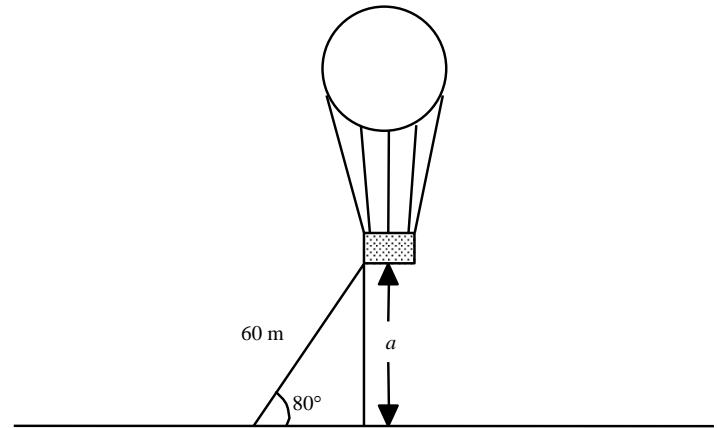


1

A hot air balloon is secured to the ground by a 60 m long rope. A gust of wind caused it to veer slightly, creating an  $80^\circ$  angle between the rope and the ground.

Which of the following equations can be used to calculate the altitude of the hot air balloon?



A)  $a = 60 \sin 80^\circ$

C)  $a = \frac{60}{\cos 80^\circ}$

B)  $a = 60 \cos 80^\circ$

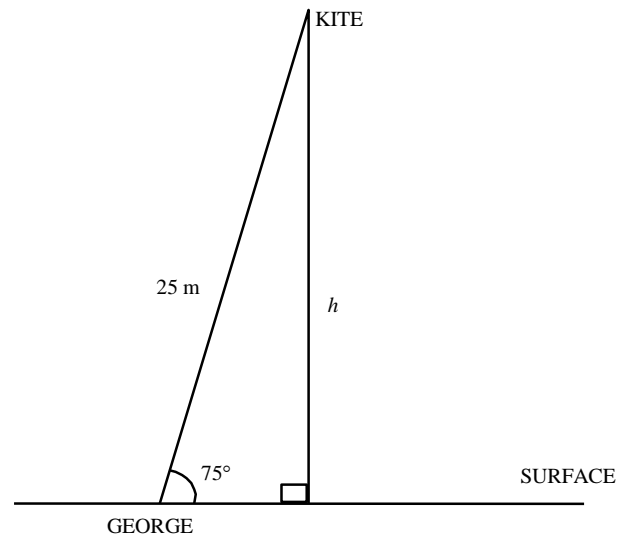
D)  $a = \frac{60}{\sin 80^\circ}$

2

While flying his kite, George completely unrolled his 25 m long string. He wants to find the height  $h$  of the kite.

He drew the following diagram:

Which of the following equations can be used to calculate the height  $h$  of the kite?



A)  $h = 25 \cos 75^\circ$

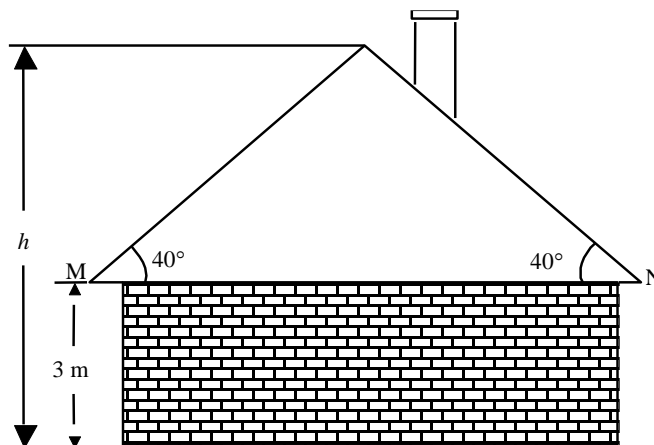
C)  $h = 25 \tan 75^\circ$

B)  $h = 25 \sin 75^\circ$

D)  $h = \frac{25}{\tan 75^\circ}$

3 The base MN of the roof of a house measures 12 m and the angle of inclination is  $40^\circ$ .

Which one of the following equations can be used to calculate the height  $h$ , in metres?



A)  $h = \frac{6}{\sin 40^\circ} + 3$

C)  $h = 6 \tan 40^\circ + 3$

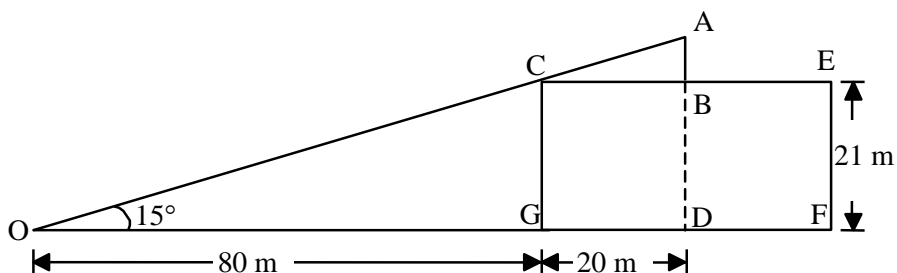
B)  $h = 6 \sin 40^\circ + 3$

D)  $h = \frac{6}{\tan 40^\circ} + 3$

4 An observer **O** is 80 m from the base **G** of a building. At an angle of elevation of  $15^\circ$  he can see just the top **A** of an antenna. The building is 40 m long and 21 m high. The antenna is equidistant from the edges **C** and **E** of the roof of the building.

The diagram below illustrates this situation.

Which expression would enable the observer to calculate the measure of the antenna **AB**?



A)  $100 \tan 15^\circ - 21$

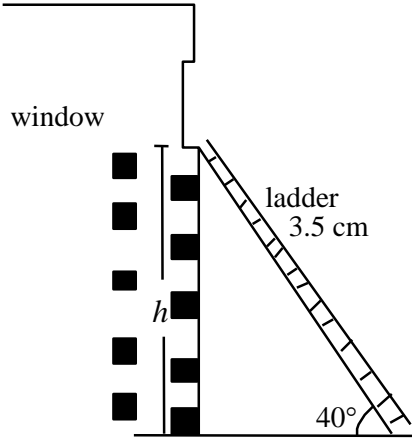
C)  $100 \cos 15^\circ - 21$

B)  $100 \sin 15^\circ - 21$

D)  $\frac{100}{\tan 15^\circ} - 21$

5

The top of a ladder 3.5 m long touches the bottom of a window. If the ladder makes an angle of  $40^\circ$  with the ground, which one of the following formulas can be used to calculate the height  $h$  of the window?



A)  $h = \frac{3.5}{\sin 40^\circ}$

C)  $h = 3.5 \sin 40^\circ$

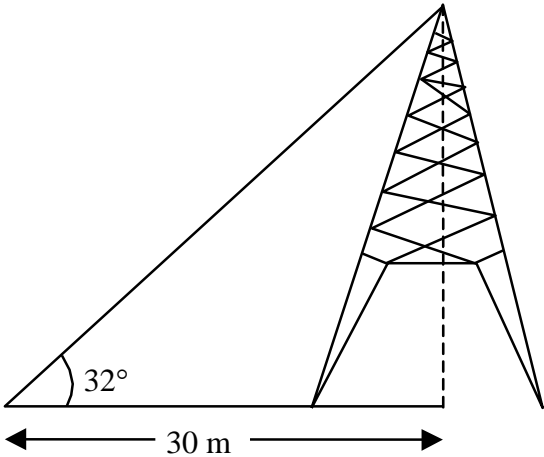
B)  $h = \frac{3.5}{\cos 40^\circ}$

D)  $h = 3.5 \cos 40^\circ$

6

A Hydro worker, standing 30 metres from the center of the base of a Hydro tower, sights the top of the tower at an angle of elevation of  $32^\circ$ .

Which one of the following expressions can be used to find the height  $h$  of the tower?



A)  $h = 30 \tan 32^\circ$

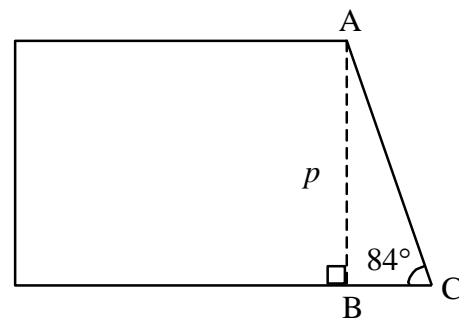
C)  $h = \frac{30}{\tan 32^\circ}$

B)  $h = 30 \sin 32^\circ$

D)  $h = \frac{30}{\sin 32^\circ}$

7

A piece of land has the shape of a right-angled trapezoid.



The depth **P** of the land and the measure of angle C are known.

Which expression can be used to calculate the measure of  $\overline{AC}$ ?

A)  $p \cos 84^\circ$

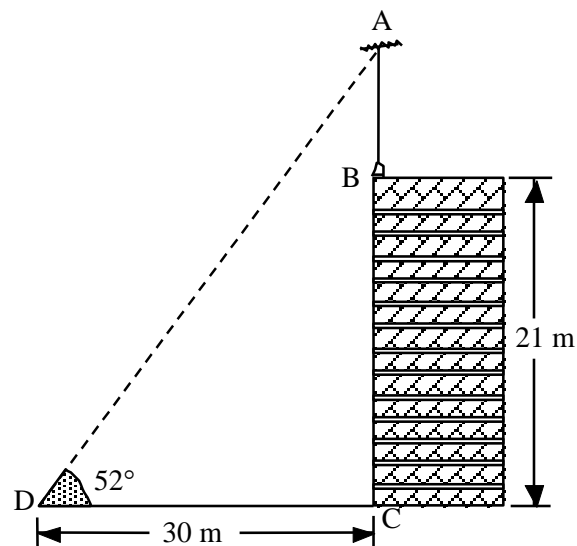
C)  $\frac{p}{\cos 84^\circ}$

B)  $p \sin 84^\circ$

D)  $\frac{p}{\sin 84^\circ}$

8

An antenna AB is mounted on the edge of the roof of a building which is 21 m high. An engineer is positioned 30 m from the base C of the building and measures the angle of elevation to the top A of the antenna. The angle measures  $52^\circ$ .



Which equation would enable the engineer to calculate the length of the antenna?

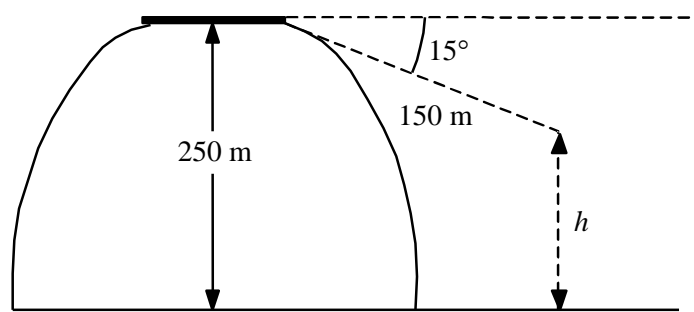
A)  $\frac{30}{\tan 52^\circ} - 21$

C)  $\frac{30}{\sin 52^\circ} - 21$

B)  $30 \tan 52^\circ - 21$

D)  $30 \cos 52^\circ - 21$

- 9 Scott and his friend were hand gliding on Mount Frontenac which is 250 metres high. Scott jumped off a platform. 45 seconds later his friend, who remained on the platform, saw him at an angle of depression of  $15^\circ$ . He calculated the distance covered by the hand glider to be 150 m.

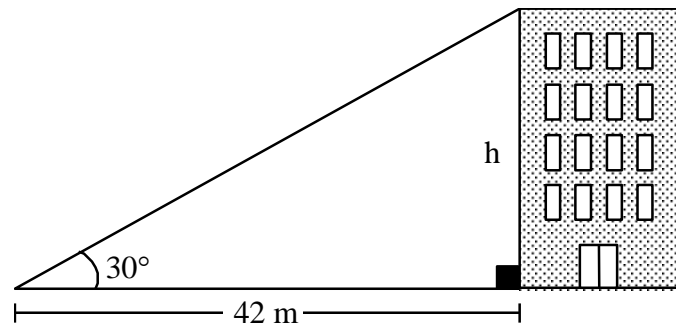


Which equation can Scott's friend use to find out how far he is from the ground?

- A)  $h = 250 - 150 \sin 15^\circ$       C)  $h = 250 - \frac{150}{\sin 15^\circ}$
- B)  $h = 250 - 150 \cos 15^\circ$       D)  $h = 250 - \frac{150}{\cos 15^\circ}$

- 10 If you are positioned 42 m from the foot of a building, the angle of elevation of the top of the building is  $30^\circ$ .

Which equation can be used to calculate the height  $h$  of this building?



- A)  $h = 42 \sin 30^\circ$       C)  $h = 42 \tan 30^\circ$
- B)  $h = \frac{42}{\sin 30^\circ}$       D)  $h = \frac{42}{\tan 30^\circ}$

### CHALLENGE!!!!

- 11 Jonathan and Katharine are 4 km apart and both looking up at an airplane flying between them. Jonathan views the airplane at an angle of elevation of  $28^\circ$  and Katharine views it at an angle of elevation of  $40^\circ$ . Write an expression that could be used to determine the height of the airplane.

## Answers

1 A

2 B

3 C

4 A

5 C

6 A

7 D

8 B

9 A

10 C