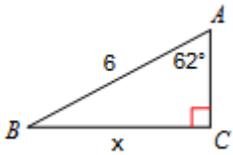
$$\sin \beta =$$

$$\tan \alpha =$$

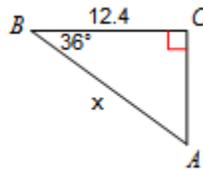
$$\cos \beta =$$

Find the measure of the indicated side. Round to the nearest hundredth.

4.



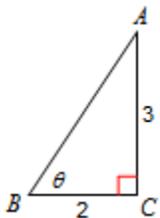
5.



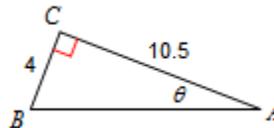
6. Given  $\triangle DEF$  where  $\angle D$  is a right angle. Find  $f$  if  $m\angle E = 16^\circ$  and  $e = 4$ . (Draw a picture!)

Find the measure of the indicated angle. Round to the nearest hundredth.

7.



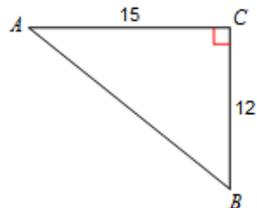
8.



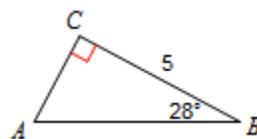
9. Given  $\triangle DEF$  where  $\angle D$  is a right angle. Find  $m\angle E$  if  $e = 11.7$  and  $f = 8$ . (Draw a picture!)

Solve each triangle. Round to the nearest hundredth.

10.



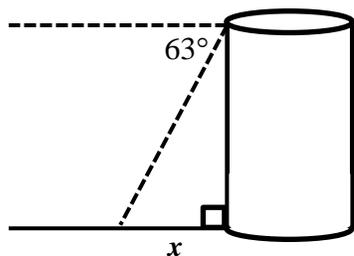
11.



12. Given  $\triangle DEF$  where  $\angle D$  is a right angle and  $m\angle F = 35^\circ$  and  $d = 16$ . (Draw a picture!)

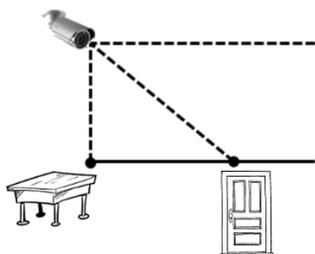
**Label the picture given and then solve it. If no picture is given, draw your own and solve!**

13. The angle of depression is measured from the top of a 43 ft tower to a reference point on the ground. Its value is found to be  $63^\circ$ . How far is the base of the tower from the point on the ground?



14. The entrance of the old town library is 2.3 ft above ground level. A ramp from the ground level to the library entrance is scheduled to be built. The angle of elevation from the base of the ramp to its top is to be  $15^\circ$ . Find the length of the ramp

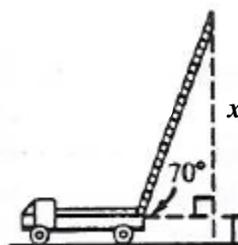
15. A closed circuit TV camera is mounted on a wall 7.4 ft above a security desk in an office building. It is used to view an entrance door 9.3 ft from the desk. Find the angle of depression from the camera lens to the entrance door.



16. A jet took off at a rate of 260 ft/s and climbed in a straight path for 3.2 min. What was the angle of elevation of its path if its final altitude was 12,000 ft?

17. The angle of elevation from the bottom of the world's largest slide located in Peru, Vermont, is approximately  $10.3^\circ$ . The slide has a vertical drop of 821 ft. Find the length of the slide.

18. The extension ladder on top of a 6 ft high hook and ladder truck is 150 ft long. If the angle of elevation of the ladder is  $70^\circ$ , to what height on a building will the ladder reach?



19. A rectangle is 14 cm wide and 48 cm long. Find the measure of the angles on either side of the diagonals.

20. The Statue of Liberty stands on a 150 ft pedestal. From a point 280 ft from the base of the pedestal, the angle of elevation to the top of Liberty's torch is  $47^\circ$ . Find the height of the statue.

## Skillz Review Simplify the following.

1.  $\frac{\frac{2}{5}}{\frac{3}{4}}$

2.  $\frac{\frac{5}{8}}{\frac{\sqrt{3}}{8}}$

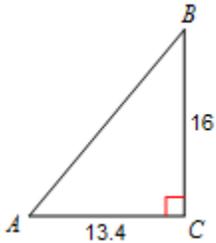
3.  $\frac{1}{\left(\frac{\sqrt{3}}{2}\right)}$

4.  $\frac{\left(\frac{\sqrt{3}}{4}\right)}{2\sqrt{2}}$

## 8.4 Basic Trigonometric Functions

## APPLICATION

1. Solve the triangle. Round to the nearest hundredth.

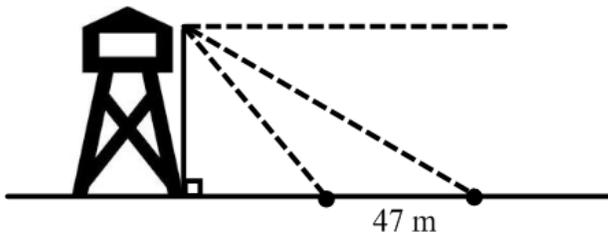


2. An isosceles trapezoid has sides whose lengths are 5, 5, 8, and 14. Find all four angles of the trapezoid.



3. The Hersch Building and the County Hospital are 38 meters apart. From a window in the Hersch Building, the angle of elevation of the top of the hospital is  $72.7^\circ$ . From the same window the angle of depression to the ground at the base of the hospital is  $63.21^\circ$ . Find the height of the hospital.

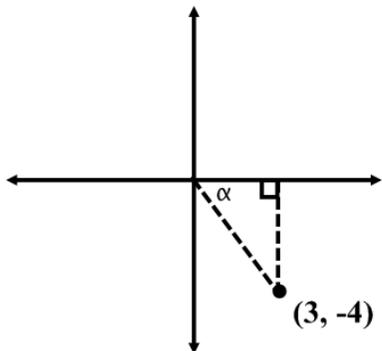
4. An engineer determines that the angle of elevation from her position to the top of a tower is  $52^\circ$ . She measures the angle of elevation again from a point 47 m farther from the tower and finds it to be  $31^\circ$ . Both positions are due east of the tower. Find the height of the tower.



5. Given the trig ratio, draw a right triangle, label all sides, find the other 2 trig ratios. DO NOT FIND  $\theta$ !

$$\sin \theta = \frac{9}{11}$$

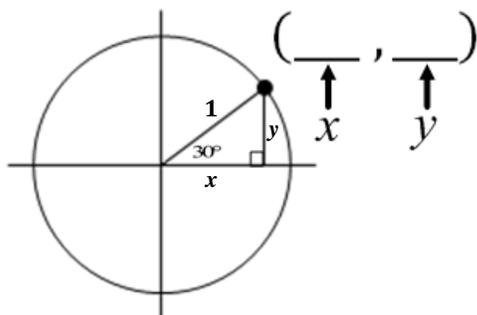
6. Given the right triangle that connects the origin and the coordinate point (3, -4) shown below, find  $\sin \alpha$ .



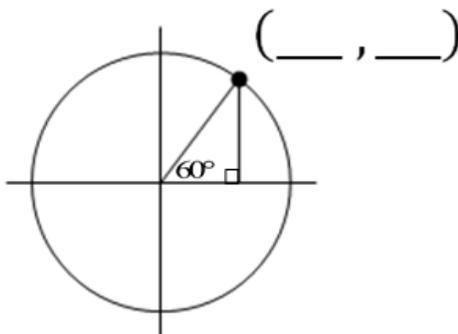
7. Use a combination of trig and Pythagorean Theorem to find the exact value of the  $x$  and  $y$  coordinate for the circles below whose centers are the origin of the coordinate plane and radii are equal to one.

**(Answers must be expressed as exact value fractions, do not give approximate decimal values!)**

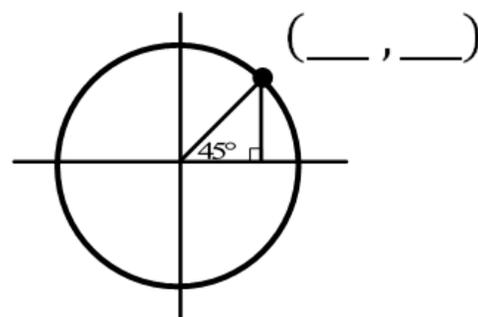
a.



b.



c.



8. The population of grasshoppers after  $t$  weeks where  $0 \leq t \leq 12$  is estimated by  $P(t) = 7500 + 3000 \sin(90t)$ .

a. Find  $P(5)$ . What does it mean in this situation?

b. What is the initial estimate?