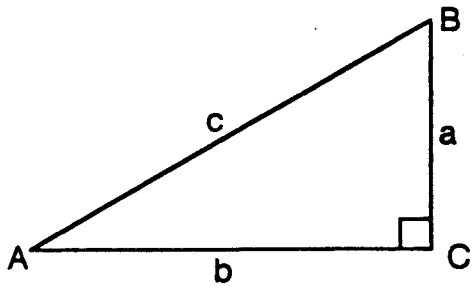


# Sine, Cosine and Tangent

Given  $\triangle ABC$



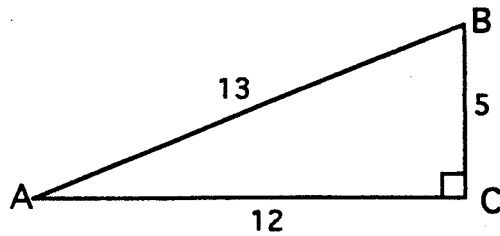
$$\sin A = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{a}{c}$$

$$\cos A = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{b}{c}$$

$$\tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{a}{b}$$

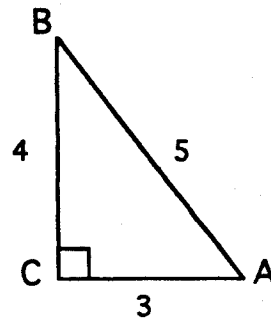
Use definitions to find the following trigonometric ratios.

1.



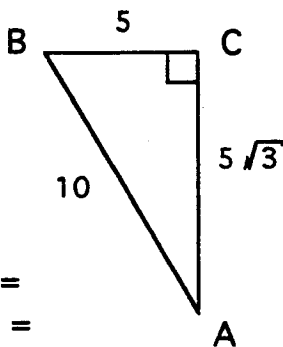
$$\begin{aligned} \sin A &= \\ \cos A &= \\ \tan A &= \end{aligned}$$

2.



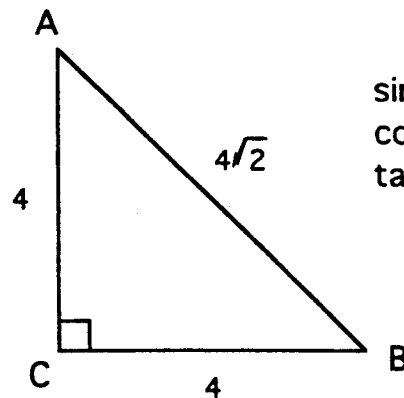
$$\begin{aligned} \sin B &= \\ \cos B &= \\ \tan B &= \end{aligned}$$

3.



$$\begin{aligned} \sin B &= \\ \cos B &= \\ \tan B &= \end{aligned}$$

4.



$$\begin{aligned} \sin A &= \\ \cos A &= \\ \tan A &= \end{aligned}$$

Find ratios (4 decimal places) and angles (nearest degree) using table or calculator.

5. a)  $\sin 34^\circ =$   
b)  $\cos 56^\circ =$

6. a)  $\cos 61^\circ =$   
b)  $\sin 29^\circ =$

7. a)  $\tan 78^\circ =$   
b)  $\tan 12^\circ =$

8. a)  $\sin x = 0.9063$   
 $x =$   
b)  $\cos x = 0.5000$   
 $x =$

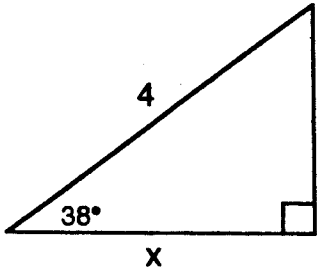
9. a)  $\cos x = 0.1219$   
 $x =$   
b)  $\sin x = 0.3420$   
 $x =$

10. a)  $\tan x = 0.5774$   
 $x =$   
b)  $\tan x = 11.4301$   
 $x =$



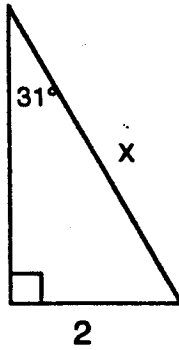
Use trigonometric ratios to solve for  $x$  in each triangle (nearest tenth).

1.



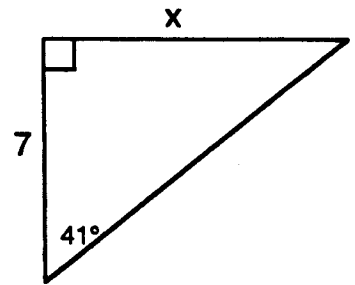
$x =$

2.



$x =$

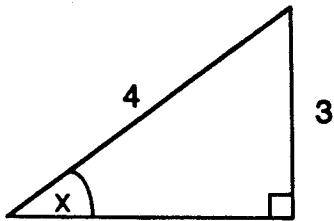
3.



$x =$

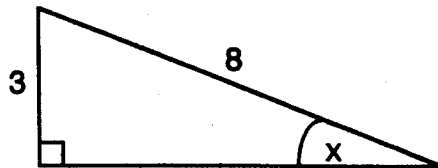
Use trigonometric ratios to solve for the missing angle (nearest degree).

4.



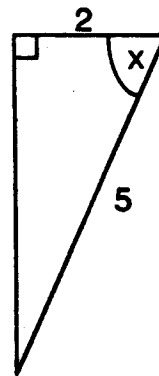
$\angle x =$

5.



$\angle x =$

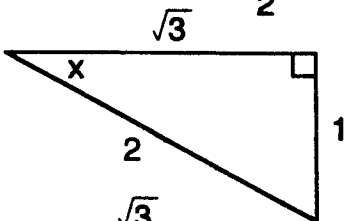
6.



$\angle x =$

For each triangle: label the given sides (use trig ratio), find the third side using Pythagorean Theorem, and write the other two trig ratios for the given angle.

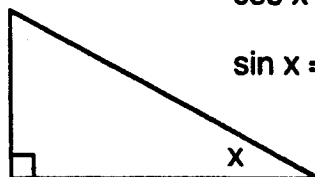
7. Example:  $\sin x = \frac{1}{2}$



$\cos x = \frac{\sqrt{3}}{2}$

$\tan x = ?$

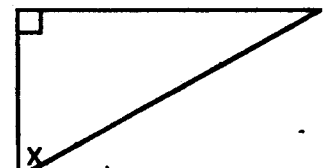
8.  $\tan x = \frac{3}{4}$



$\cos x =$

$\sin x =$

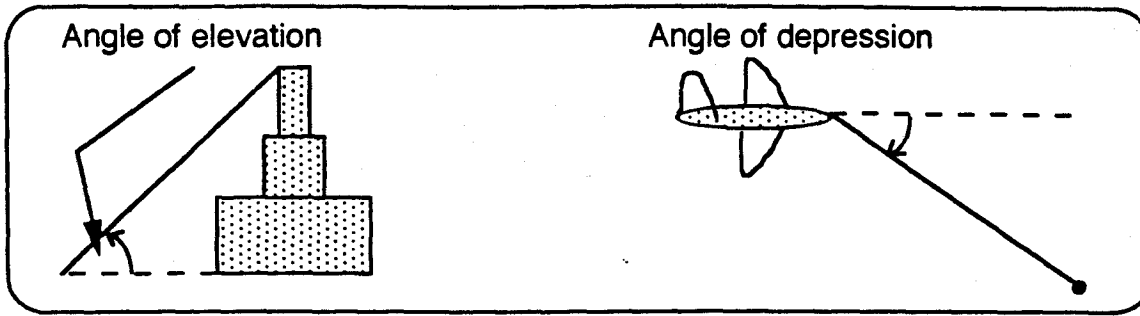
9.  $\cos x = \frac{2}{5}$



$\sin x =$

$\tan x =$

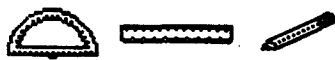
# Trig Word Problems



Make a sketch and solve each.

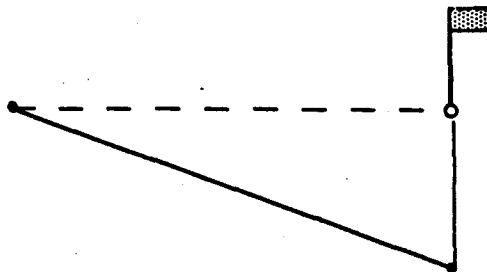
1. At a distance of 130 feet from the base of a building, the angle of elevation to the top is  $68^\circ$ . Find the height of the building.
2. What is the angle of elevation to the top of the 555 foot high Washington Monument if it is viewed from 375 feet?
3. At an altitude of 1050 feet above the ground, a glider pilot sights the landing area. What should the glide angle (angle of depression) be if the landing area is 6000 feet away?
4. The tow line of a parasailor makes an angle of  $62^\circ$  with the level of its tow boat. How many feet of line will keep the parasailor 850 feet above the boat?

## Trig Word Problems



Make a sketch and solve each.

5. Slammin' Sammy slices his drive on the 180 yard, 6th hole,  $16^\circ$  off the line to the hole. (A slice is to the right.) How far from the hole is the ball?  
How far did the ball travel?



6. What is the angle of elevation to the sun if 7'2" Shaq casts a shadow of 36 feet?

7. A 28 foot rescue ladder reaches Binky, who is 21 feet up a tree. What angle does the ladder make with the ground?

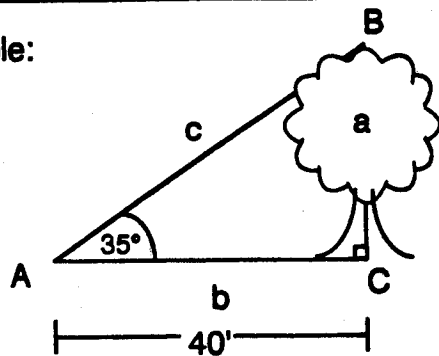
8. From a fire watch tower, the ranger sights a fire at an angle of depression of  $6^\circ$ . The ranger is 830 meters above the level of the fire. How far away is the fire?

9. From a point 110 feet in front of the courthouse, the angle of elevation to the top of the courthouse is  $32^\circ$  and the angle of elevation to the top of the flagpole on top of the courthouse is  $47^\circ$ . How tall is the flag pole?

# Clinometer Activities

Use your clinometer to determine the height of the listed items.

Example:



$$\tan A = \frac{a}{b}$$

$$\tan 35^\circ = \frac{a}{40}$$

$$40 \cdot \tan 35^\circ = a$$

$$40 \cdot 0.7002 = a$$

$$28.008 = a$$

$$a \approx 28 \text{ feet}$$

Use clinometer to measure  $\angle A$ .  
Measure distance b.

Show your measurements and work.

1. flag pole

2. football scoreboard

3. tree

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