Elevation/depression

6 questions | 15 marks

Equivalent correct methods earn the corresponding marks.

1. From level ground 30 m away, roof elevation is 40°. Find its height to 0.1 m. [2 marks]

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

Round the result, not the tangent value.

Answer: 25.2 m

2. A tree top is 25 m above an observer sight line, at elevation 50°. Find horizontal distance to 0.1 m. [2 marks]

$\tan 50^\circ = \frac{25}{d}$.

$d = \frac{25}{\tan 50^\circ}$.

Answer: 21.0 m

3. An observer is 16 m from a 12 m wall. Their eye is 1.6 m high. Find elevation to the top to 0.1°. [3 marks]

Vertical difference $= 12 - 1.6 = 10.4$ m.

$\theta = \tan^{-1}\left(\frac{10.4}{16}\right)$.

Answer: 33.0°

4. A cliff top is 40 m above sea level. Depression to a boat is 25°. Find the horizontal distance to 0.1 m. [3 marks]

Use the equal elevation angle at the boat.

$d = \frac{40}{\tan 25^\circ}$.

Answer: 85.8 m

5. A line of sight makes 38° with a vertical wall. Find its angle with the horizontal. [2 marks]

$\theta = 90^\circ - 38^\circ = 52^\circ$.

Answer: 52°

6. A camera 1.2 m high is 15 m from a flagpole. Top elevation is 55°. Find total pole height to 0.1 m. [3 marks]

Height above camera $= 15\tan 55^\circ$.

Add 1.2 m.

Answer: 22.6 m