

## Solutions

### 8 Trigonometry – SOH-CAH-TOA

1. Find SV and then SW

$$\sin 34 = \frac{SV}{13.1} \quad \text{hence } SV = 7.33 \text{ cms}$$

$$\cos 25 = \frac{SW}{SV} = \frac{SW}{7.33} \quad \text{so } SW = 6.6 \text{ cms (2 sf)}$$

2. Let Length of ladder =  $l$

$$\sin 60 = \frac{14}{l} \quad l = 16.17 \text{ m}$$

Look at second triangle, cat is 15 m up the tree.

Let angle of ladder be  $\theta$

$$\sin \theta = \frac{15}{16.17} \quad \sin \theta = 0.9276 \quad \theta = 68^\circ$$

3. Let angle of ramp be  $\theta$

$$\tan \theta = \frac{0.5}{1.9} \rightarrow \theta = \tan^{-1} \left( \frac{0.5}{1.9} \right) \quad \theta = 14.7^\circ$$

Yes, the ramp satisfies local building regulations.

4. a) B to C:  $\tan 70 = \frac{13.5}{BC}$   $BC = 4.9 \text{ m}$

- b) A to B is  $AC - BC$

$$\tan 40 = \frac{13.5}{AC} \quad AC = 16.1 \text{ m}$$

Hence AB is:  $16.1 - 4.9 = 11.2 \text{ metres.}$

5. a) Let diagonal of courtyard =  $d$  metres

$$\tan 8^\circ = \frac{4.6}{d} \rightarrow d = \frac{4.6}{\tan 8^\circ} = 32.7 \text{ metres}$$

- b) Let length of side of courtyard =  $l$  metres.

Then by Pythagoras:

$$l^2 + l^2 = 32.7^2 \rightarrow 2l^2 = 1069.29$$

$$l = \sqrt{534.65} = 23.12... \text{ metres}$$

This is approx 23 metres.

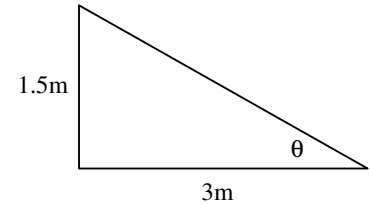
6. See Pythagoras Section 6  
For the solution – misplaced in wrong section.

- 7.

$$\tan \theta = \frac{1.5}{3}$$

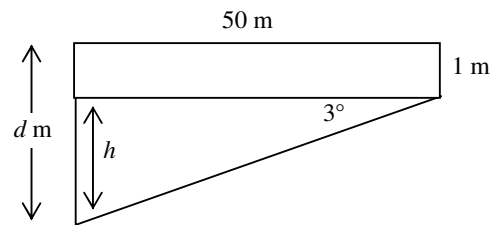
$$\theta = \tan^{-1} \frac{1.5}{3}$$

$$\theta = 26.565..^\circ$$



Yes Planning permission should be granted, since angle is between  $23^\circ$  and  $27^\circ$

- 8.



$$\tan 3^\circ = \frac{h}{50} \quad \text{hence } h = 50 \tan 3^\circ = 2.62 \text{ metres}$$

$$\text{Hence } d = 1 + 2.62 = 3.62$$

Hence depth of pool = 3.6 metres (2 sf)