Name:_____

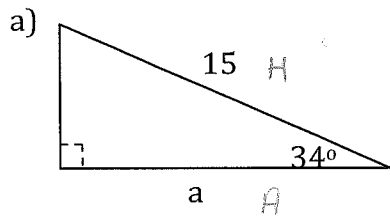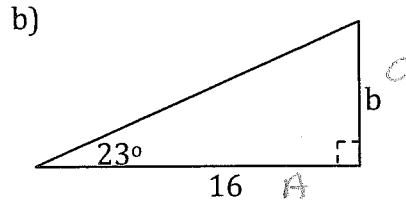## Using Trigonometric Ratios to Find Sides Assignment

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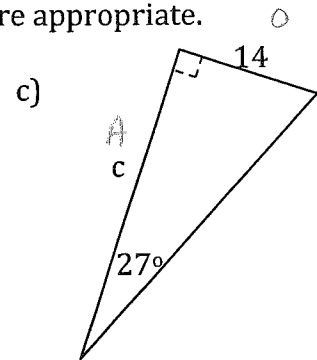
a)

$$\cos 34° = \frac{a}{15}$$

$$a = 15 \cos 34°$$

b)

$$\tan 23° = \frac{b}{16}$$

$$b = 16 \tan 23°$$

c)

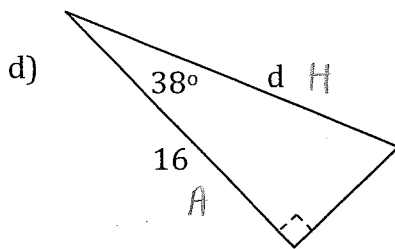$$\tan 27° = \frac{14}{c}$$

$$c = \frac{14}{\tan 27°}$$

a)_____12.44_____

b)_____6.79_____

c)_____27.48_____

d)
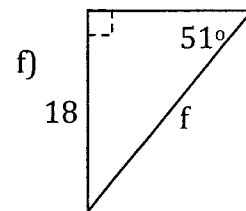
$$\cos 38° = \frac{16}{d}$$

$$d = \frac{16}{\cos 38°}$$

e)

$$\sin 62° = \frac{e}{9}$$

$$e = 9 \sin 62°$$

f)
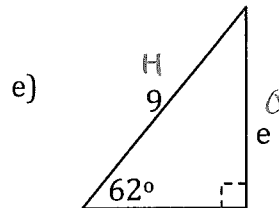
$$\sin 51° = \frac{18}{f}$$

$$f = \frac{18}{\sin 51°}$$

d)_____20.30_____

e)_____7.95_____

f)_____23.16_____

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

  i) Sketch a GOOD diagram which has all information labelled on it (including missing side).

  ii) Write the trigonometric ratio you will use.

  iii) Solve for the indicated side. Show your work.

  iv) Round to 2 decimal places where appropriate.

  v) 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°?
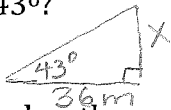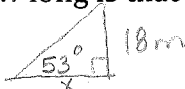
$\tan 43° = \frac{x}{36}$

$x = 36 \tan 43° \doteq 33.57$

$\boxed{33.57m}$

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?

$\tan 53° = \frac{18}{x}$ $x = \frac{18}{\tan 53°} \doteq 13.56$

$\boxed{13.56m}$

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?

$\cos 61° = \frac{2.3}{x}$ $x = \frac{2.3}{\cos 61°}$

$\boxed{4.74m}$

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?

$\cos 59° = \frac{22}{x}$ $x = \frac{22}{\cos 59°}$

$\boxed{42.72m}$

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?

$\sin 38° = \frac{132}{x}$ $x = \frac{132}{\sin 38°} \doteq 214.40$

$\boxed{214.40m}$

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?
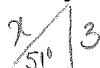
$\tan 23° = \frac{98}{x}$ $x = \frac{98}{\tan 23°}$

$\boxed{230.87m}$

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?

$\sin 51° = \frac{3}{x}$ $x = \frac{3}{\sin 51°}$

$\boxed{3.86km}$

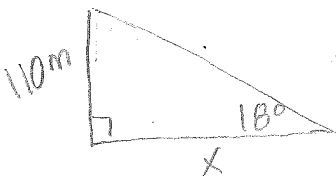h) The firing angle of a missile is 28°. About how high is it after it has traveled 450 m?

$\sin 28° = \frac{x}{450}$

$x = 450 \sin 28°$

$\boxed{211.26m}$

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?

$\tan 18° = \frac{110}{x}$

$x = \frac{110}{\tan 18°}$

$\boxed{338.5m}$