

Start Tasks — Answers



Find x . Find the hidden dimension first.

1.



Solution

$$h = \sqrt{10^2 - 6^2} = 8$$

$$x = \sqrt{8^2 + 15^2} =$$

$$17 \text{ cm}$$

2.



Solution

$$d = \sqrt{3^2 + 4^2} = 5$$

$$x = \sqrt{5^2 + 12^2} =$$

$$13 \text{ m}$$

3.



Solution

$$h = \sqrt{13^2 - 5^2} = 12$$

$$x = \sqrt{12^2 + 9^2} =$$

$$15 \text{ cm}$$

4.



Solution

$$d = \sqrt{6^2 + 8^2} = 10$$

$$x = \sqrt{10^2 + 24^2} =$$

$$26 \text{ m}$$

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Find x . Show the two Pythagoras steps.

5.



Solution

$$h = \sqrt{17^2 - 8^2} = 15$$

$$x = \sqrt{15^2 + 20^2} = 25 \text{ cm}$$

6.



Solution

$$d = \sqrt{9^2 + 12^2} = 15$$

$$x = \sqrt{15^2 + 20^2} = 25 \text{ m}$$

7.



Solution

$$h = \sqrt{25^2 - 7^2} = 24$$

$$x = \sqrt{24^2 + 10^2} = 26 \text{ cm}$$

8.



Solution

$$d = \sqrt{5^2 + 12^2} = 13$$

$$x = \sqrt{13^2 + 84^2} = 85 \text{ cm}$$

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Find x . Show both equations or steps.

9.



Solution

$$h = \sqrt{41^2 - 9^2} = 40$$

$$x = \sqrt{40^2 + 42^2} = 58 \text{ m}$$

10. A rectangle is 9 cm by 12 cm. Find the diagonal, then the perimeter.

Solution

$$\text{Diagonal} = \sqrt{9^2 + 12^2} = 15$$

$$\text{Perimeter} = 2(9 + 12) = 42 \text{ cm}$$

11. A square has area 64 m^2 . Find the side, then the diagonal.

Solution

$$\text{Side} = \sqrt{64} = 8$$

$$\text{Diagonal} = 8\sqrt{2} \approx 11.3 \text{ m}$$

12. An isosceles triangle has equal sides 17 cm and base 16 cm. Find the height, then the area.

Solution

$$\text{Height} = \sqrt{17^2 - 8^2} = 15$$

$$\text{Area} = \frac{1}{2}(16)(15) = 120 \text{ cm}^2$$

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Find the hidden length first, then complete the second step.

13. A rectangle has diagonal 13 cm and width 5 cm. Find the length, then the perimeter.

Solution

$$\text{Length} = \sqrt{13^2 - 5^2} = 12$$

$$\text{Perimeter} = 2(5 + 12) = 34 \text{ cm}$$

15. A square has side 7 m. Find the diagonal, then explain if a 10 m path is long enough.

Solution

$$\text{Diagonal} = 7\sqrt{2} \approx 9.9 \text{ m}$$

Yes: $9.9 < 10$, long enough

14. A ladder reaches 8 m up a wall and the base is 6 m away. Find the ladder length, then round to 1 decimal place.

Solution

$$\begin{aligned}\text{Ladder} &= \sqrt{8^2 + 6^2} = 10 \\ &= 10.0 \text{ m (1 d.p.)}\end{aligned}$$

16. An isosceles triangle has equal sides 13 cm and base 24 cm. Find the height, then the area.

Solution

$$\text{Height} = \sqrt{13^2 - 12^2} = 5$$

$$\text{Area} = \frac{1}{2}(24)(5) = 60 \text{ cm}^2$$

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Two-step problems: find a hidden length first.

17. A rectangle is 3 m by 4 m. Find the diagonal, then the area.

Solution

$$\text{Diagonal} = \sqrt{3^2 + 4^2} = 5$$

$$\text{Area} = 3 \times 4 = 12 \text{ m}^2$$

18. A right triangle has hypotenuse 15 cm and one short side 9 cm. Find the other short side, then the area.

Solution

$$\text{Other side} = \sqrt{15^2 - 9^2} = 12$$

$$\text{Area} = \frac{1}{2}(9)(12) = 54 \text{ cm}^2$$

19. A square has diagonal 14 cm. Find the side, then the area.

Solution

$$\text{Side} = \frac{14}{\sqrt{2}} = 7\sqrt{2} \approx 9.9$$

$$\text{Area} = \frac{14^2}{2} = 98 \text{ cm}^2$$

20. A rectangle is 8 m by 15 m. Find the diagonal, then compare it with 23 m.

Solution

$$\text{Diagonal} = \sqrt{8^2 + 15^2} = 17$$

$17 < 23$, so shorter than 23 m

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Find the missing dimension, then use it in your calculation.

21. An isosceles triangle has equal sides 25 cm and base 14 cm. Find the height, then the area.

Solution

$$\text{Height} = \sqrt{25^2 - 7^2} = 24$$

$$\text{Area} = \frac{1}{2}(14)(24) = 168 \text{ cm}^2$$

22. A rectangle has diagonal 17 cm and width 8 cm. Find the length, then the perimeter.

Solution

$$\text{Length} = \sqrt{17^2 - 8^2} = 15$$

$$\text{Perimeter} = 2(8 + 15) = 46 \text{ cm}$$

23. A ladder is 25 m long and reaches 24 m high. Find the base distance, then the triangle area.

Solution

$$\text{Base} = \sqrt{25^2 - 24^2} = 7$$

$$\text{Area} = \frac{1}{2}(7)(24) = 84 \text{ m}^2$$

24. A square has side 9 cm. Find the diagonal exactly, then to 1 decimal place.

Solution

$$\text{Diagonal} = 9\sqrt{2} \text{ cm}$$

$$\approx 12.7 \text{ cm (1 d.p.)}$$

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Complete both steps: the hidden length, then the final target.

25. A triangle has area 24 cm^2 and base 8 cm . Find the height, then say if equal sides of 5 cm would fit an isosceles triangle.

Solution

$$\text{Height} = \frac{2(24)}{8} = 6$$

No: side needs $\sqrt{4^2 + 6^2} \approx 7.2 > 5$

27. A right triangle has hypotenuse 13 cm and one short side 12 cm . Find the other short side, then the area.

Solution

$$\text{Other side} = \sqrt{13^2 - 12^2} = 5$$

$$\text{Area} = \frac{1}{2}(12)(5) = 30 \text{ cm}^2$$

26. A rectangle is 4 cm by 5 cm . Find the diagonal, then the perimeter.

Solution

$$\text{Diagonal} = \sqrt{4^2 + 5^2} = \sqrt{41} \approx 6.4$$

$$\text{Perimeter} = 2(4 + 5) = 18 \text{ cm}$$