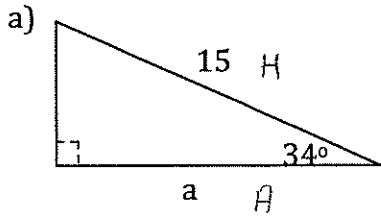


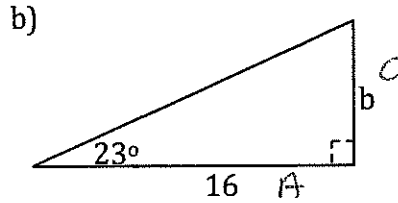
Using Trigonometric Ratios to Find Sides Assignment

1. Find each indicated side. Round answers to 2 decimal places where appropriate.



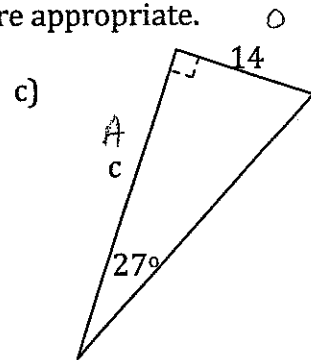
$$\cos 34^\circ = \frac{a}{15}$$

$$a = 15 \cos 34^\circ$$



$$\tan 23^\circ = \frac{b}{16}$$

$$b = 16 \tan 23^\circ$$



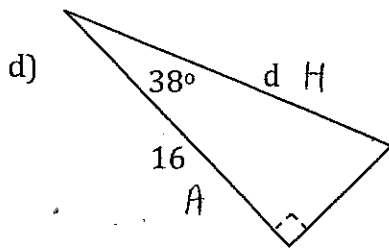
$$\tan 27^\circ = \frac{14}{c}$$

$$c = \frac{14}{\tan 27^\circ}$$

a) 12.44

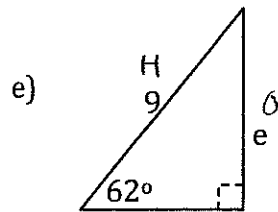
b) 6.79

c) 27.48



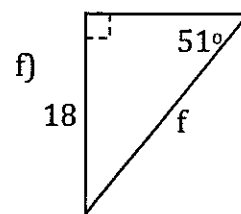
$$\cos 38^\circ = \frac{16}{d}$$

$$d = \frac{16}{\cos 38^\circ}$$



$$\sin 62^\circ = \frac{e}{9}$$

$$e = 9 \sin 62^\circ$$



$$\sin 51^\circ = \frac{18}{f}$$

$$f = \frac{18}{\sin 51^\circ}$$

d) 20.30

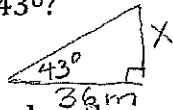
e) 7.95

f) 23.16

2. Complete the following problems on a separate piece of paper.

- Sketch a GOOD diagram which has all information labelled on it (including missing side).
- Write the trigonometric ratio you will use.
- Solve for the indicated side. Show your work.
- Round to 2 decimal places where appropriate.
- Include units in your answer.

a) How tall is a tree if its shadow is 36 m long, and the angle that the shadow makes with the ground is 43° ?

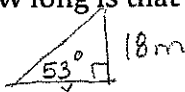


$$\tan 43^\circ = \frac{x}{36}$$

$$x = 36 \tan 43^\circ \approx 33.57$$

33.57m

b) On a sunny day, the sun's rays strike the ground at an angle of 53° . A tree 18 m in height casts a shadow. How long is that shadow?

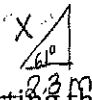


$$\tan 53^\circ = \frac{18}{x}$$

$$x = \frac{18}{\tan 53^\circ} \approx 13.56$$

13.56m

c) A ladder is resting against a wall and makes an angle of 61° with the ground. If the base of the ladder is 2.3 m from the wall, how high does the ladder reach up the wall?



$$\cos 61^\circ = \frac{2.3}{x}$$

$$x = \frac{2.3}{\cos 61^\circ}$$

4.74m

d) A wire supporting the top of a hydro tower meets the ground at an angle of 59° . The wire is secured 22 m from the base of the tower. How high is the tower?

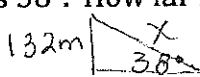


$$\cos 59^\circ = \frac{22}{x}$$

$$x = \frac{22}{\cos 59^\circ}$$

42.72m

e) From a point 132 m above the ground in a control tower, the angle of depression to a truck on the ground is 38° . How far is the truck away from the observer in the tower?

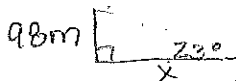


$$\sin 38^\circ = \frac{132}{x}$$

$$x = \frac{132}{\sin 38^\circ} \approx 214.40$$

214.40m

f) An observation tower is 98 m tall. The angle of depression from the top of the tower to an historical marker is 23° . How far from the base of the tower is the marker?

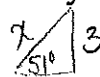


$$\tan 23^\circ = \frac{98}{x}$$

$$x = \frac{98}{\tan 23^\circ}$$

230.87m

g) A pilot in a plane 3 km above the ground estimates the angle of depression to a runway as being 51° . How far horizontally is the pilot from the runway?

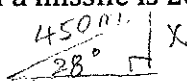


$$\sin 51^\circ = \frac{3}{x}$$

$$x = \frac{3}{\sin 51^\circ}$$

3.86km

h) The firing angle of a missile is 28° . About how high is it after it has traveled 450 m?

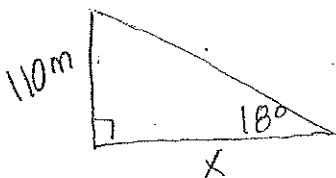


$$\sin 28^\circ = \frac{x}{450}$$

$$x = 450 \sin 28^\circ$$

211.26m

i) The top of a lighthouse is 110 m above the level of the water. The angle of depression from the top of the lighthouse to a fishing boat is 18° . How far from the base of the lighthouse is the fishing boat?



$$\tan 18^\circ = \frac{110}{x}$$

$$x = \frac{110}{\tan 18^\circ}$$

330.58m