

Foundation GCSE: Pythagoras' Theorem

Name: _____

Class: _____

Instructions: Answer all questions. Questions are ordered from easiest (1) to hardest (20). Working out should be shown where appropriate.

1. A right-angled triangle has shorter sides of length 3 cm and 4 cm. Calculate the length of the hypotenuse.
2. Calculate the length of the hypotenuse of a right-angled triangle with shorter sides 6 cm and 8 cm.
3. A right-angled triangle has sides of length 5 cm and 12 cm forming the right angle. Find the length of the hypotenuse.
4. The hypotenuse of a right-angled triangle is 10 cm and one shorter side is 6 cm. Calculate the length of the other shorter side.
5. A right-angled triangle has a hypotenuse of 13 cm and one side of length 5 cm. Find the length of the remaining side.
6. Calculate the length of the hypotenuse of a right-angled triangle where the two shorter sides are 9 cm and 12 cm.
7. A square has a side length of 7 cm. Calculate the exact length of its diagonal.
8. A rectangle measures 10 cm by 24 cm. Calculate the length of its diagonal.
9. A right-angled triangle has a hypotenuse of length 17 cm and one leg of length 8 cm. Find the length of the other leg.
10. Calculate the length of the hypotenuse when the shorter sides are 7 cm and 24 cm.
11. A ladder of length 5 m is placed against a vertical wall with its base 1.4 m away from the wall. Calculate how high up the wall the ladder reaches.
12. Find the missing side of a right-angled triangle where the hypotenuse is 20 cm and one side is 12 cm.
13. A rectangular garden path has dimensions 15 m by 36 m. Calculate the length of the direct diagonal shortcut across the grass.
14. Calculate the hypotenuse of a right-angled triangle with shorter sides of 9.5 cm and 16.8 cm, giving your answer to 1 decimal place.
15. Two points on a coordinate grid are located at (1,2) and (4,6). Calculate the straight-line distance between them.
16. An isosceles triangle has a base of 16 cm and equal sides of length 10 cm. Calculate the vertical height of the triangle.
17. A right-angled triangle has a hypotenuse of 25.4 cm and one side of 14.2 cm. Calculate the length of the remaining side to 1 decimal place.
18. A ship sails due North for 28 km, then due East for 45 km. Calculate the direct straight-line distance from its starting point.
19. An equilateral triangle has a side length of 12 cm. Calculate the exact vertical height of the triangle.
20. A rhombus has diagonals of lengths 18 cm and 24 cm. Calculate the exact length of one of the sides of the rhombus.

Answers & Worked Solutions

1. 5 cm : $\sqrt{3^2 + 4^2} = \sqrt{9 + 16} = \sqrt{25} = 5$.
2. 10 cm : $\sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100} = 10$.
3. 13 cm : $\sqrt{5^2 + 12^2} = \sqrt{25 + 144} = \sqrt{169} = 13$.
4. 8 cm : $\sqrt{10^2 - 6^2} = \sqrt{100 - 36} = \sqrt{64} = 8$.
5. 12 cm : $\sqrt{13^2 - 5^2} = \sqrt{169 - 25} = \sqrt{144} = 12$.
6. 15 cm : $\sqrt{9^2 + 12^2} = \sqrt{81 + 144} = \sqrt{225} = 15$.
7. $\sqrt{98}$ cm (or 9.9 cm) : $\sqrt{7^2 + 7^2} = \sqrt{98} \approx 9.9$.
8. 26 cm : $\sqrt{10^2 + 24^2} = \sqrt{100 + 576} = \sqrt{676} = 26$.
9. 15 cm : $\sqrt{17^2 - 8^2} = \sqrt{289 - 64} = \sqrt{225} = 15$.
10. 25 cm : $\sqrt{7^2 + 24^2} = \sqrt{49 + 576} = \sqrt{625} = 25$.
11. 4.8 m : $\sqrt{5^2 - 1.4^2} = \sqrt{25 - 1.96} = \sqrt{23.04} = 4.8$.
12. 16 cm : $\sqrt{20^2 - 12^2} = \sqrt{400 - 144} = \sqrt{256} = 16$.
13. 39 m : $\sqrt{15^2 + 36^2} = \sqrt{225 + 1296} = \sqrt{1521} = 39$.
14. 19.3 cm : $\sqrt{9.5^2 + 16.8^2} = \sqrt{90.25 + 282.24} = \sqrt{372.49} \approx 19.3$.
15. 5 units : $\sqrt{(4-1)^2 + (6-2)^2} = \sqrt{3^2 + 4^2} = 5$.
16. 6 cm : $\sqrt{10^2 - 8^2} = \sqrt{100 - 64} = \sqrt{36} = 6$.
17. 21.1 cm : $\sqrt{25.4^2 - 14.2^2} = \sqrt{645.16 - 201.64} = \sqrt{443.52} \approx 21.1$.
18. 53 km : $\sqrt{28^2 + 45^2} = \sqrt{784 + 2025} = \sqrt{2809} = 53$.
19. $6\sqrt{3}$ cm (or 10.4 cm) : $\sqrt{12^2 - 6^2} = \sqrt{144 - 36} = \sqrt{108} = 6\sqrt{3}$.
20. 15 cm : Half diagonals are 9 cm and 12 cm, so side = $\sqrt{9^2 + 12^2} = 15$.