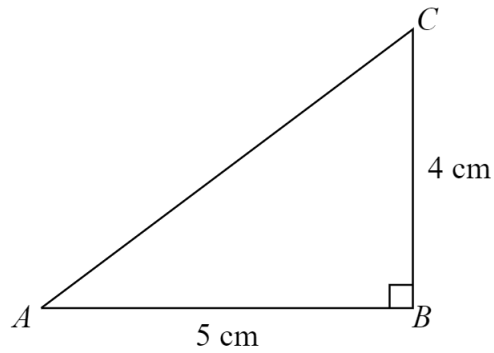


1. Level 1 – 2 [Length: 6 minutes]

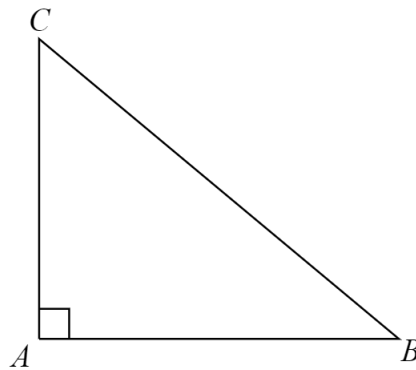
The diagram below shows $\triangle ABC$.



- (a) Calculate the length of the hypotenuse to 4 decimal places. [2]
- (b) Calculate the following values to 2 decimal places [4]
 - (i) $\sin A$
 - (ii) $\cos A$

2. Level 3 – 4 [Length: 5 minutes]

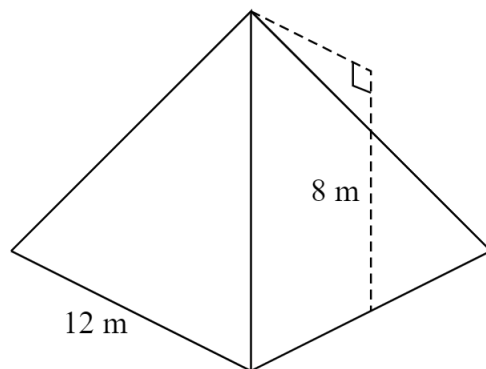
In $\triangle ABC$ we have $AB = 4$ cm and $AC = 3$ cm .



- (a) Determine the length of the third side and add all three lengths to the diagram above. [3]
- (b) Find the size of $\angle BCA$. [2]

3. Level 5 – 6 [Length: 6 minutes]

A pyramid has a square base with sides of length 12 m and a height of 8 m. This is shown in the diagram below.

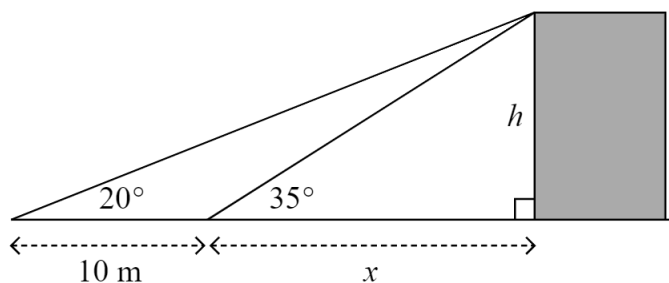


- (a) Find the surface area of the pyramid. [4]
- (b) Find the angle between any triangular face and the base of the pyramid. [2]

4. Level 7 – 8 [Length: 6 minutes]

Miki is standing some distance away from a building. She measures the angle of elevation to the top of the building to be 20° . She then moves 10 m closer to the building and finds the new angle of elevation to the top to be 35° .

This information is shown in the diagram below



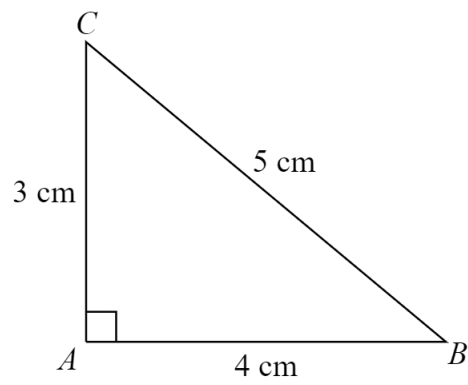
- (a) Determine two different equations involving x and h . [2]
- (b) Determine the height h of the building. [4]

1. (a) $\sqrt{25 + 16} = 6.4031$

(b) (i) $\frac{4}{6.4031} = 0.62$

(ii) $\frac{5}{6.4031} = 0.78$

2. (a) We have $\sqrt{9 + 16} = 5$



- (b) Use any trigonometric function e.g.

$$\tan \angle BCA = \frac{4}{3}$$

So

$$\angle BCA = 53.1^\circ$$

3. (a) The area of the base is $12^2 = 144 \text{ m}^2$.

The height of each triangle is $\sqrt{6^2 + 8^2} = 10 \text{ m}$.

So the total surface area is

$$144 + 4 \times \frac{1}{2} \times 12 \times 10 = 384 \text{ m}^2$$

(b) $\arccos\left(\frac{6}{10}\right) = 53.1^\circ$

4. (a) $\tan 20 = \frac{h}{10+x}$ and $\tan 35 = \frac{h}{x}$

(b) Solve simultaneously.

e.g. Rearrange both equations to determine an expression for h then either set both expressions equal to each other, or plot a graph and find the intersection.

$$h = (10+x)\tan 20 \quad \text{and} \quad h = x \tan 35$$

$$\text{So } (10+x)\tan 20 = x \tan 35$$

$$\text{Solve this equation. So } x = \frac{10 \tan 20}{\tan 35 - \tan 20} = 10.8248.$$

$$\text{Giving } h = 10.8248 \tan 35 = 7.58 \text{ m.}$$