Practical right-triangle problems and interpreting diagrams

6 questions | 20 marks

Equivalent correct methods earn the corresponding marks.

1. A 13 m ladder has its foot 5 m from a wall. Find its vertical reach. [3 marks]

$h = \sqrt{169 - 25} = 12$ m.

Answer: 12 m

2. The same 13 m ladder slides so its foot is now 12 m from the wall. How far does the top drop? [4 marks]

Original height $= \sqrt{169 - 25} = 12$ m.

New height $= \sqrt{169 - 144} = 5$ m.

Drop $= 12 - 5 = 7$ m.

Answer: 7 m

3. A ramp makes 7° with level ground and has horizontal run 4.8 m. Find its sloping length to two decimal places. [3 marks]

$\cos 7^\circ = \frac{4.8}{L}$.

$L = \frac{4.8}{\cos 7^\circ}$.

Answer: 4.84 m

4. A vertical pole casts a 4.5 m shadow on level ground. The Sun's elevation is 36°. Find the pole height to two decimal places. [3 marks]

$h = 4.5\tan 36^\circ$.

Assume a vertical pole and a straight ray of sunlight.

Answer: 3.27 m

5. A taut 30 m kite string begins at ground level and makes 40° to horizontal. Find the kite height to two decimal places. [3 marks]

$h = 30\sin 40^\circ$.

The string is the hypotenuse.

Answer: 19.28 m

6. Eyes are 1.6 m above level ground, 30 m horizontally from a building. Its top is at 25° above horizontal. Find total height to two decimal places. [4 marks]

Height above eyes $= 30\tan 25^\circ$.

Total height $= 1.6 + 30\tan 25^\circ$.

Answer: 15.59 m