

Applying Pythagoras theory – Solutions



Worked answers showing the equation, substitution, and solution for each problem.

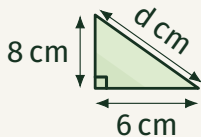
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Solution method

Identify the right-angled triangle, write Pythagoras' equation ($a^2 + b^2 = c^2$), substitute the known values, solve, and include units. Answers are shown to the required accuracy.

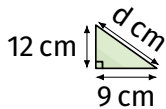
Worked example A rectangle is 6 m by 8 m. Find the diagonal.



$$d^2 = 6^2 + 8^2 = 36 + 64 = 100$$

$$d = \sqrt{100} = 10 \text{ m}$$

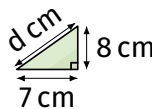
1. A rectangle measures 9 cm by 12 cm. Find the diagonal.



Solution

$$d^2 = 9^2 + 12^2 = 225, d = 15 \text{ cm}$$

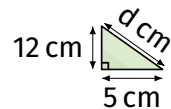
2. A rectangle is 7 m by 8 m. Find the diagonal to 1 d.p.



Solution

$$d^2 = 49 + 64 = 113, d \approx 10.6 \text{ m}$$

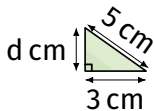
3. A rectangle is 5 cm by 12 cm. Find the diagonal.



Solution

$$d^2 = 25 + 144 = 169, d = 13 \text{ cm}$$

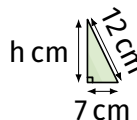
4. A 5 m ladder leans against a wall. It reaches 3 m up the wall. How far is the base from the wall?



Solution

$$5^2 = 3^2 + d^2, d^2 = 16, d = 4 \text{ m}$$

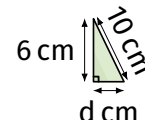
5. A ladder is 12 m long. Its base is 7 m from the wall. How high does it reach to 1 d.p.?



Solution

$$144 = 49 + h^2, h^2 = 95, h \approx 9.7 \text{ m}$$

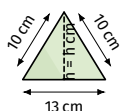
6. A ladder is 10 m long. It reaches 6 m up the wall. How far is the base from the wall to 1 d.p.?



Solution

$$100 = d^2 + 36, d^2 = 64, d = 8 \text{ m}$$

7. An isosceles triangle has equal sides of 13 cm and base 10 cm. Find the height.



Solution

$$13^2 = 5^2 + h^2, h^2 = 144, h = 12 \text{ cm}$$

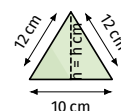
8. An isosceles triangle has equal sides of 10 cm and base 8 cm. Find the height to 1 d.p.



Solution

$$100 = 16 + h^2, h^2 = 84, h \approx 9.2 \text{ cm}$$

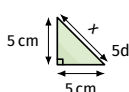
9. An isosceles triangle has equal sides 10 cm and base 12 cm. Find the height.



Solution

$$100 = 36 + h^2, h^2 = 64, h = 8 \text{ cm}$$

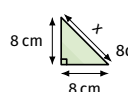
10. A square has side length 5 cm. Find its diagonal.



Solution

$$d^2 = 25 + 25 = 50, d \approx 7.07 \text{ cm}$$

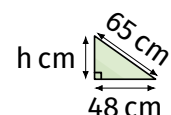
11. A square has side length 8 cm. Find its diagonal to 1 d.p.



Solution

$$d^2 = 64 + 64 = 128, d \approx 11.3 \text{ cm}$$

12. A TV screen is 65 inches (diagonal). The width is 48 inches. Find the height to the nearest inch.



Solution

$$4225 = 2304 + h^2, h \approx 44 \text{ in}$$

Applying Pythagoras theory – Solutions (continued)

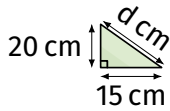


Page 2 of worked solutions.

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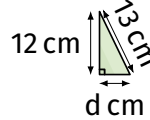
13. A rectangle is 15 cm by 20 cm. Find the diagonal.



Solution

$$d^2 = 225 + 400 = 625, d = 25 \text{ cm}$$

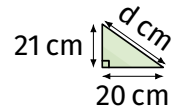
14. A ladder is 13 m long. It reaches 12 m up a wall. How far is the base from the wall?



Solution

$$169 = d^2 + 144, d^2 = 25, d = 5 \text{ m}$$

15. A rectangle is 20 m by 21 m. Find the diagonal to 1 d.p.



Solution

$$d^2 = 400 + 441 = 841, d = 29 \text{ m}$$

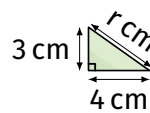
16. An isosceles triangle has equal sides 15 cm and base 14 cm. Find the height to 1 d.p.



Solution

$$225 = 49 + h^2, h^2 = 176, h \approx 13.3 \text{ cm}$$

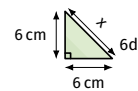
17. A ramp forms a right triangle. It rises 3 m and runs 4 m. Find the length of the ramp.



Solution

$$r^2 = 16 + 9 = 25, r = 5 \text{ m}$$

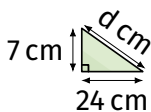
18. A square has side length 6 cm. Find its diagonal to 1 d.p.



Solution

$$d^2 = 36 + 36 = 72, d \approx 8.5 \text{ cm}$$

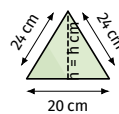
19. A rectangle is 24 cm by 7 cm. Find the diagonal.



Solution

$$d^2 = 576 + 49 = 625, d = 25 \text{ cm}$$

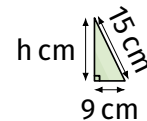
20. An isosceles triangle has equal sides 20 cm and base 24 cm. Find the height to 1 d.p.



Solution

$$400 = 144 + h^2, h^2 = 256, h = 16 \text{ cm}$$

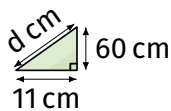
21. A ladder is 15 m long. Its base is 9 m from the wall. How high does it reach to 1 d.p.?



Solution

$$225 = 81 + h^2, h^2 = 144, h = 12 \text{ m}$$

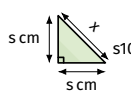
22. A rectangle is 11 cm by 60 cm. Find the diagonal to 1 d.p.



Solution

$$d^2 = 121 + 3600 = 3721, d = 61 \text{ cm}$$

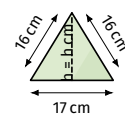
23. A square has diagonal 10 cm. Find its side length to 1 d.p.



Solution

$$100 = 2s^2, s^2 = 50, s \approx 7.1 \text{ cm}$$

24. An isosceles triangle has equal sides 17 cm and base 16 cm. Find the height.



Solution

$$289 = 64 + h^2, h^2 = 225, h = 15 \text{ cm}$$

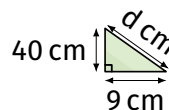
25. A ladder is 25 m long. It reaches 24 m up a wall. How far is the base from the wall?



Solution

$$625 = d^2 + 576, d^2 = 49, d = 7 \text{ m}$$

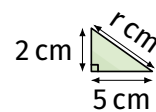
26. A rectangle is 9 cm by 40 cm. Find the diagonal to 1 d.p.



Solution

$$d^2 = 81 + 1600 = 1681, d = 41 \text{ cm}$$

27. A ramp rises 2 m and runs 5 m. Find the length of the ramp to 1 d.p.



Solution

$$r^2 = 25 + 4 = 29, r \approx 5.4 \text{ m}$$