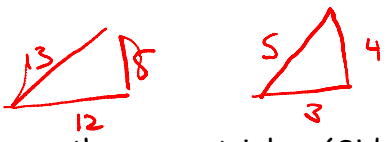
8.4 Using the Pythagorean Relationship

Warm-up:



25, 15, 20
5, 3, 4

1. Which of the following are pythagorean triples. (Side lengths create right triangles)

10, 6, 8

a) 5,6,7

$5^2+6^2=7^2$?

$25+36 \neq 49$

NO!

b) 5,13,12

$5^2+12^2=13^2$

$25+144=169$

yes ✓

c) 90,54,72

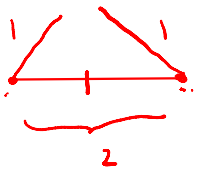
$54^2+72^2=90^2$

✓

yes

2. Is a 1,1,2 triangle possible?

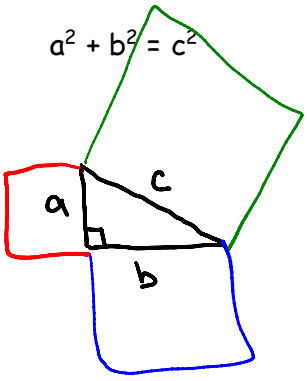
$1+1=2$



Not possible $a+b>c$

Common triples: (3,4,5), (5,12,13), (8, 15, 17), (7, 24, 25), (20, 21, 29), (11, 60, 61).

Using the Pythagorean Relationship:

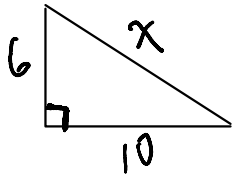


Used to find a missing side of a RIGHT triangle when given the other two sides.

hypotenuse.

Examples:

Find x.



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

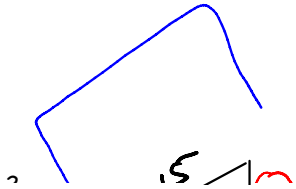
$6^2+10^2=x^2$

$36+100=x^2$

$136=x^2$ ← area of the square on "c"

$\sqrt{136}=x$

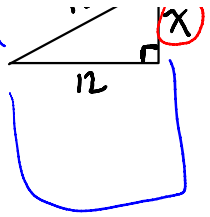
$11.6=x$



$m^2+n^2=15^2$

$b^2=c^2-a^2$

2.



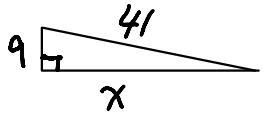
$x^2 = 15^2 - 12^2$

$x^2 = 225 - 144$

$x^2 = 81$

$x = 9$

3.



$x^2 = 41^2 - 9^2$

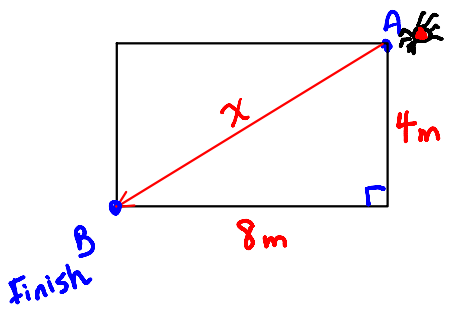
$x^2 = 1681 - 81$

$x^2 = 1600$

$x = \sqrt{1600}$

$x = 40$

4. How much longer is it to walk around the room than diagonally across?



Around? $8 + 4 = 12$ m

Across: $x^2 = 4^2 + 8^2$

$x^2 = 16 + 64$

$x^2 = 80$

$x = 8.94$

Shorter? $12 - 8.94 = 3$ m shorter

b) If it is walking at a speed of 1.2 m/sec diagonally. How fast would it have to walk around to get to the finish in the same amount of time?

$S = \frac{d}{t}$

$t = \frac{d}{S}$

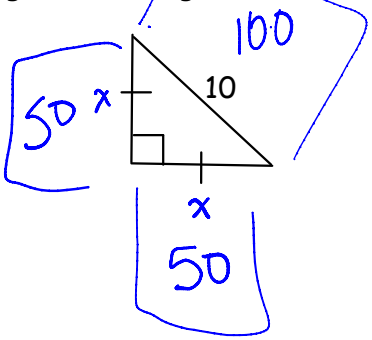
$t_D = t_{Around}$

$\frac{8.94\text{m}}{1.2\text{m/s}} = \frac{12\text{m}}{x}$

$8.94x = 14.4$

$x = 1.61$ m/sec

5. Find the length of the legs.



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

$\frac{2x^2}{2} = \frac{100}{2}$

$x^2 = 50$

$x = \sqrt{50}$

$x = 7.07$

Assignment p104: #4-16

← algebraic approach