

Boost Free Lessons - Year 9 Maths

Lesson 15: Finding Unknown Angle

Name: _____ Grade: _____ Date: _____

Worked Example 1

A right-angled triangle has an opposite side of 7 and a hypotenuse of 12. Find θ , correct to 1 decimal place.

1. Opposite and Hypotenuse means use sin: $\sin \theta = \frac{7}{12}$.
2. Work out the fraction as a decimal: $7 \div 12 = 0.5833$.
3. To get from the ratio back to the angle, use the inverse function $\sin^{-1}$ (often the SHIFT key).
4. $\theta = \sin^{-1}(0.5833) = 35.68\dots$

$\theta \approx 35.7^\circ$

Worked Example 2

A right-angled triangle has an opposite side of 9 and an adjacent side of 5. Find θ , correct to 1 decimal place.

1. Opposite and Adjacent means use tan: $\tan \theta = \frac{9}{5}$.
2. $9 \div 5 = 1.8$.
3. $\theta = \tan^{-1}(1.8) = 60.94\dots$
4. Unlike sin and cos, the value of tan can be larger than 1.

$\theta \approx 60.9^\circ$

Remember: To go from a ratio back to an angle, use the inverse functions $\sin^{-1}$, $\cos^{-1}$ and $\tan^{-1}$. Make sure your calculator is set to degrees.



Question 1: Find θ , correct to 1 decimal place.

1. $\sin \theta = 0.5$

2. $\cos \theta = 0.5$

3. $\tan \theta = 1$

4. $\sin \theta = \frac{3}{5}$

5. $\cos \theta = \frac{4}{5}$

6. $\tan \theta = \frac{3}{4}$

7. $\sin \theta = 0.8$

8. $\tan \theta = 2$



Question 2: Find θ from the sides given, correct to 1 decimal place.

1. Opposite 5, hypotenuse 8

2. Adjacent 6, hypotenuse 10

3. Opposite 4, adjacent 7

4. Opposite 12, hypotenuse 20

5. Adjacent 9, hypotenuse 15

6. Opposite 11, adjacent 4



Question 3: Answer the following questions, correct to 1 decimal place.

1. A 5 m ladder reaches 4 m up a wall. Find the angle the ladder makes with the ground.
2. A ramp rises 1.5 m over a horizontal distance of 8 m. Find the angle of the ramp.
3. A right-angled triangle has shorter sides of 8 and 15. Find the smaller acute angle.
4. A kite is 30 m above the ground on a string 50 m long. Find the angle the string makes with the ground.
5. A road rises 60 m over a distance of 900 m measured along the road. Find its angle of elevation.





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Answers: Finding Unknown Angle**Question 1**

- | | |
|-----------------|-----------------|
| 1. 30.0° | 5. 36.9° |
| 2. 60.0° | 6. 36.9° |
| 3. 45.0° | 7. 53.1° |
| 4. 36.9° | 8. 63.4° |

Question 2

- | | |
|-----------------|-----------------|
| 1. 38.7° | 4. 36.9° |
| 2. 53.1° | 5. 53.1° |
| 3. 29.7° | 6. 70.0° |

Question 3

1. 53.1°
2. 10.6°
3. 28.1°
4. 36.9°
5. 3.8°

