

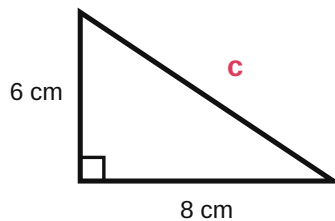
Boost Free Lessons - Year 8 Maths

Lesson 18: Finding the Hypotenuse

Name: _____ Grade: _____ Date: _____

Worked Example 1

Find the length of the hypotenuse in the triangle below.



1. Pythagoras' theorem says $c^2 = a^2 + b^2$, where c is the hypotenuse.
2. The hypotenuse is the side opposite the right angle, and it is always the longest side.
3. Substitute the two shorter sides: $c^2 = 6^2 + 8^2 = 36 + 64 = 100$.
4. Take the square root of both sides: $c = \sqrt{100}$.

$c = 10 \text{ cm}$

Worked Example 2

The two shorter sides of a right-angled triangle are 5 m and 9 m. Find the hypotenuse, correct to 1 decimal place.

1. $c^2 = 5^2 + 9^2$.
2. $5^2 = 25$ and $9^2 = 81$, so $c^2 = 106$.
3. $c = \sqrt{106} = 10.295\dots$
4. Round to 1 decimal place at the very end, never partway through.

$c \approx 10.3 \text{ m}$

Remember: The hypotenuse is opposite the right angle and is always the longest side. To find it, **add** the squares of the two shorter sides, then take the square root.



Question 1: Find the hypotenuse of a right-angled triangle with these two shorter sides.

1. 3 cm and 4 cm
2. 5 cm and 12 cm
3. 8 cm and 15 cm
4. 9 m and 12 m
5. 7 cm and 24 cm
6. 20 m and 21 m
7. 6 cm and 8 cm
8. 10 cm and 24 cm



Question 2: Find the hypotenuse for these shorter sides, correct to 1 decimal place.

1. 4 cm and 7 cm

2. 5 m and 5 m

3. 2 cm and 6 cm

4. 9 m and 11 m

5. 3.5 cm and 4.8 cm

6. 12 m and 15 m



Question 3: Answer the following questions.

1. A ladder has its foot 1.5 m from a wall and reaches 3.6 m up the wall. How long is the ladder?
2. A rectangular field measures 40 m by 30 m. How long is the diagonal?
3. A television screen is 60 cm wide and 45 cm tall. Find the length of its diagonal.
4. A boat sails 8 km east, then 6 km north. How far is it from where it started?
5. A ramp rises 1.2 m over a horizontal distance of 3.5 m. Find the length of the ramp, correct to 1 decimal place.





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Answers: Finding the Hypotenuse**Question 1**

- | | |
|----------|----------|
| 1. 5 cm | 5. 25 cm |
| 2. 13 cm | 6. 29 m |
| 3. 17 cm | 7. 10 cm |
| 4. 15 m | 8. 26 cm |

Question 2

- | | |
|-----------|-----------|
| 1. 8.1 cm | 4. 14.2 m |
| 2. 7.1 m | 5. 5.9 cm |
| 3. 6.3 cm | 6. 19.2 m |

Question 3

1. 3.9 m
2. 50 m
3. 75 cm
4. 10 km
5. 3.7 m

