LESSON MAKER PRO

Right Triangle Routes

Use square numbers to find missing side lengths.

GRADE 8 · 8.G.B

CCSS.Math.Content.8.G.B "Understand and apply the Pythagorean Theorem."

NAME _____ DATE _____

THE PYTHAGOREAN THEOREM

For a right triangle, add the squares of the two legs. The sum equals the square of the hypotenuse, which is the longest side opposite the right angle.

WORKED EXAMPLE

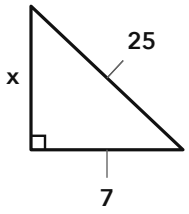
A right triangle has legs of 9 units and 12 units. Find the hypotenuse, x.

1. $9^2 + 12^2 = x^2$
2. $81 + 144 = x^2$
3. $225 = x^2$, so $x = 15$

Answer: 15 units

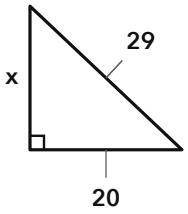
PRACTICE 6 problems

1 A right triangle has leg 7 and hypotenuse 25. Find the other leg x.



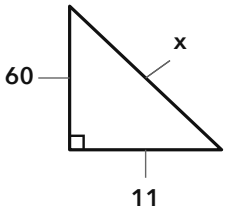
ANSWER _____

2 A right triangle has leg 20 and hypotenuse 29. Find the other leg x.



ANSWER _____

3 A right triangle has legs 11 and 60. Find the hypotenuse x.



ANSWER _____

4 A right triangle has one leg of 10 units and a hypotenuse of 26 units. Find the other leg, x.

ANSWER _____

5 The side lengths of a triangle are 6 units, 8 units, and 11 units. Is it a right triangle? Show a check.

ANSWER _____

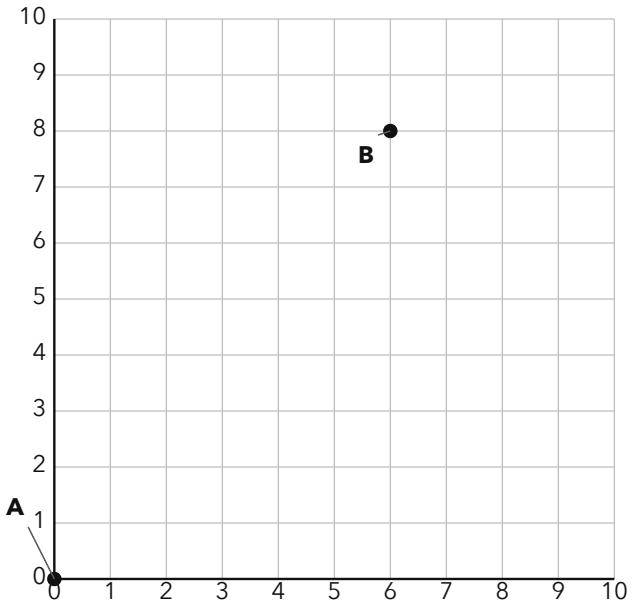
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6 Find x: $16^2 + 30^2 = x^2$.

ANSWER _____

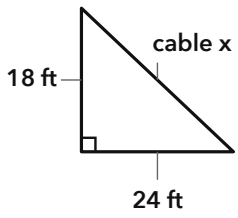
APPLY IT Show your work

1 In a video game, your character travels directly from checkpoint A to checkpoint B. Use the coordinate grid to find the distance, in blocks, between the checkpoints. The checkpoints are A(0,0) and B(6,8).



ANSWER _____

2 For a theater club set, a support cable runs from the top of an 18-ft post to a point on the floor 24 ft from the post's base. What is the cable's length?



ANSWER _____

CHALLENGE One step up

A right triangle has side lengths x, x + 1, and x + 9, with x + 9 as the hypotenuse. Find x and all three side lengths.

WORK SPACE AND ANSWER

ANSWER KEY

Right Triangle Routes

GRADE 8 · 8.G.B

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A right triangle has leg 7 and hypotenuse 25. Find the other leg x.	**x = 24**
2	A right triangle has leg 20 and hypotenuse 29. Find the other leg x.	**x = 21**
3	A right triangle has legs 11 and 60. Find the hypotenuse x.	**x = 61**
4	A right triangle has one leg of 10 units and a hypotenuse of 26 units. Find the other leg, x.	**x = 24**
5	The side lengths of a triangle are 6 units, 8 units, and 11 units. Is it a right triangle? Show a check.	**No; $6^2 + 8^2 = 100$, but $11^2 = 121$.**
6	Find x: $16^2 + 30^2 = x^2$.	**x = 34**

PART 2 · APPLY IT

1. **10 blocks** The horizontal and vertical changes are 6 blocks and 8 blocks. Since $6^2 + 8^2 = 100$, the distance is 10 blocks.
2. **30 ft** The post and floor distance are the legs, so $18^2 + 24^2 = x^2$. This gives $x^2 = 900$, so the cable is 30 ft long.

CHALLENGE

x = 20; the side lengths are 20, 21, and 29.

Accept equivalent correct equations and square-root work. For the right-triangle check, students must compare the sum of the squares of the two shorter sides with the square of the longest side.