

Warm-Up:

Solve.

1) $\sqrt{x-9}=4$

$$\begin{array}{r} x-9=16 \\ +9 \quad +9 \\ \hline \end{array}$$

$$\sqrt{25-9}=4$$

$X=25$

2) $\sqrt{x+4}+3=0$

$$\begin{array}{r} 3-3 \\ \hline \end{array}$$

$$(\sqrt{x+4})^2 = (-3)^2$$

$$\sqrt{x+4}+3 \neq 0$$

$$\begin{array}{r} (\sqrt{x+4})^2 = 9 \\ \sqrt{\quad} = 3 \\ \hline \end{array}$$

$x=5$ No Solution

30) $L = \sqrt{kP}$ $L = 232$ ft

$P = 870,000$ lbs

$$(232)^2 = (\sqrt{k \cdot 870,000})^2$$

$$\frac{53,824}{870,000} = \frac{k \cdot 870,000}{870,000}$$

$$0.0619 = k$$

32) $\left(\sqrt{\frac{x}{6}}\right)^2 = (9)^2$

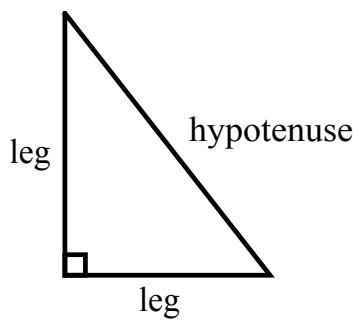
$$6 \cdot \frac{x}{6} = 81 \cdot 6$$

$$x = 486$$

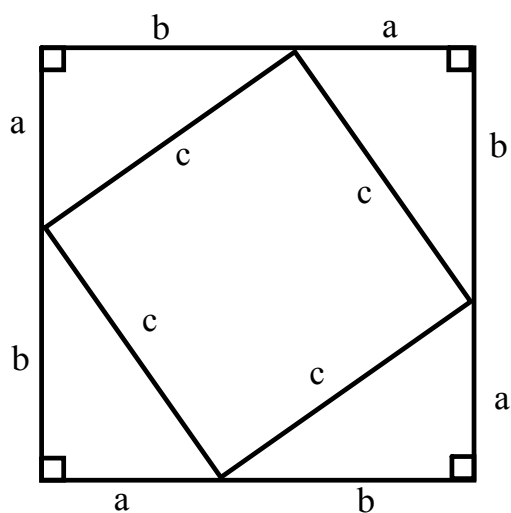
Section 10-4: The Pythagorean Theorem

In a right triangle, the side opposite the right angle is called the hypotenuse.

The other two sides are called legs.

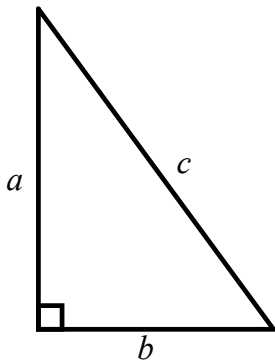


Write an expression for the area of this square.



The Pythagorean Theorem:

If a and b are the length of the legs in a right triangle, and c is the hypotenuse, then $a^2 + b^2 = c^2$.



Examples:

1) Find the length of the hypotenuse of a right triangle if the legs measure 18 units and 20 units.

$$18^2 + 20^2 = c^2$$

$$324 + 400 = c^2$$

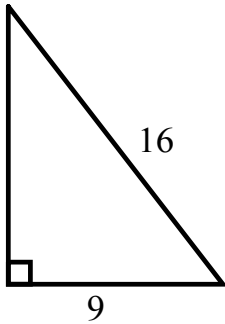
$$\sqrt{724} = \sqrt{c^2} = \sqrt{4} \sqrt{181}$$

$$\sqrt{724} = \sqrt{4 \cdot 181} = 2\sqrt{181}$$

$$c = 2\sqrt{181}$$

Examples:

2) Find the length of the missing side. Write in radical form.



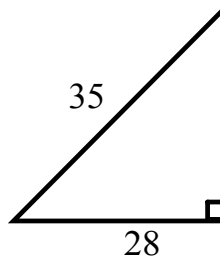
$$\begin{aligned} a^2 + 9^2 &= 16^2 \\ a^2 + 81 &= 256 \\ -81 \quad -81 & \end{aligned}$$

$$\sqrt{a^2} = \sqrt{175}$$

$$\begin{aligned} a &= \sqrt{25 \cdot 7} \\ a &= 5\sqrt{7} \end{aligned}$$

Examples:

3) What is the area of $\triangle XYZ$?



A) 94 units²

B) 128 units²

C) 294 units²

D) 588 units²

Converse of the Pythagorean Theorem:

If a and b are the measures of the smallest sides of a triangle, and c is the longest side, if $a^2 + b^2 = c^2$, then the triangle is a right triangle.

Examples:

Determine whether the following side measures form a right triangle.

4) 7, 12, 15

$$7^2 + 12^2 \stackrel{?}{=} 15^2$$

$$49 + 144 \neq 225$$

No

5) 27, 36, 45

$$27^2 + 36^2 = 45^2$$

$$729 + 1296 = 2025$$

Yes

A *Pythagorean Triple* is a set of three integers that would form the sides of a right triangle.

Examples:

3, 4, 5

5, 12, 13

7, 24, 25

8, 15, 17

Examples:

Determine whether the following side measures form a Pythagorean Triple.

4) 11, 59, 61

5) 9, 40, 41

Homework: pg. 552-554 #10-36 even, 42, 44, 51

Section 10-4 Vocab

$$\frac{\sqrt{2}}{\sqrt{11}} \cdot \frac{\sqrt{11}}{\sqrt{11}} = \frac{\sqrt{22}}{11}$$

$$\frac{4}{3+\sqrt{2}} \cdot \frac{(3-\sqrt{2})}{(3-\sqrt{2})} = \frac{12-4\sqrt{2}}{9-2}$$

$$\frac{12-4\sqrt{2}}{7}$$