

Module 3 topic b lesson 3 Pythagorean Theorem finding a missing leg.notebook



"I know what we're going to do today."

- 1) Bell Ringer: p. 61
- 2) Go over homework
- 3) Lesson 3: finding a leg
- 4) homework: pages 69-71

PS #10 due Friday

May 9 3:48 PM

$A^2 + B^2 = C^2$

Determine if the following triangles are right triangles using the Pythagorean Theorem.

1.) $A = 5, B = 6, C = 8$ $5^2 + 6^2 = 8^2$ $25 + 36 \neq 64$ Y / N

2.) $A = 6, B = 8, C = 10$ $6^2 + 8^2 = 10^2$ $36 + 64 \neq 100$ Y / N

3.) $A = 5, B = 8, C = 12$ $5^2 + 8^2 = 12^2$ $25 + 64 \neq 144$ Y / N

4.) $3^2 + 3^2 = 6^2$
 $9 + 9 \neq 36$

Jan 3 11:28 AM

5.) $A = 18, B = 24, C = 30$

$$18^2 + 24^2 = 30^2 \quad \text{Y/N}$$

6.) $A = 5, B = 12, C = 13$

$$5^2 + 12^2 = 13^2 \quad \text{Y/N}$$

$$25 + 144 = 169$$

7.) $A = 10, B = 24, C = 26$

$$10^2 + 24^2 = 26^2 \quad \text{Y/N}$$

$$100 + 576 = 676$$

8.) $A = 1, B = 1, C = \sqrt{2}$

$$1^2 + 1^2 = (\sqrt{2})^2 \quad \text{Y/N}$$

$$1 + 1 = 2$$

$$2$$

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P. lele

Lesson 12: Finding the length of a leg using Pythagorean Theorem

Classwork

Example 1

Given a right triangle with a hypotenuse with length 13 units and a leg with length 5 units, as shown, determine the length of the other leg.

$$a^2 + b^2 = c^2$$

$$5^2 + b^2 = 13^2$$

$$25 + b^2 = 169$$

$$b^2 = 144$$

$$b = 12$$

The length of the leg is 12 units.

$$25 + b^2 = 169$$

$$-25 \quad -25$$

$$\sqrt{b^2} = \sqrt{144}$$

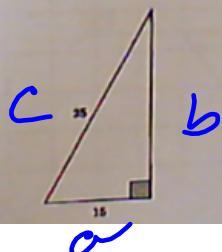
$$b = 12$$

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Exercises 1-2

1. Use the Pythagorean theorem to find the missing length of the leg in the right triangle.

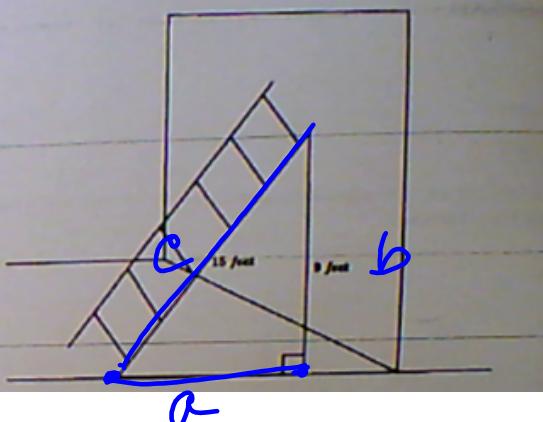


$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 15^2 + b^2 &= 25^2 \\
 225 + b^2 &= 625 \\
 -225 &\quad -225 \\
 b^2 &= 400 \\
 b &= 20
 \end{aligned}$$

Jan 3-11:25 AM

2. You have a 15-foot ladder and need to reach exactly 9 feet up the wall. How far from the wall should you place the ladder so that you can reach your desired location?

$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 a^2 + 9^2 &= 15^2 \\
 a^2 + 81 &= 225 \\
 -81 &\quad -81 \\
 a^2 &= 144 \\
 a &= 12
 \end{aligned}$$



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Pythagorean Triple

Exercises 3-6

3. Find the length of the segment AB , if possible.

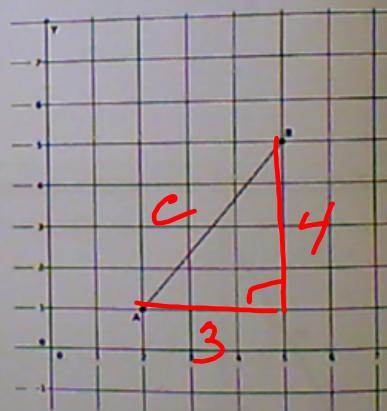
$$a^2 + b^2 = c^2$$

$$3^2 + 4^2 = c^2$$

$$9 + 16 = c^2$$

$$\sqrt{25} = \sqrt{c^2}$$

$$5 = c$$



Jan 3-1:18 PM

Pyth. Triples

3, 4, 5

6, 8, 10

9, 12, 15

12, 16, 20

5, 12, 13

10, 24, 26

15, 36, 39

7, 24, 25

14, 48, 50

Jan 3-1:22 PM

4. Given a rectangle with dimensions 5 cm and 10 cm, as shown, find the length of the diagonal, if possible.

$$a^2 + b^2 = c^2$$

$$10^2 + 5^2 = c^2$$

$$100 + 25 = c^2$$

$$125 = c^2$$

$$\sqrt{125} = c$$

exact
≈ 11.2 cm

Jan 3-11:26 AM

$$\sqrt{125}$$

$$\sqrt{25} \sqrt{5}$$

$$5\sqrt{5}$$

radical 25

$$5 \text{ radical } 5$$

$$\sqrt{72}$$

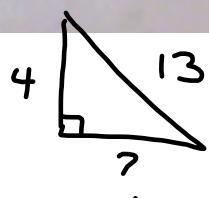
$$\sqrt{36} \sqrt{12}$$

$$6\sqrt{2}$$

Jan 3-1:28 PM

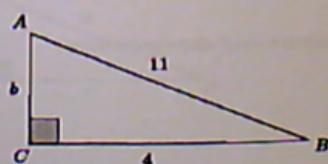
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5. A right triangle has a hypotenuse of length 13 in. and a leg with length 4 in. What is the length of the other leg?



Jan 3-11:26 AM

6. Find the length of b in the right triangle below, if possible.



Jan 3-11:26 AM

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Homework:

1. Find the length of the segment AB shown below, if possible.

A right triangle is plotted on a coordinate grid. The horizontal leg is labeled "3 feet" and the vertical leg is labeled "4 feet". The hypotenuse is labeled "AB". A right angle symbol is at vertex B.

Jan 3-11:26 AM

2. A 20-foot ladder is placed 12 feet from the wall, as shown. How high up the wall will the ladder reach?

A right triangle is drawn. The horizontal leg is labeled "12 feet". The hypotenuse is labeled "20 feet". A right angle symbol is at the vertex where the vertical leg meets the hypotenuse.

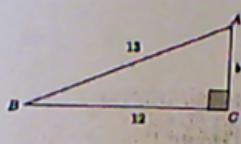
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A rectangle has dimensions 6 in. by 12 in. What is the length of the diagonal of the rectangle?

Use the Pythagorean theorem to find the missing side lengths for the triangles shown in Problems 4–8.

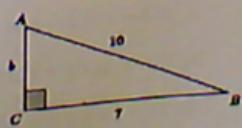
4. Determine the length of the missing side, if possible.



5. Determine the length of the missing side, if possible.



6. Determine the length of the missing side, if possible.



Jan 3-11:27 AM

7. Determine the length of the missing side, if possible.



8. Determine the length of the missing side, if possible.



Jan 3-11:27 AM