BE-Geometry 11 Monday 11-1-10

(1.) Solve using EBS or EBA

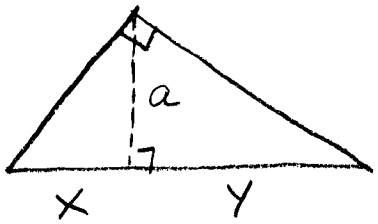
$$\begin{cases} y = -x + 3 \\ y = 2x - 3 \end{cases}$$

(2) Graph the above 2 lines on the <u>same</u> graph. Does their intersection support your answer to (1)?

Recall the 2 theorems we studied in Ch. 7-1 that applied to Right Triangles

Theorem 7.1 An altitude to the hypotenuse will form 3 similar $\triangle$'s

Theorem 7.2 An altitude to the hypotenuse will be the geometric mean of the 2 segments it makes on the hypotenuse.

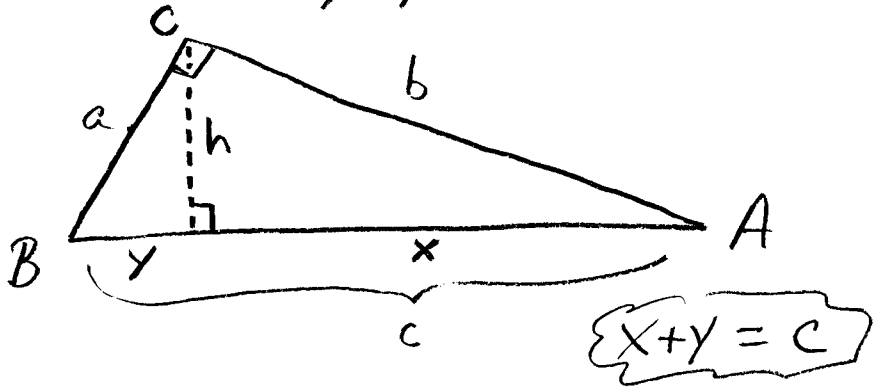


$$\frac{x}{a} = \frac{a}{y} \quad \therefore a^2 = xy$$

$$a = \sqrt{xy}$$

These can be used to prove another interesting Theorem.

Lets look at a typical right $\triangle$ with an altitude that measures h.
The sides are a, b, c (hypotenuse).
The $\angle$s are A, B, C.



Since all 3 $\triangle$'s are $\sim$.

$\frac{c}{a} = \frac{a}{y}$ ← hypotenuse / ← short leg Also: $\frac{c}{b} = \frac{b}{x}$ ← hypot / ← long leg

$\therefore a^2 = cy$ AND $b^2 = cx$

← ADD b^2 to left side AND cx to right side

$+ b^2 \quad + cx$

$a^2 + b^2 = cy + cx$

$a^2 + b^2 = c(y + x)$

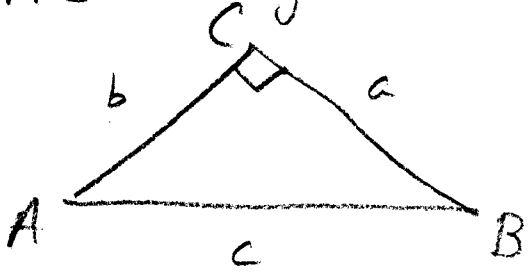
BUT $y + x = c$

$\therefore \boxed{a^2 + b^2 = c^2}$ Pythagorean Theorem

Pg 350 Theorem 7-5

Many other proofs including Pythagoras, a US President! (Which one??)

"Standard" Right △ labels



c is ALWAYS the hypotenuse

Know a, b ⇒ $c^2 = a^2 + b^2$

$c = \sqrt{a^2 + b^2}$

Know a, c ⇒ $b^2 = c^2 - a^2$

$b = \sqrt{c^2 - a^2}$

Know b, c ⇒ $a^2 = c^2 - b^2$

$a = \sqrt{c^2 - b^2}$

Converse of P.T.

If $c^2 = a^2 + b^2$ then it is a Right △ (Theorem 7.5)

↑ if you know one leg, c^2 is always first.

Why?

Because it is always bigger than a^2 or b^2 and length must be positive so it is always bigger − smaller

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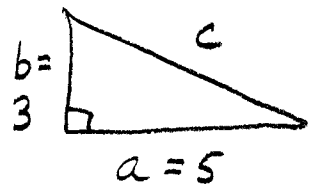
Ex 1 Pg 351 Find c



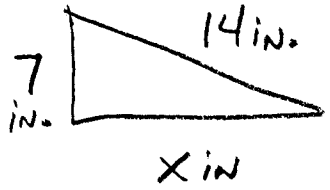
$3^2 + 5^2 = c^2$

$9 + 25 = c^2$ $\therefore$ $c^2 = 34$

$\boxed{c = \sqrt{34}}$

34
2 17

Ex 2 Pg 351 Find x



DO NOT USE a, b, c !!!

Use 7, x, 14

$7^2 + x^2 = 14^2$

$x^2 = 14^2 - 7^2$ $\therefore$ $x = \sqrt{196 - 49}$

14 7
3 49

$x = \sqrt{147}$

$\boxed{x = 7\sqrt{3} \text{ in}}$

units !!!

Pythagorean Triple whole numbers that satisfy $a^2 + b^2 = c^2$

Ex 3, 4, 5

Ex 6, 8, 10

Homework: Page 353-354 #4-6, 8-11.