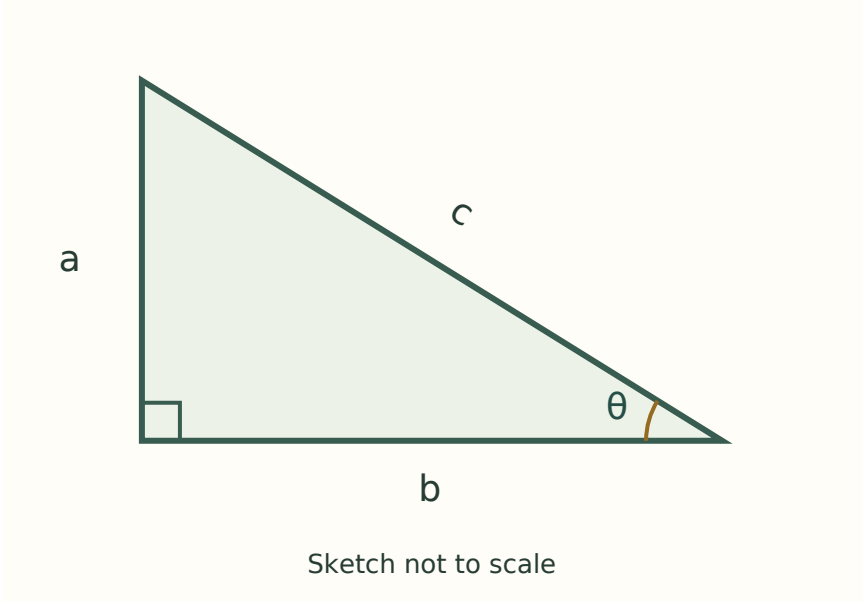
Pythagoras and Trigonometry - Practice paper 1

16 questions | 43 marks | 55 minutes

Apply right-triangle geometry to diagrams, lengths, angles and contextual decisions.

Equivalent correct methods earn the corresponding marks.

1. In the sketch, which side is the hypotenuse? [1 mark]



Sketch not to scale

c faces the marked right angle.

Answer: c

2. Find the hypotenuse with legs 6 cm and 8 cm. [2 marks]

$c = \sqrt{36 + 64} = 10$ cm.

Answer: 10 cm

3. Hypotenuse $= 17$ cm and one leg $= 15$ cm. Find the other leg. [2 marks]

$x = \sqrt{289 - 225} = 8$ cm.

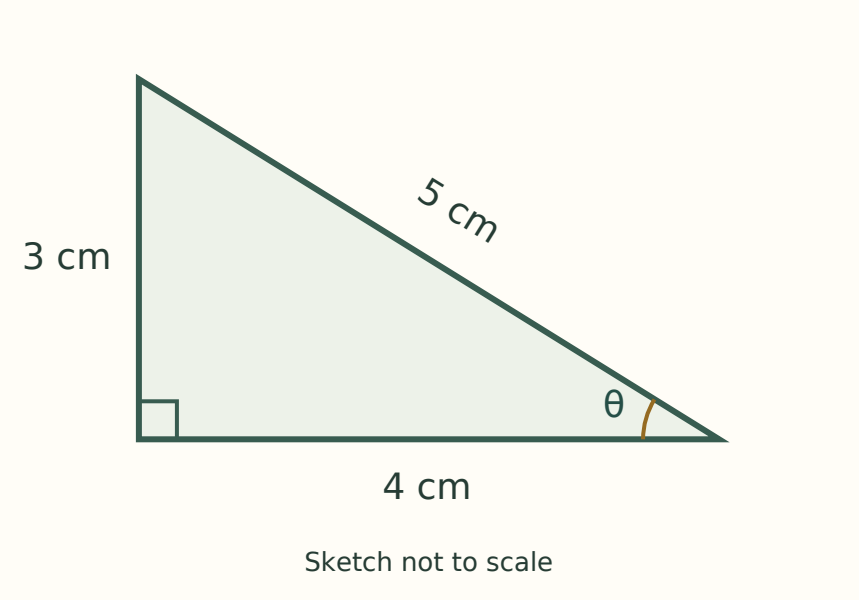
Answer: 8 cm

4. Find the hypotenuse with legs 3 m and 5 m, exactly and to two decimal places. [3 marks]

$c = \sqrt{9 + 25} = \sqrt{34} \approx 5.83$ m.

Answer: $\sqrt{34}$ m; 5.83 m

5. For θ in this sketch, name the opposite and adjacent lengths. [2 marks]



Sketch not to scale

The vertical 3 cm side is across from θ.

The horizontal 4 cm side touches θ.

Answer: Opposite 3 cm; adjacent 4 cm

6. Opposite, adjacent and hypotenuse are 5, 12 and 13. State $\sin\theta$, $\cos\theta$ and $\tan\theta$. [3 marks]

Use $\sin = \frac{o}{h}$, $\cos = \frac{a}{h}$, $\tan = \frac{o}{a}$.

Answer: $\frac{5}{13}$, $\frac{12}{13}$, $\frac{5}{12}$

7. Evaluate $\sin 30^\circ$. [1 mark]

Use degree mode: $\sin 30^\circ = 0.5$.

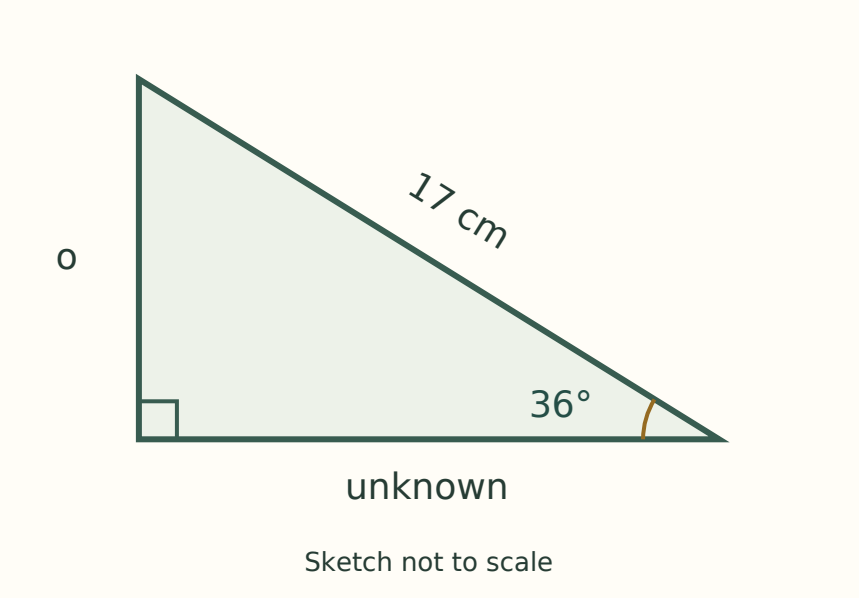
Answer: 0.5

8. Hypotenuse $= 10$ m and opposite $= 6$ m. Find adjacent. [2 marks]

$a = \sqrt{100 - 36} = 8$ m.

Answer: 8 m

9. Find opposite when hypotenuse $=17$ cm and $\theta = 36^\circ$. Round to two decimal places. [3 marks]



$o = 17\sin 36^\circ$.

Answer: 9.99 cm

10. Find opposite when adjacent $=9$ m and $\theta = 28^\circ$. Round to two decimal places. [3 marks]

$o = 9\tan 28^\circ$.

Answer: 4.79 m

11. Find hypotenuse when opposite $=7$ cm and $\theta = 40^\circ$. Round to two decimal places. [3 marks]

$\sin 40^\circ = \frac{7}{h}$.

$h = \frac{7}{\sin 40^\circ}$.

Answer: 10.89 cm

12. Find θ when adjacent $=9$ cm and hypotenuse $=15$ cm. Round to two decimal places. [3 marks]

$\theta = \cos^{-1}(\frac{9}{15})$.

Answer: 53.13°

13. Similar right triangles have $\frac{\text{opposite}}{\text{adjacent}} = \frac{3}{4}$. Find opposite when adjacent $=28$ cm. [3 marks]

$o = 28(\frac{3}{4}) = 21$ cm.

Answer: 21 cm

14. A rectangular field is 18 m by 24 m. Answer each part. [5 marks]

(a) Find the diagonal. [2 marks]

$d^2 = 324 + 576 = 900$.

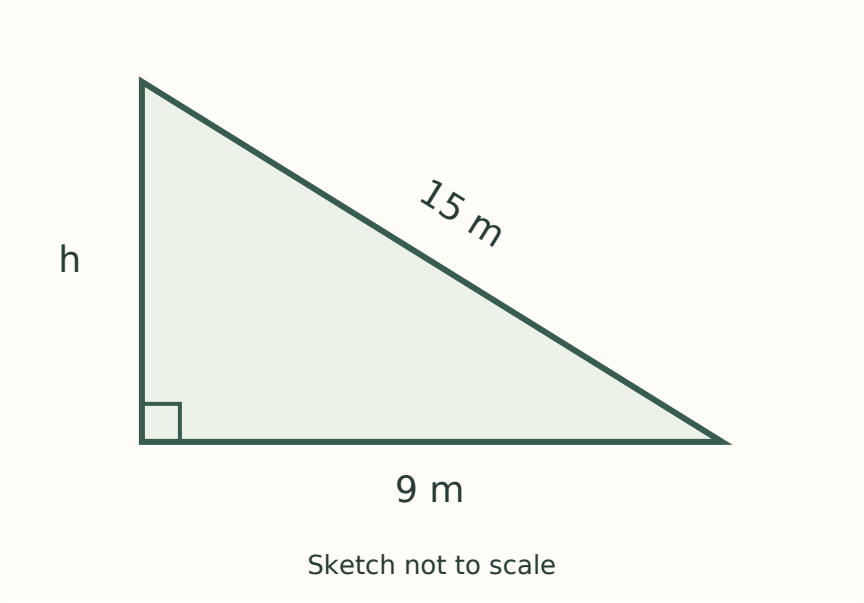
Answer: 30 m

(b) Find the angle between the diagonal and the 24 m side, to two decimal places. [3 marks]

$\theta = \tan^{-1}\left(\frac{18}{24}\right)$.

Answer: 36.87°

15. A 15 m ladder has its foot 9 m from a vertical wall. How high does it reach? [3 marks]



Sketch not to scale

$h = \sqrt{225 - 81} = 12$ m.

Answer: 12 m

16. A student writes $\tan 30^\circ = \frac{x}{10}$, then $x = \frac{10}{\tan 30^\circ}$. Correct the rearrangement and find x to two decimal places. [4 marks]

Multiply both sides by 10: $x = 10\tan 30^\circ$.

The student divided instead of multiplying.

Answer: $x = 10\tan 30^\circ \approx 5.77$