Pythagorean Theorem:

* Given a right triangle, *then*

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

* $leg^2 + leg^2 = hyp^2$

Converse of Pythagorean Theorem:

If $a^2 + b^2 = c^2$, then the triangle is a right triangle.

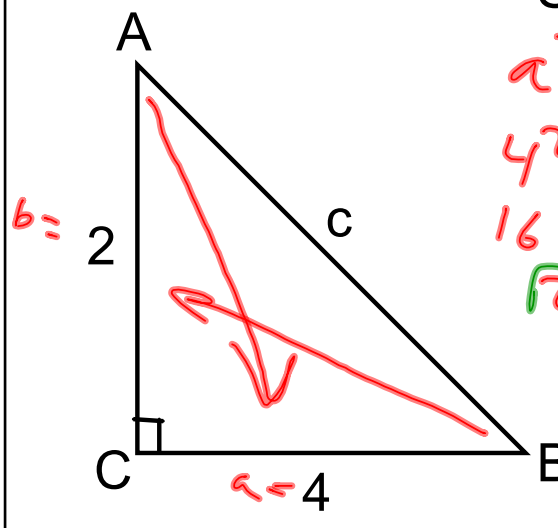
Pythagorean Triple:

*Three **whole** numbers that satisfy the equation $a^2 + b^2 = c^2$ where *c* is the greatest number.

*Examples: 3, 4, 5 6, 8, 10

Example 1:

Solve for c.



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

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

$16 + 4 = c^2$

$\sqrt{20} = \sqrt{c^2}$

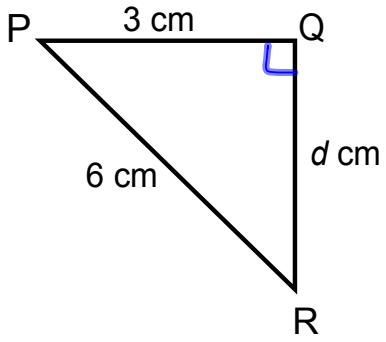
$\sqrt{20} = c$

$\sqrt{4} \cdot \sqrt{5} = c$

$2\sqrt{5} = c$

7-2 Pythagorean Theorem

Example 2: Find *d*.



$d^2 + 3^2 = 6^2$

$d^2 + 9 = 36$

$-9 \quad -9$

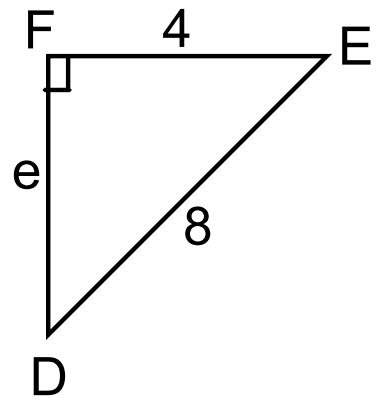
$\sqrt{d^2} = \sqrt{27}$

$d = \sqrt{27}$

$d = \sqrt{3} \cdot \sqrt{9}$

$d = 3\sqrt{3}$ cm

Example 3:



Solve for e.

$e^2 + 4^2 = 8^2$

$e^2 + 16 = 64$

$-16 \quad -16$

$\sqrt{e^2} = \sqrt{48}$

$e = \sqrt{48}$

$e = \sqrt{16} \cdot \sqrt{3}$

$e = 4\sqrt{3}$

Example 4:

Determine whether each set of measures are the sides of a right triangle. Then state if they form a Pythagorean Triple.

a. 9, 12, and 15 (a, b, c)

$9^2+b^2=c^2$

$9^2+12^2=15^2$

$81+144=225$

$225=225$ ✓

Yes, right △

Yes, pyth. triple

b. 21, 42, and 54 (a, b, c)

$21^2+42^2=54^2$

$441+1764=2916$

$2205 \neq 2916$

No, not a right △.

c. $4\sqrt{3}$, 4 and 8 (a, b, c)

$(4\sqrt{3})^2+4^2=8^2$

$4^2\cdot(\sqrt{3})^2$

$16\cdot 3+16=64$

$48+16=64$

$64=64$ ✓

Yes, right △.

no pyth. triple