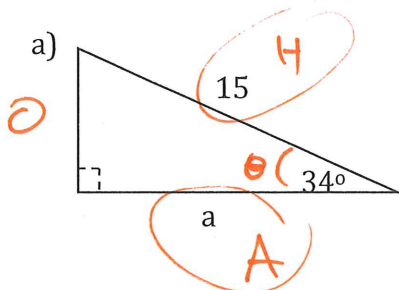


Using Trigonometric Ratios to Find Sides Assignment

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



$$\cos \theta = \frac{A}{H}$$

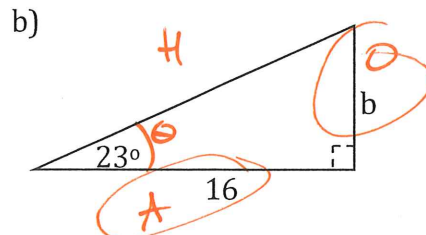
$$15 \times \cos 34^\circ = \frac{a}{15} \times 15$$

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

$$15 (0.829) = a$$

$$12.44 = a$$

a) _____



$$\tan \theta = \frac{O}{A}$$

$$16 \times \tan \theta = \frac{b}{16} \times 16$$

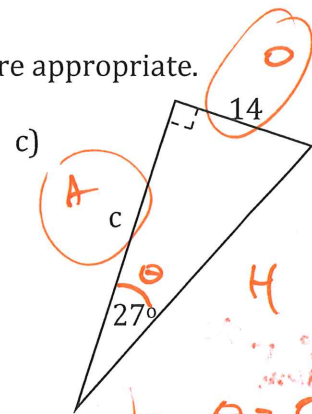
$$16 \tan \theta = b$$

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

$$16 (0.424) = b$$

$$b = 6.79$$

b) _____



$$\tan \theta = \frac{O}{A}$$

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

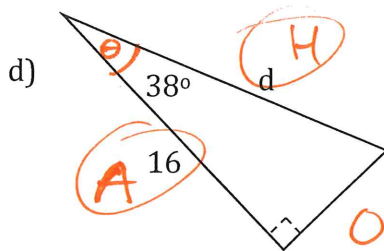
$$c \tan 27^\circ = 14$$

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

$$c = \frac{14}{\tan 27^\circ} = \frac{14}{0.510}$$

$$c = 27.48$$

c) _____



$$\cos \theta = \frac{A}{H}$$

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

$$d \cos 38^\circ = 16$$

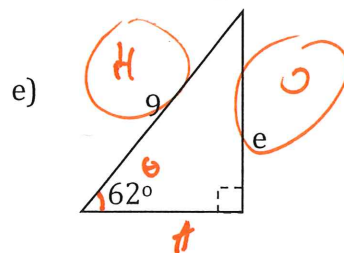
$$\frac{d \cos 38^\circ}{\cos 38^\circ} = \frac{16}{\cos 38^\circ}$$

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

$$d = \frac{16}{0.788}$$

$$d = 20.30$$

d) _____



$$\sin \theta = \frac{O}{H}$$

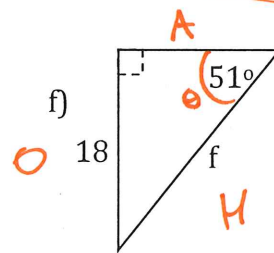
$$9 \times \sin 62^\circ = \frac{e}{9} \times 9$$

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

$$9 (0.883) = e$$

$$7.95 = e$$

e) _____



$$\sin \theta = \frac{O}{H}$$

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

$$f \sin 51^\circ = 18$$

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

$$f = \frac{18}{\sin 51^\circ} = \frac{18}{0.777}$$

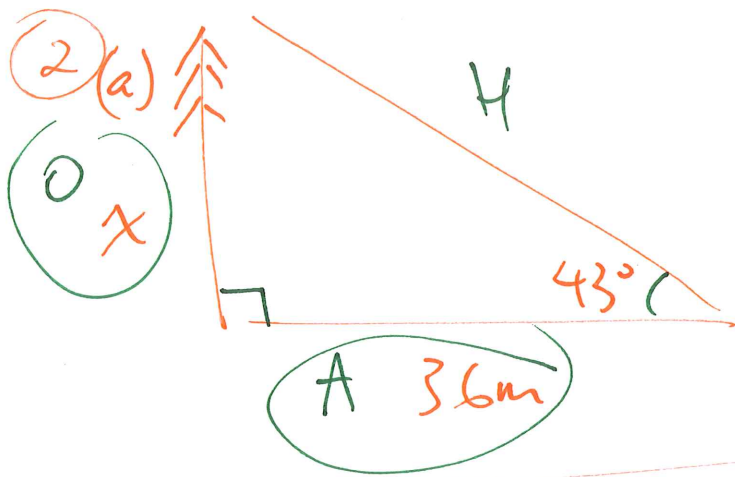
$$f = 23.16$$

f) _____

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.

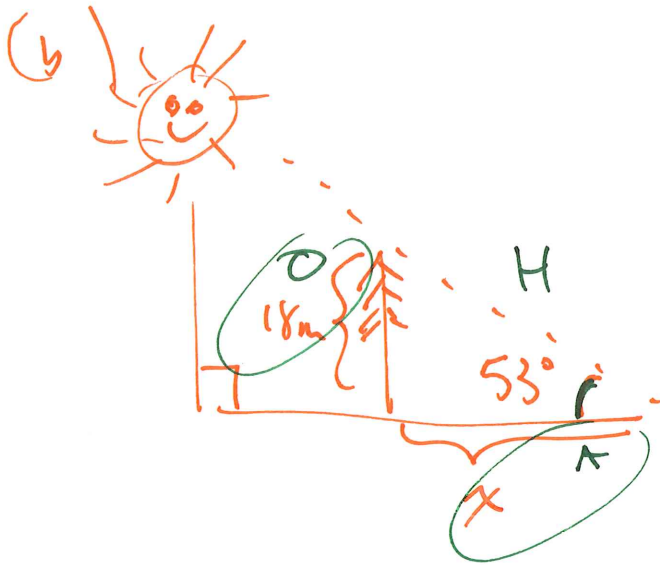
- a) How tall is a tree if its shadow is 36 m long, and the angle that the shadow makes with the ground is 43° ?
- b) On a sunny day, the sun's rays strike the ground at an angle of 53° . A tree 18 m in height casts a shadow. How long is that shadow?
- c) A ladder is resting against a wall and makes an angle of 61° with the ground. If the base of the ladder is 2.3 m from the wall, how long is the ladder?
- 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 long is the wire?
- 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?
- 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?
- g) A pilot in a plane 3 km above the ground estimates the angle of depression to a runway as being 51° . How far is the pilot from the runway?
- h) The firing angle of a missile is 28° . About how high is it after it has traveled 450 m?
- 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?



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

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

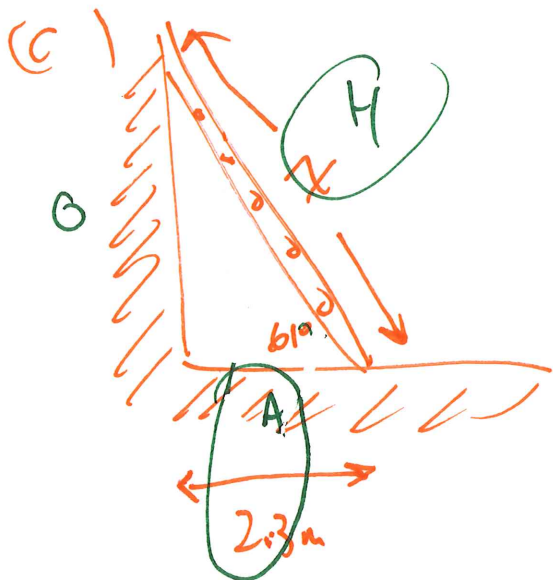
$$x = 33.57m$$



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

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

$$x = 13.56m$$

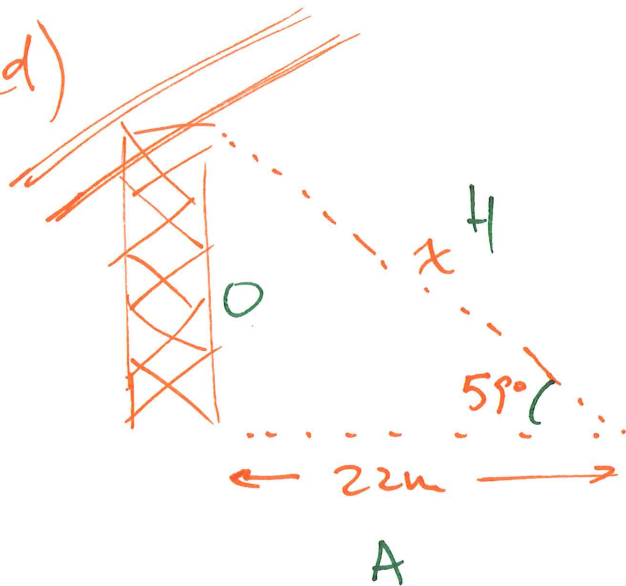


$$\cos 61^\circ = \frac{2.3}{x}$$

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

$$x = 4.74m$$

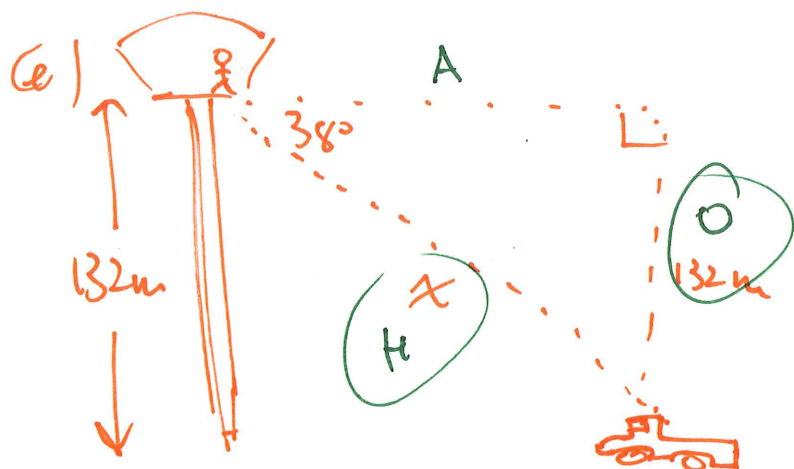
(d)



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

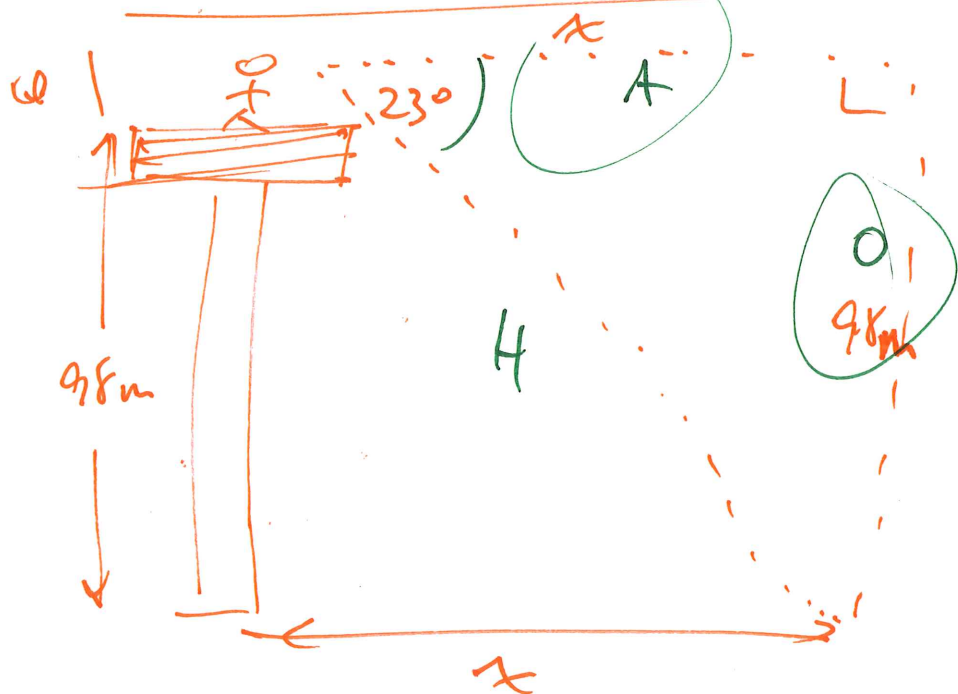
$$x = \frac{22}{\cos 59^\circ}$$

$$x = 42.72\text{m}$$



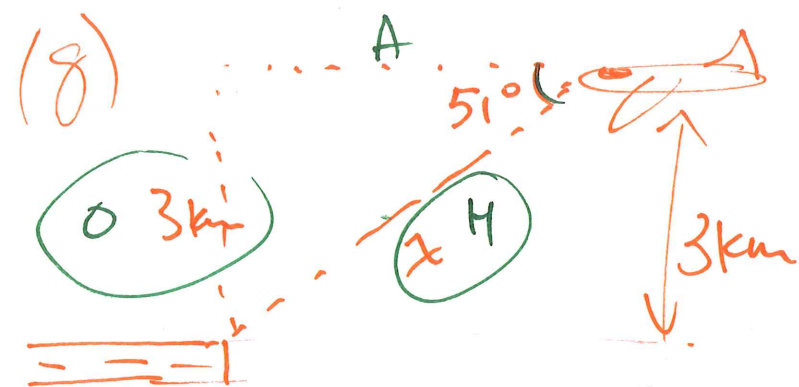
$$\sin 38^\circ = \frac{132}{x}$$

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



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

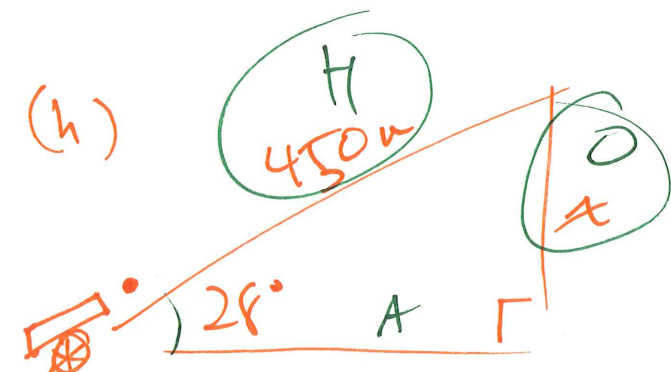
$$x = \frac{98}{\tan 23^\circ}$$
$$= 230.87\text{m}$$



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

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

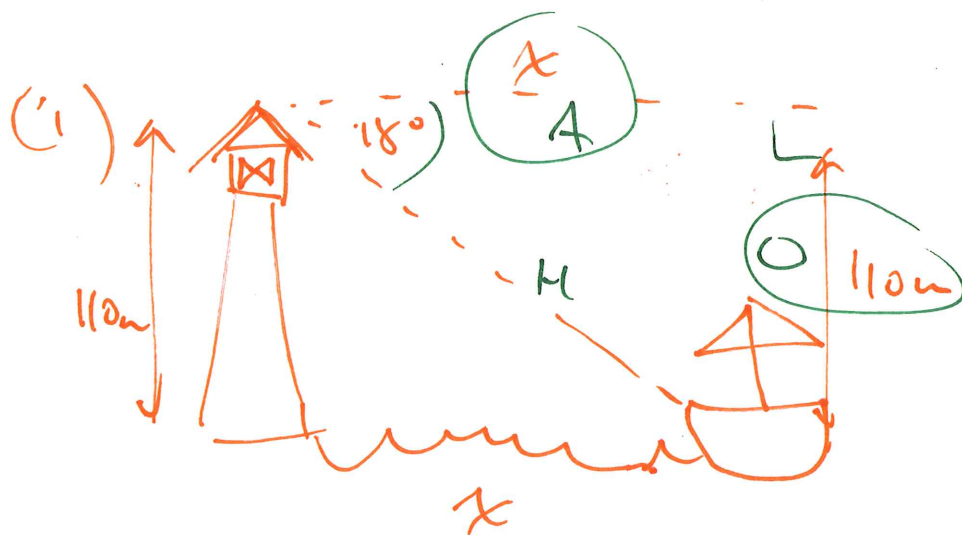
$$x = 3.86 \text{ km}$$



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

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

$$x = 211.26 \text{ m}$$



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

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

$$x = 338.5 \text{ m}$$