Pythagoras and Trigonometry - Practice paper 2

16 questions | 44 marks | 55 minutes

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

Equivalent correct methods earn the corresponding marks.

1. Triangle PQR is right-angled at R. Which side is the hypotenuse? [1 mark]

PQ is opposite right angle R.

Answer: PQ

2. Find the hypotenuse with legs 9 cm and 40 cm. [2 marks]

$c = \sqrt{81 + 1600} = 41$ cm.

Answer: 41 cm

3. Hypotenuse = 25 m and one leg = 7 m. Find the other leg. [2 marks]

$x = \sqrt{625 - 49} = 24$ m.

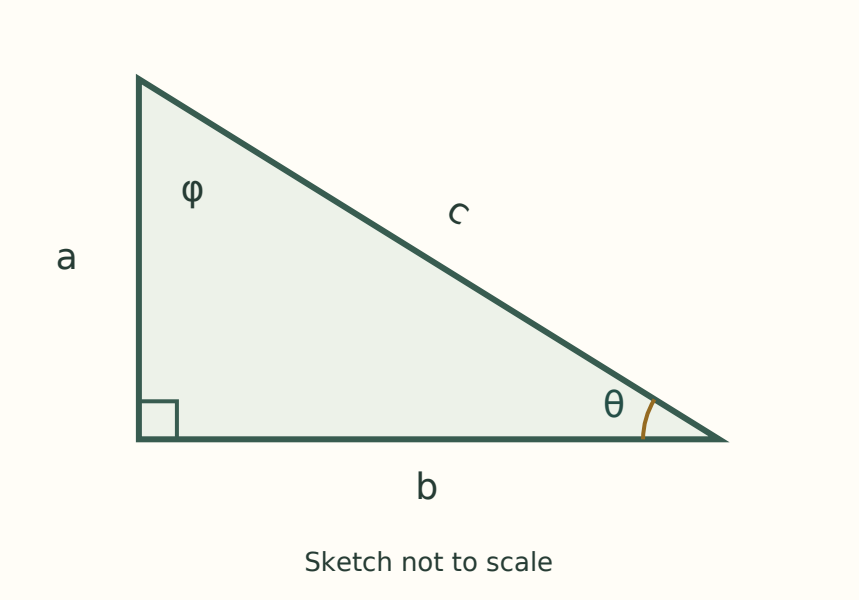
Answer: 24 m

4. Find the hypotenuse with legs 12 m and 13 m, exactly and to two decimal places. [3 marks]

$c = \sqrt{144 + 169} = \sqrt{313} \approx 17.69$ m.

Answer: $\sqrt{313}$ m; 17.69 m

5. Use upper angle φ instead of θ. Name opposite and adjacent. [2 marks]



Sketch not to scale

b lies across from φ; a touches φ and is not hypotenuse.

Answer: Opposite b; adjacent a

6. Enlarge a 5-12-13 triangle by 2.5. Find the three new side lengths and say whether the angles change. [3 marks]

Multiply every length by 2.5.

A uniform enlargement preserves angles.

Answer: 12.5, 30, 32.5; angles unchanged

7. You know adjacent and hypotenuse and need the acute angle. Which inverse function? [2 marks]

$\theta = \cos^{-1}(a/h)$.

Answer: Inverse cosine

8. Explain why sin θ = 1.2 cannot describe an acute angle in a right triangle. [2 marks]

For an acute angle $0 < \sin\theta < 1$.

Answer: Opposite cannot exceed hypotenuse.

9. Find adjacent when h = 22 m and θ = 41°. Give two decimal places. [3 marks]

$a = 22\cos 41^\circ$.

Answer: 16.60 m

10. Find adjacent when o = 12 cm and θ = 32°. Give two decimal places. [3 marks]

$\tan 32^\circ = 12/a$.

$a = 12/\tan 32^\circ$.

Answer: 19.20 cm

11. Find hypotenuse when a = 7 cm and θ = 54°. Give two decimal places. [3 marks]

$h = 7/\cos 54^\circ$.

Answer: 11.91 cm

12. Find the acute angle opposite a 9 cm side when hypotenuse = 15 cm. Give two decimal places. [3 marks]

$\theta = \sin^{-1}(9/15)$.

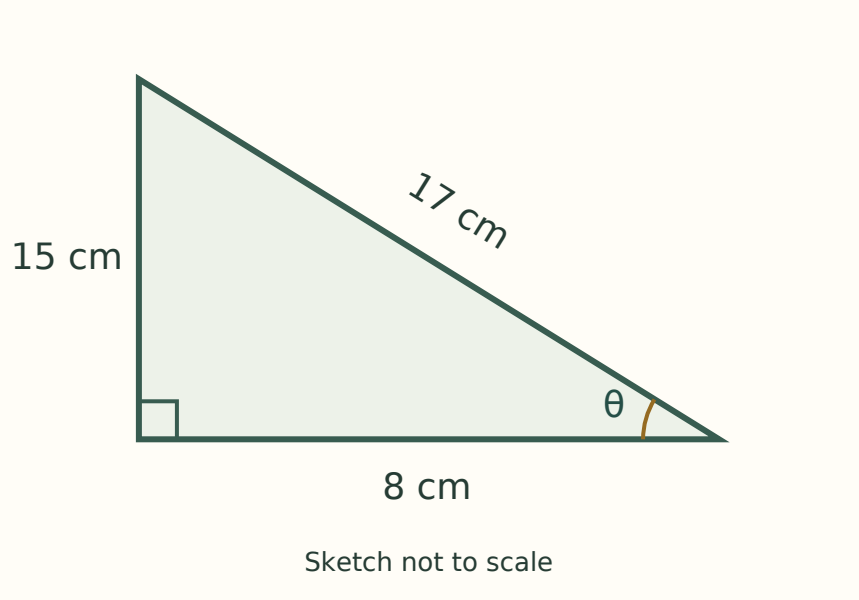
Answer: 36.87°

13. Find the angle with opposite 14 m and adjacent 20 m. Give two decimal places. [3 marks]

$\theta = \tan^{-1}(14/20)$.

Answer: 34.99°

14. Find θ in the diagram to one decimal place. [3 marks]



Sketch not to scale

$\theta = \sin^{-1}(15/17) \approx 61.9275^\circ$.

Answer: 61.9°

15. A ramp rises 0.8 m over a horizontal run of 6 m. Answer each part. [5 marks]

(a) Find the sloping length to two decimal places. [2 marks]

$L = \sqrt{36.64}$.

Answer: 6.05 m

(b) Find the angle to horizontal to two decimal places. [3 marks]

$\theta = \tan^{-1}(0.8/6)$.

Answer: 7.59°

16. A student says doubling all sides doubles the acute angles. Use side ratios to explain why this is false. [4 marks]

For example, $o/a = 3/4$ becomes $6/8 = 3/4$.

The same ratios give the same acute angles.

Answer: Angles stay unchanged.