

**Lesson 8**  
**Converse, Word Problems & Applications**

**Part I: Given 3 sides of a triangle, determine if it is a right triangle**

- Step 1: Draw a right triangle**  
**Step 2: Label sides (be sure to label legs and hypotenuse correctly)**  
**Step 3: Plug into Pythagorean Theorem**  
**Step 4: Determine if it is a right triangle**

**Examples:**

1) Can a right triangle have the sides of 6, 9, and 12?

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

$$6^2 + 9^2 = 12^2$$

$$36 + 81 = 144$$

$$117 \neq 144 \quad \text{No}$$

2) Can a right triangle have the sides of 7, 24, and 25?

$$7^2 + 24^2 = 25^2$$

$$49 + 567 = 625$$

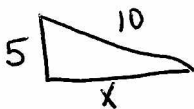
$$625 = 625 \quad \text{Yes}$$

**Part 2: Word Problems and Applications**

- Step 1: Draw a right triangle**  
**Step 2: Label sides (be sure to label legs and hypotenuse correctly)**  
**Step 3: Solve using the Pythagorean Theorem**

**Examples:**

3) A student designed a school pennant that is shaped like a right triangle. One side is 5 inches long, and the hypotenuse is 10 inches long. How long is the third side to the nearest tenth?



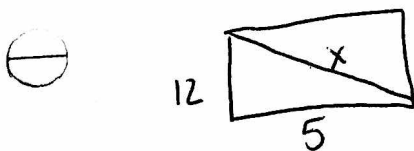
$$x^2 + 5^2 = 10^2$$

$$x^2 + 25 = 100$$

$$x^2 = 75$$

$x = 8.7$

4) A rectangle is 12 inches high and 5 inches wide. What is the measure of its diagonal?



$$5^2 + 12^2 = x^2$$

$$25 + 144 = x^2$$

$$\sqrt{169} = \sqrt{x^2}$$

$$13 = x$$

**Try These:**

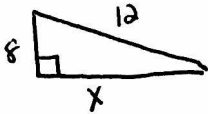
1) Can a right triangle have side lengths of 5, 8, 13.

$$25 + 64 = 169$$

$$89 \neq 169$$

No

2) Mr. Carroll designed a new Jet's pennant that is shaped like a right triangle. One side is 8 inches long and the hypotenuse is 12 inches long. How long is the third side to the nearest inch?



$$x^2 + 64 = 144$$

$$\sqrt{x^2} = \sqrt{80}$$

$$8.94$$

$$x = 9$$

**Lesson 8: Classwork (Round to the nearest tenth if necessary.)**

Problem	Picture	Work
1) Matt's ramp for his skateboard is 10 inches high and 30 inches long. How far will Matt travel up the ramp? Round to the nearest <u>tenth</u> if necessary.		$10^2 + 30^2 = x^2$ $100 + 900 = x^2$ $\sqrt{1000} = \sqrt{x^2}$ $x = 31.6$
2) A 15 foot ladder is leaning up against a brick wall. The bottom of the ladder is 9 feet from the base of the wall. How high up the wall does the ladder reach?		$x^2 + 9^2 = 15^2$ $x^2 + 81 = 225$ $\sqrt{x^2} = \sqrt{144}$ $x = 12$
3) A 20 foot rope is attached to the top of a flagpole. The rope reaches 12 feet from the base of the flagpole. What is the height of the flagpole?		$x^2 + 12^2 = 20^2$ $x^2 + 144 = 400$ $\sqrt{x^2} = \sqrt{256}$ $x = 16$
4) Trey drove 8 miles due east and then 5 miles due north. How far is Trey from his starting point? Round to the nearest <u>tenth</u> of an inch.		$5^2 + 8^2 = x^2$ $25 + 64 = x^2$ $\sqrt{89} = \sqrt{x^2}$ $9.4 = x$
5) Lauren is building a rectangular picture frame. If the sides of the frame are 8 inches by 10 inches, what should the diagonal measure?		$8^2 + 10^2 = x^2$ $64 + 100 = x^2$ $x = 12.8$