Pythagoras' Theorem and Right-Angled Trigonometry

Geometry and measures · 6 questions · step-by-step answers at the end

Name: Date: Score: / 6

USEFUL EQUATIONS

$a^2 + b^2 = c^2$ $\sin\theta = \text{opp/hyp}$ $\cos\theta = \text{adj/hyp}$ $\tan\theta = \text{opp/adj}$

Questions

Show your working in the space under each question.

1. EASY A right-angled triangle has hypotenuse 13 cm and one side 5 cm. Find the third side.

2. EASY The hypotenuse is 10 cm and an angle is 30°. Find the side opposite the 30° angle.

3. MEDIUM A 6 m ladder has its foot 2 m from a wall. How high up the wall does it reach, and what angle does it make with the ground?

4. MEDIUM The side adjacent to a 40° angle is 7 cm. Find the hypotenuse.

5. HARD From a point 50 m from the foot of a tower, the angle of elevation of the top is 35°. Find the height of the tower.

6. HARD Use an equilateral triangle of side 2 to find the exact value of sin 60° and the area of the triangle.

Step-by-step answers

Pythagoras' Theorem and Right-Angled Trigonometry

1. $13^2 - 5^2 = 169 - 25 = 144$, so the side is **12 cm**.
2. opp = hyp × sin 30° = 10 × 0.5 = **5 cm**.
3. Height = √(36 − 4) = √32 = **5.66 m**. cos θ = 2/6, so θ = **70.5°**.
4. cos 40° = 7/hyp, so hyp = 7/cos 40° = **9.14 cm**.
5. height = 50 × tan 35° = **35.0 m**.
6. Split it in half: base 1, hypotenuse 2, so height = √(4 − 1) = √3. sin 60° = **√3/2**. Area = (1/2)(2)(√3) = **√3**.