KIDSLEARN MATH · PRACTICE ASSIGNMENT

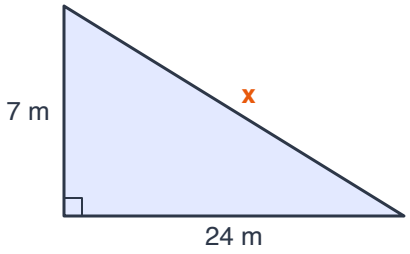
Pythagorean Theorem

Name: Date: Score: / 50

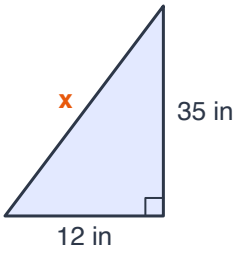
Use $a^2 + b^2 = c^2$, where c is the hypotenuse (the side opposite the right angle). Give each answer with its unit. When asked for "simplest radical form", write a root like $3\sqrt{5}$; otherwise round as the question says. Answers are at the end.

Part A — Warm-up

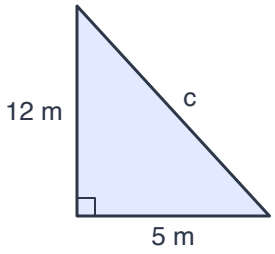
1. Find the length of the hypotenuse x.



2. Find the length of the hypotenuse x.



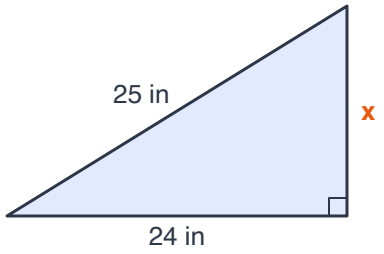
3. Find the length of the hypotenuse c.



4. A right triangle has legs of 24 in and 32 in. How long is its hypotenuse?

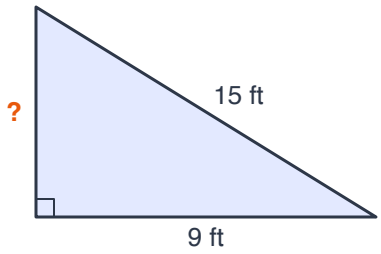
5. A right triangle has legs of 30 in and 16 in. How long is its hypotenuse?

6. Find the length of the missing side x.

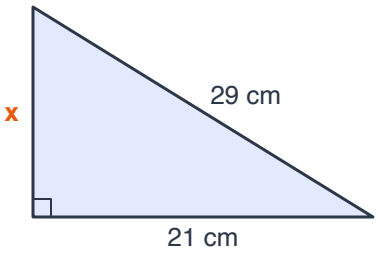


7. A right triangle has a hypotenuse of 25 in and one leg of 24 in. How long is the other leg?

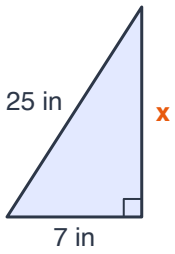
8. Find the length of the missing side.



9. Find the length of the missing side x.



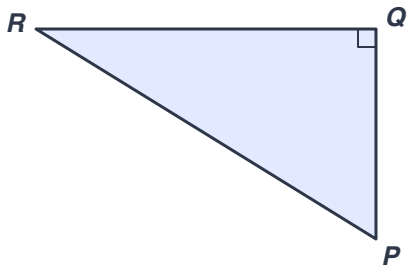
10. Find the length of the missing side x.



11. A right triangle has legs $a = 5$ and $b = 9$. What is c^2?

12. A right triangle has legs $a = 7$ and $b = 2$. What is c^2?

13. Triangle PQR has a right angle at Q. Which side is the hypotenuse?



(A) PQ (B) PR (C) QR

14. The squares on the two legs of a right triangle have areas 400 cm² and 441 cm². What is the area of the square on the hypotenuse?

15. A right triangle has legs $a = 10$ and $b = 10$. What is c^2?

Part B — Core practice

16. A triangle has sides 32, 24 and 40 cm. Is it a right triangle?

(A) Yes (B) No

17. Which set of side lengths makes a right triangle?

(A) 12, 35, 38 (B) 7, 23, 25 (C) 7, 22, 25 (D) 12, 35, 37

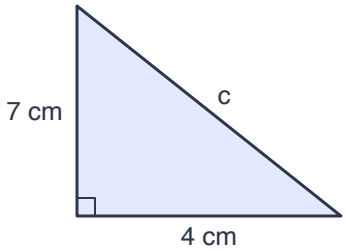
18. A triangle has sides 37, 37 and 12 cm. Is it a right triangle?

(A) Yes (B) No

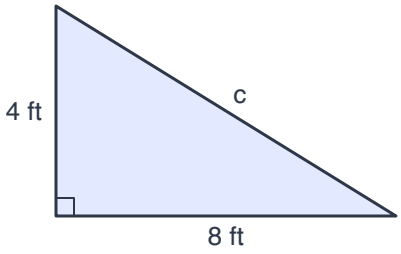
19. A triangle has sides 9, 40 and 42 cm. Is it a right triangle?

(A) Yes (B) No

20. Find c. Give your answer in simplest radical form.



21. Find c, to 1 decimal place.



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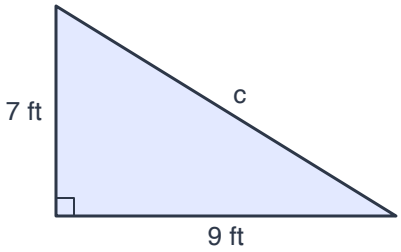
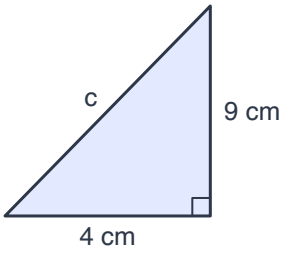
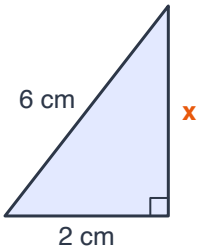


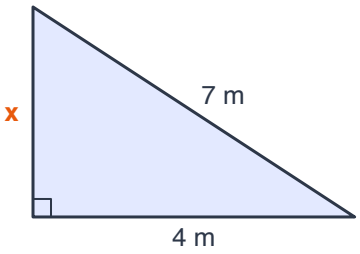
23. Find c, to 1 decimal place.



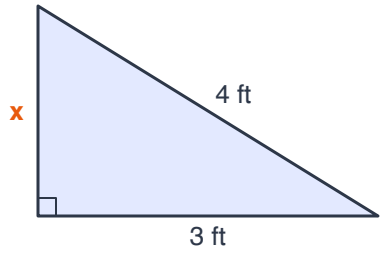
24. Find x. Give your answer in simplest radical form.



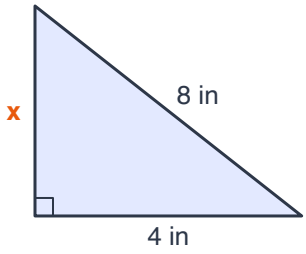
25. Find x, to 1 decimal place.



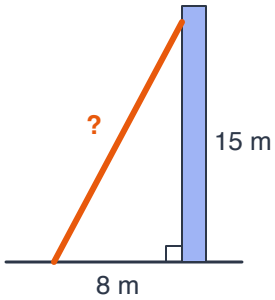
26. Find x, to 1 decimal place.



27. Find x, to 1 decimal place.



28. A ladder leans against a wall. Its foot is 8 m from the wall and its top reaches 15 m up the wall. How long is the ladder?



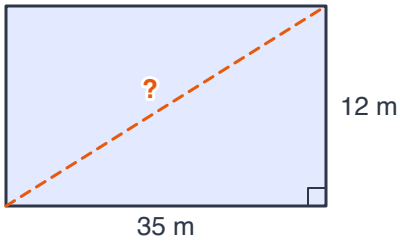
29. A rectangular field is 14 m by 48 m. Instead of walking along two sides to the opposite corner, Sam walks straight across the diagonal. How many metres shorter is Sam's walk?

30. A kite string is 37 m long and pulled tight. The kite is directly above a point 12 m away from the person holding the string (along the ground). How high is the kite? (Ignore the person's height.)

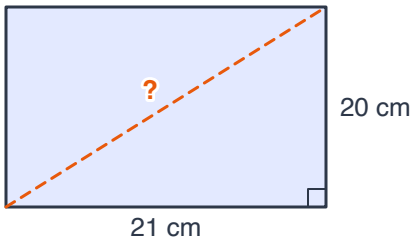
31. A hiker walks 20 km west and then 21 km south. How far is it from its starting point in a straight line?

32. A 39-inch TV screen (measured along the diagonal) is 36 inches wide. How tall is it?

33. Find the length of the diagonal of the rectangle.



34. Find the length of the diagonal of the rectangle.



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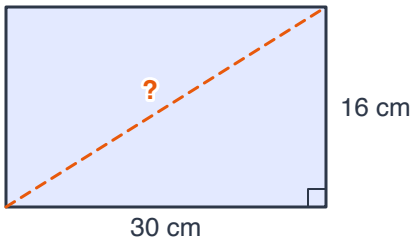
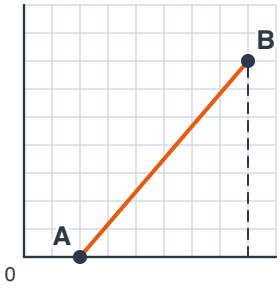
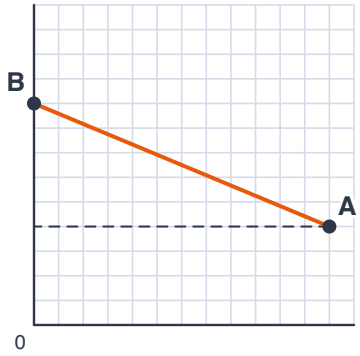


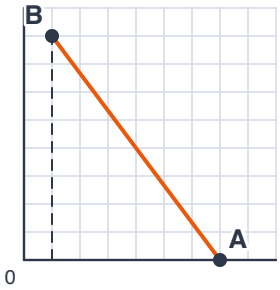
36. Find the distance between $A(2, 0)$ and $B(8, 7)$ in simplest radical form.



37. Find the distance between $A(12, 4)$ and $B(0, 9)$.

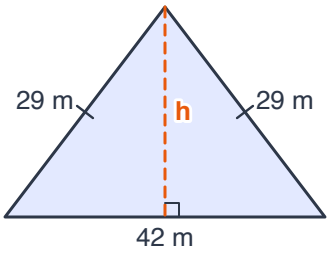


38. Find the distance between $A(7, 0)$ and $B(1, 8)$.

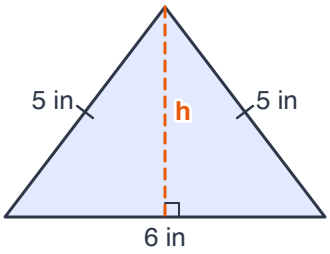


Part C — Challenge

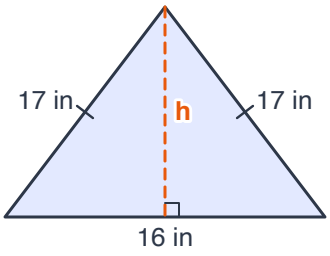
39. An isosceles triangle has two sides of 29 m and a base of 42 m. Find its area.



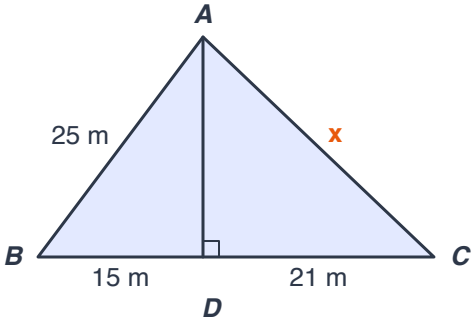
40. An isosceles triangle has two sides of 5 in and a base of 6 in. Find its height h.



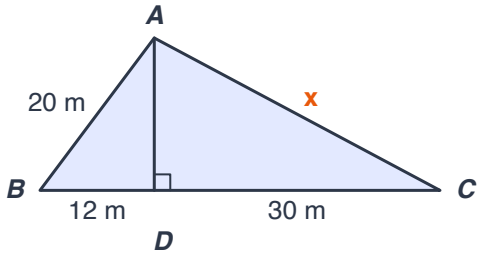
41. An isosceles triangle has two sides of 17 in and a base of 16 in. Find its height h.



42. AD is perpendicular to BC. Find $x = AC$.



43. AD is perpendicular to BC. Find $x = AC$.



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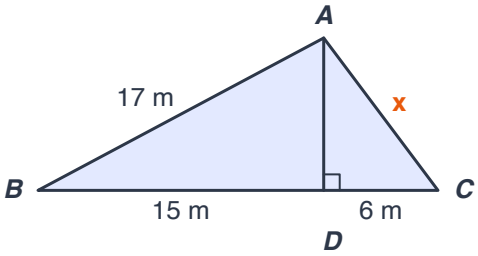
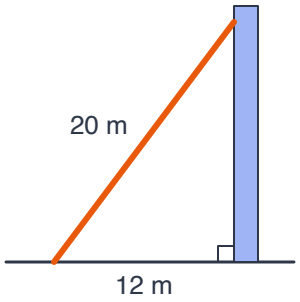


45. A right triangle has a hypotenuse of 26 cm and one leg of 24 cm. Find its area.

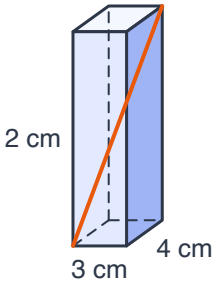
46. A right triangle has a hypotenuse of 34 in and one leg of 16 in. Find its perimeter.

47. A right triangle has a hypotenuse of 37 in and one leg of 35 in. Find its perimeter.

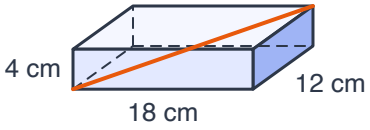
48. A 20 m ladder leans against a wall with its foot 12 m from the wall. The top slides down the wall by 4 m. How far does the foot of the ladder move away from the wall?



49. Find the length of the space diagonal of the box (the red line from one corner to the opposite corner).



50. Find the length of the space diagonal of the box (the red line from one corner to the opposite corner).



Answer Key — Pythagorean Theorem

1. **25 m**
   $c^2 = 7^2 + 24^2 = 49 + 576 = 625$, so $c = \sqrt{625} = 25$ m.

2. **37 in**
   $c^2 = 35^2 + 12^2 = 1225 + 144 = 1369$, so $c = \sqrt{1369} = 37$ in.

3. **13 m**
   $c^2 = 12^2 + 5^2 = 144 + 25 = 169$, so $c = \sqrt{169} = 13$ m.

4. **40 in**
   $c^2 = 24^2 + 32^2 = 576 + 1024 = 1600$, so $c = \sqrt{1600} = 40$ in.

5. **34 in**
   $c^2 = 30^2 + 16^2 = 900 + 256 = 1156$, so $c = \sqrt{1156} = 34$ in.

6. **7 in**
   $a^2 = c^2 - b^2 = 25^2 - 24^2 = 625 - 576 = 49$, so $a = \sqrt{49} = 7$ in.

7. **7 in**
   $a^2 = c^2 - b^2 = 25^2 - 24^2 = 625 - 576 = 49$, so $a = \sqrt{49} = 7$ in.

8. **12 ft**
   $a^2 = c^2 - b^2 = 15^2 - 9^2 = 225 - 81 = 144$, so $a = \sqrt{144} = 12$ ft.

9. **20 cm**
   $a^2 = c^2 - b^2 = 29^2 - 21^2 = 841 - 441 = 400$, so $a = \sqrt{400} = 20$ cm.

10. **24 in**
    $a^2 = c^2 - b^2 = 25^2 - 7^2 = 625 - 49 = 576$, so $a = \sqrt{576} = 24$ in.

11. **106**
    $c^2 = a^2 + b^2 = 25 + 81 = 106$.

12. **53**
    $c^2 = a^2 + b^2 = 49 + 4 = 53$.

13. **(B) PR**
    The hypotenuse is the side opposite the right angle at Q, which is PR. It is the longest side.

14. **841 cm²**
    $a^2 + b^2 = c^2$: the two small squares add up to the big one, $400 + 441 = 841$ cm².

15. **200**
    $c^2 = a^2 + b^2 = 100 + 100 = 200$.

16. **(A) Yes**
    $24^2 + 32^2 = 1600$ and $40^2 = 1600$ — equal, so it is a right triangle.

17. **(D) 12, 35, 37**
    $12^2 + 35^2 = 1369$ and $37^2 = 1369$ — equal, so it is a right triangle.

18. **(B) No**
    $12^2 + 37^2 = 1513$ and $37^2 = 1369$ — not equal, so it is not a right triangle.

19. **(B) No**
    $9^2 + 40^2 = 1681$ and $42^2 = 1764$ — not equal, so it is not a right triangle.

20. **$\sqrt{65}$ cm**
    $c = \sqrt{7^2 + 4^2} = \sqrt{65}$ cm.

21. **8.9 ft**
    $c = \sqrt{16 + 64} = \sqrt{80} \approx 8.9$ ft.

22. **$\sqrt{130}$ ft**
    $c = \sqrt{7^2 + 9^2} = \sqrt{130}$ ft.

23. **9.8 cm**
    $c = \sqrt{81 + 16} = \sqrt{97} \approx 9.8$ cm.

24. **$4\sqrt{2}$ cm**
    $x = \sqrt{6^2 - 2^2} = \sqrt{36 - 4} = \sqrt{32} = 4\sqrt{2}$ cm.

25. **5.7 m**
    $x = \sqrt{49 - 16} = \sqrt{33} \approx 5.7$ m.

26. **2.6 ft**
    $x = \sqrt{16 - 9} = \sqrt{7} \approx 2.6$ ft.

27. **6.9 in**
    $x = \sqrt{64 - 16} = \sqrt{48} \approx 6.9$ in.

28. **17 m**
    $\sqrt{8^2 + 15^2} = \sqrt{289} = 17$ m.

29. **12 m**
    Diagonal $= \sqrt{14^2 + 48^2} = 50$ m. Along the sides is $14 + 48 = 62$ m, so the saving is $62 - 50 = 12$ m.

30. **35 m**
    $\sqrt{37^2 - 12^2} = \sqrt{1225} = 35$ m.

31. 29 **km**
The two legs meet at a right angle: $\sqrt{20^2 + 21^2} = \sqrt{841} = 29$ km.

32. 15 **in**
$\sqrt{39^2 - 36^2} = \sqrt{225} = 15$ inches.

33. 37 **m**
The diagonal is the hypotenuse: $\sqrt{35^2 + 12^2} = \sqrt{1369} = 37$ m.

34. 29 **cm**
The diagonal is the hypotenuse: $\sqrt{21^2 + 20^2} = \sqrt{841} = 29$ cm.

35. 34 **cm**
The diagonal is the hypotenuse: $\sqrt{30^2 + 16^2} = \sqrt{1156} = 34$ cm.

36. $\sqrt{85}$
Across 6, up 7: $AB = \sqrt{6^2 + 7^2} = \sqrt{85}$.

37. 13
Across 12, up 5: $AB = \sqrt{12^2 + 5^2} = \sqrt{169} = 13$.

38. 10
Across 6, up 8: $AB = \sqrt{6^2 + 8^2} = \sqrt{100} = 10$.

39. 420 **m²**
The height cuts the base in half (21), so $h = \sqrt{29^2 - 21^2} = \sqrt{400} = 20$. Area $= \frac{1}{2} \times 42 \times 20 = 420$ m².

40. 4 **in**
The height cuts the base in half (3), so $h = \sqrt{5^2 - 3^2} = \sqrt{16} = 4$ in.

41. 15 **in**
The height cuts the base in half (8), so $h = \sqrt{17^2 - 8^2} = \sqrt{225} = 15$ in.

42. 29 **m**
In triangle ABD: $AD = \sqrt{25^2 - 15^2} = \sqrt{400} = 20$. In triangle ADC: $x = \sqrt{20^2 + 21^2} = \sqrt{841} = 29$ m.

43. 34 **m**
In triangle ABD: $AD = \sqrt{20^2 - 12^2} = \sqrt{256} = 16$. In triangle ADC: $x = \sqrt{16^2 + 30^2} = \sqrt{1156} = 34$ m.

44. 10 **m**
In triangle ABD: $AD = \sqrt{17^2 - 15^2} = \sqrt{64} = 8$. In triangle ADC: $x = \sqrt{8^2 + 6^2} = \sqrt{100} = 10$ m.

45. 120 **cm²**
Other leg $= \sqrt{26^2 - 24^2} = \sqrt{100} = 10$. Area $= \frac{1}{2} \times 24 \times 10 = 120$ cm².

46. 80 **in**
Other leg $= \sqrt{1156 - 256} = 30$. Perimeter $= 30 + 16 + 34 = 80$ in.

47. 84 **in**
Other leg $= \sqrt{1369 - 1225} = 12$. Perimeter $= 12 + 35 + 37 = 84$ in.

48. 4 **m**
At first the top is $\sqrt{20^2 - 12^2} = 16$ m high; after sliding it is 12 m. The foot is then $\sqrt{20^2 - 12^2} = 16$ m out, so it moves $16 - 12 = 4$ m.

49. 13 **cm**
Floor diagonal$^2 = 3^2 + 4^2 = 25$. Space diagonal $= \sqrt{25 + 12^2} = \sqrt{169} = 13$ cm.

50. 22 **cm**
Floor diagonal$^2 = 18^2 + 12^2 = 468$. Space diagonal $= \sqrt{468 + 4^2} = \sqrt{484} = 22$ cm.