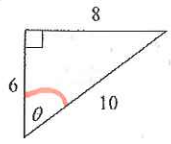
Trig Ratios Study Guide

Name Key

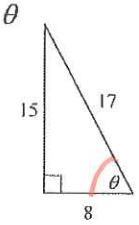
Find the value of the trig function indicated.

1) $\sin\theta$



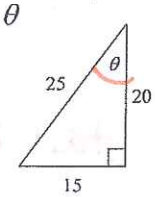
$\frac{8}{10} = \frac{4}{5}$

2) $\cos\theta$



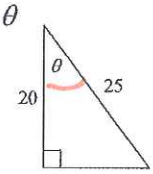
$\cos\theta = \frac{8}{17}$

3) $\tan\theta$



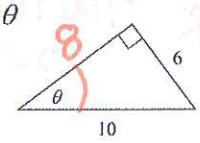
$\tan\theta = \frac{15}{20} = \frac{3}{4}$

4) $\cos\theta$



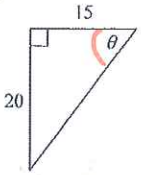
$\cos\theta = \frac{20}{25} = \frac{4}{5}$

5) $\sin\theta$



$\sin\theta = \frac{6}{10} = \frac{3}{5}$

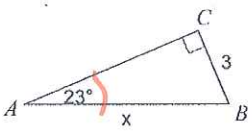
6) $\tan\theta$



$\tan\theta = \frac{20}{15} = \frac{4}{3}$

Find the measure of each side indicated. Round to the nearest tenth.

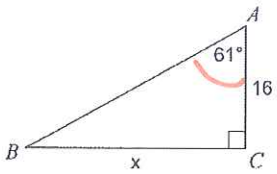
7)



$\sin 23 = \frac{3}{x}$

$\frac{3}{\sin 23} = 7.7$

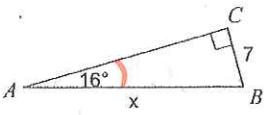
8)



$\tan 61 = \frac{x}{16}$

$16 \tan 61 = 28.9$

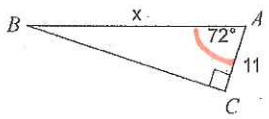
9)



$\sin 16 = \frac{7}{x}$

$\frac{7}{\sin 16} = 25.4$

10)

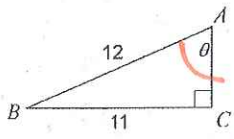


$\cos 72 = \frac{11}{x}$

$\frac{11}{\cos 72} = 35.6$

Find the measure of each angle indicated. Round to the nearest tenth.

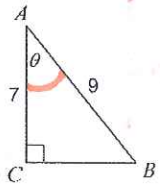
11)



$\sin\theta = \frac{11}{12}$

$\sin^{-1}\left(\frac{11}{12}\right) = 66.4°$

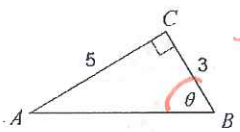
12)



$\cos\theta = \frac{7}{9}$

38.9°

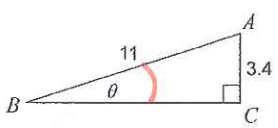
13)



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

59°

14)

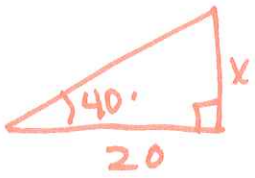


$\sin\theta = \frac{3.4}{11}$

18°

Application Problems: Draw a picture if one is not provided; be sure to write out your equation!

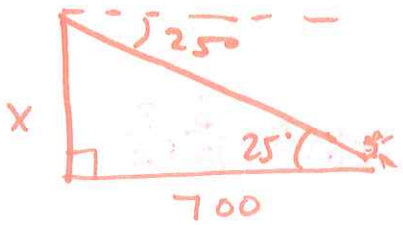
1. If you are standing 20 meters from the foot of a tower and the angle of elevation to the top of the tower is 40°, how tall is the tower?



$\tan 40 = \frac{x}{20}$

$x = 16.8\text{ m}$

2. The angle of depression from the top of a building to a person on the ground is 25°. If the person is 700 feet from the base of the building, how tall is the building?



$\tan 25 = \frac{x}{700}$

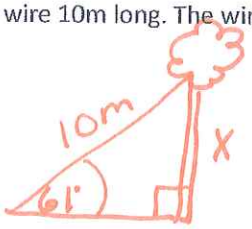
$700 \tan 25 = 326.4\text{ ft.}$

3. A ramp has an angle of elevation of 20°. It has a vertical height of 2 meters. What is the length of the ramp?

$\sin 20 = \frac{2}{x}$

$x = 5.8\text{m}$

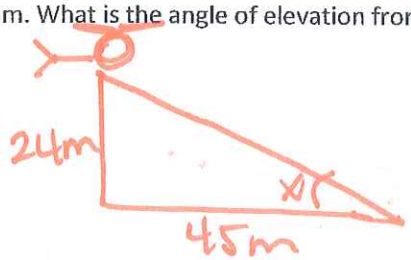
4. A damaged tree is supported by a guy wire 10m long. The wire makes an angle of 61° with the ground. How tall is the tree?



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

$\frac{10}{\sin 61} = 11.4\text{m}$

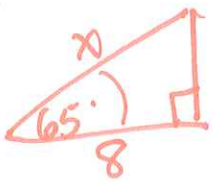
5. A news helicopter is hovering above a road at an altitude of 24m. The horizontal distance from the helicopter to the accident on the ground is 45m. What is the angle of elevation from the car to the helicopter?



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

$x \approx 28.1°$

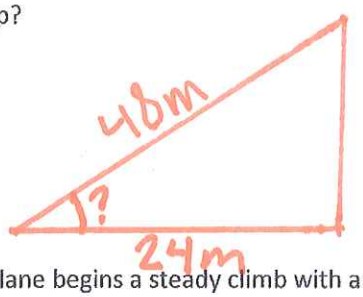
6. A ladder leaning against the side of a house forms an angle of 65° with the ground. The foot of the ladder is 8 feet from the building. Find the length of the ladder.



$\cos 65 = \frac{8}{x}$

$\frac{8}{\cos 65} = 18.9\text{ ft.}$

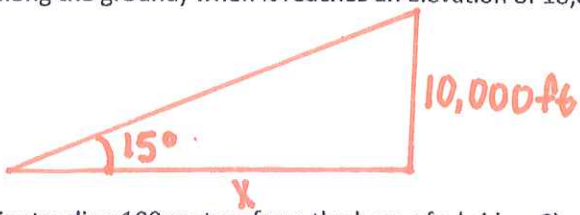
7. A ship travels east from Port Lincoln 24 miles before turning north. When the ship becomes disabled and radios for help, the rescue boast needs to know the fastest route to the ship. The rescue boat navigator finds that the shortest route from Port Lincoln is 48 miles long. At what angle should the rescue boat travel to take the shortest route to the ship?



$\cos^{-1} = \frac{24}{48}$

$\angle = 60°$

8. An airplane begins a steady climb with an angle of elevation of 15°. How far is the plane from the airport (distance measured along the ground) when it reaches an elevation of 10,000 ft?

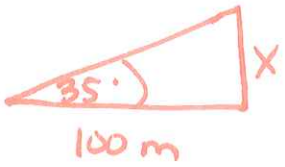


$\tan 15 = \frac{10000}{x}$

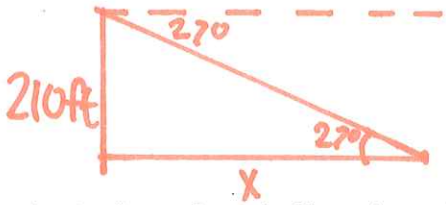
$x = 37320.5$

9. A surveyor is standing 100 meters from the base of a bridge. She determines that the angle of elevation to the top of the bridge is 35°. What is the height of the bridge?

$\tan 35 = \frac{x}{100}$



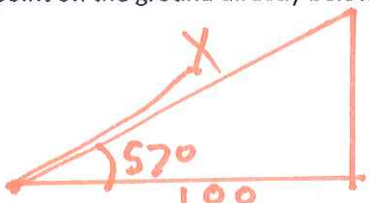
10. From the top of a lighthouse, which is 210 feet tall, the angle of depression to a boat is 27°. Find the distance from the boat to the foot of the lighthouse.



$\tan 27 = \frac{210}{x}$

$x = 412.1$

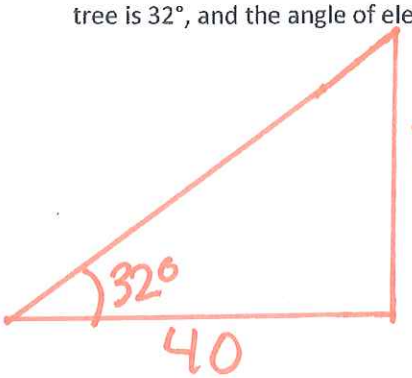
11. Richard is flying a kite. The kite string makes an angle of 57° with the ground. If Richard is standing 100 feet from the point on the ground directly below the kite, find the length of the kite's string.



$\cos 57 = \frac{100}{x}$

$x = 183.6$

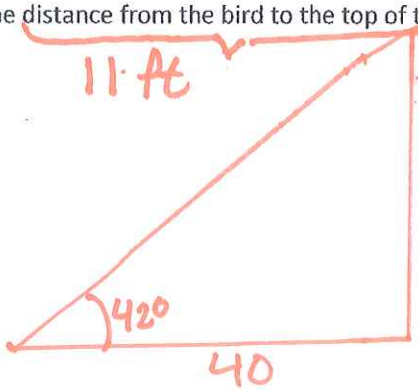
12. A bird is flying above a tree. You are standing 40 feet away from the tree. The angle of elevations to the top of the tree is 32°, and the angle of elevation to the bird is 42°. What is the distance from the bird to the top of the tree?



$\tan 32 = \frac{x}{40}$

$x = 25$

$\frac{36}{-25}$
11



$\tan 42 = \frac{x}{40}$

$x = 36$

7 Kathrin
8 Patrick