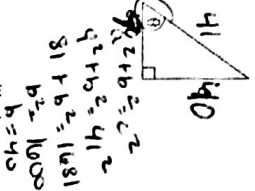


Use the definitions of the trigonometric functions to label the correct sides of the triangle. Then find the length of the third side and the values of the other five trigonometric functions.

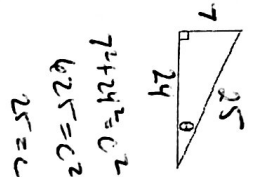
1) If  $\cos \theta = \frac{9}{11}$ , find the following:

$$\begin{aligned} \sin \theta &= \frac{40}{41} \\ \tan \theta &= \frac{40}{9} \\ \cot \theta &= \frac{9}{40} \\ \sec \theta &= \frac{41}{9} \\ \csc \theta &= \frac{41}{40} \end{aligned}$$



2) If  $\tan \theta = \frac{7}{24}$ , find the following:

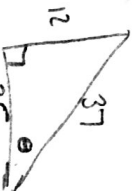
$$\begin{aligned} \sin \theta &= \frac{7}{25} \\ \cos \theta &= \frac{24}{25} \\ \cot \theta &= \frac{24}{7} \\ \sec \theta &= \frac{25}{7} \\ \csc \theta &= \frac{25}{7} \end{aligned}$$



In the problems below, you will also need to draw your triangle for reference.

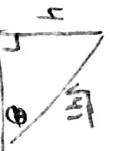
3) If  $\csc \theta = \frac{37}{12}$ , find the following:

$$\begin{aligned} \sin \theta &= \frac{12}{37} \\ \cos \theta &= \frac{35}{37} \\ \tan \theta &= \frac{12}{35} \\ \cot \theta &= \frac{35}{12} \\ \sec \theta &= \frac{37}{12} \end{aligned}$$

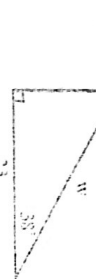
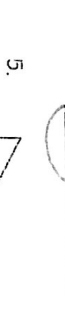
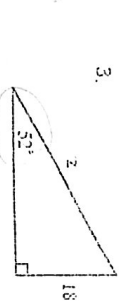
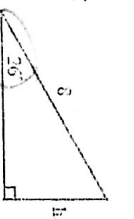
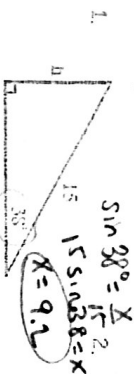


4) If  $\cot \theta = \frac{5}{4}$ , find the following:

$$\begin{aligned} \tan \theta &= \frac{4}{5} \\ \sin \theta &= \frac{4}{5} \\ \cos \theta &= \frac{3}{5} \\ \tan \theta &= \frac{4}{3} \\ \sec \theta &= \frac{5}{3} \\ \csc \theta &= \frac{5}{4} \end{aligned}$$



Use trig ratios to solve for the missing side or angle. Round to the nearest tenth.



1)  $\cos 38 = \frac{23}{w}$   
 $w = \frac{23}{\cos 38}$   
 $w = 29.2$

2)  $\sin 26 = \frac{x}{8}$   
 $8 \sin 26 = x$   
 $3.5 = x$

3)  $\sin 52 = \frac{z}{18}$   
 $z = \frac{18 \sin 52}{1}$   
 $z = 22.8$

7)  $\tan x = \frac{5}{7}$   
 $\tan^{-1} \frac{5}{7}$

5)  $\tan 15 = \frac{y}{38}$   
 $38 \tan 15 = y$   
 $10.2 = y$

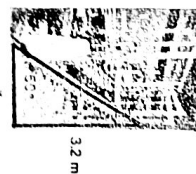
4)  $\tan 55 = \frac{y}{43}$   
 $43 \tan 55 = y$   
 $41.4 = y$

Trigonometry Word Problems

1. The stringer, that supports the stairs, makes an angle of  $50^\circ$  with the floor. It reaches 3.2 m up the wall. How far is the base of the stringer from the wall?

$$\tan 50 = \frac{3.2}{x}$$

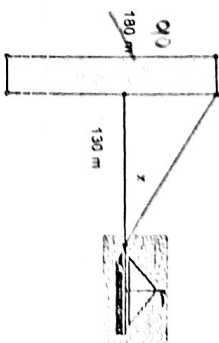
$x = 2.7m$



2. A ship is 130 m away from the centre of a barrier that measures 180 m from end to end. What is the minimum angle that the boat must be turned to avoid hitting the barrier?

$$\tan x = \frac{180}{130}$$

$\tan^{-1} \frac{180}{130}$   
 $x = 3.59$



3. A ramp has an angle of inclination of  $20^\circ$ . It has a vertical height of 1.8 m. What is the length, L, metres, of the ramp?

$$\sin 20 = \frac{1.8}{L}$$

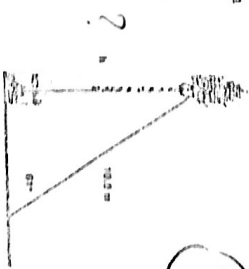
$L = 5.3m$



4. A damaged tree is supported by a guy wire 10.0 m long. The wire makes an angle of  $61^\circ$  with the ground. Calculate the height at which the guy wire is attached to the tree.

$$\sin 61 = \frac{x}{10}$$

$10 \sin 61 = x$   
 $8.7m = x$



5. A helicopter is hovering above a road at an altitude of 24 m. At a certain time, the distance between the helicopter and a car on the road is 45.0 m. Calculate the angle of elevation of the helicopter from the car.

$$\sin x = \frac{24}{45}$$

$\sin^{-1} \frac{24}{45}$

$\theta = 32.2^\circ$

