Name: _____ Date: _____ Hour: _____

Unit 4A: Day 10: Finding the Length of the Hypotenuse

Focus Question: How do I find the length of the hypotenuse of a right triangle?

A. Using the calculator

1. As we leave the grid, not all numbers will stay below 15 and will not stay whole numbers. Find and use the squared button to simplify each term

a. 17^2 289

b. 7.5^2 56.25

c. 9.15^2 83.7225

d. $\sqrt{24}^2$ 24

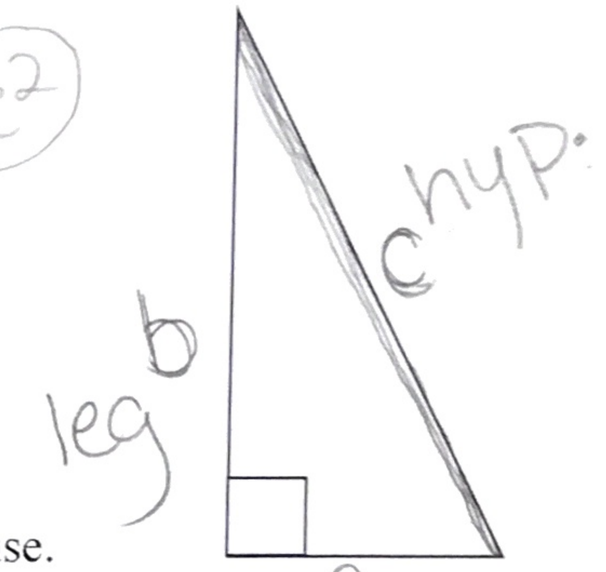
2. Fill in the table below.

Exact Number	$\sqrt{75}$	$\sqrt{171}$	$\sqrt{2}$	$\sqrt{116}$
My Estimate	$\sqrt{64}$ (11) $\sqrt{75}$ (6) $\sqrt{81}$ 8 — 9 ≈ 8.75	$\sqrt{169}$ (2) $\sqrt{171}$ (25) $\sqrt{196}$ 13 — 14 ≈ 13.05		
Calculator answer rounded to the nearest hundredth	8.66	≈ 13.08	1.41	10.77

B. The "Real" Pythagorean Theorem

1. On the right triangle, label the sides with *a*, *b*, and *c*.

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



2. Back in the days of Pythagoras (550 BC), they did not use *a*, *b*, and *c*. They used leg and hypotenuse. Pythagoras stated his theorem as "**in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the legs.**"

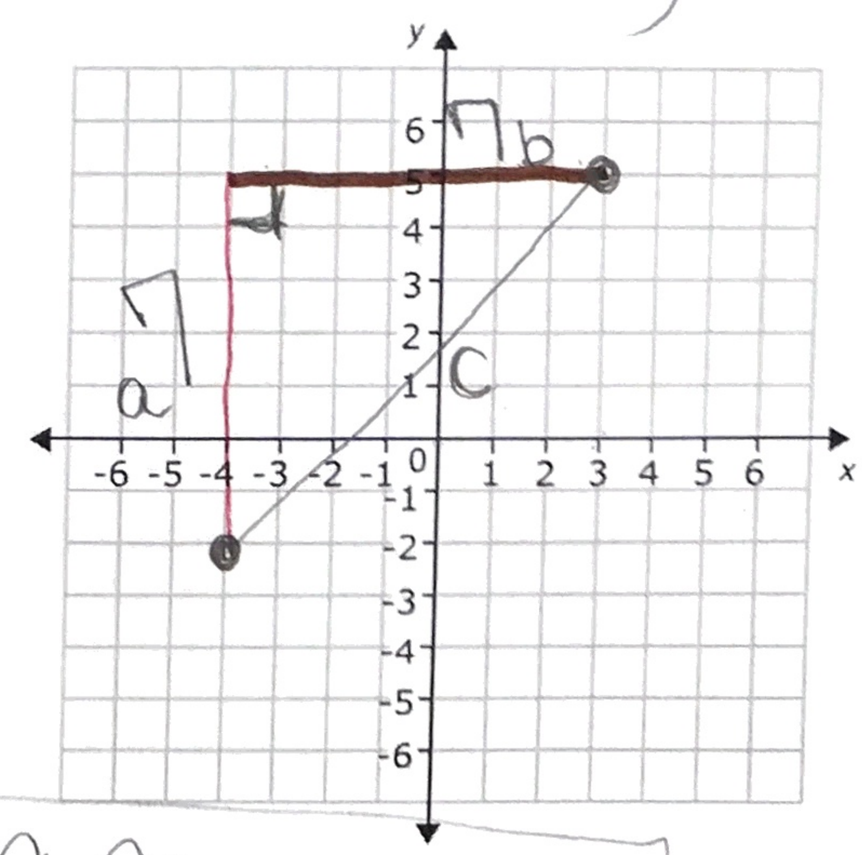
Write this using a, b, and c. Then, label the triangle using leg and hypotenuse.

sq. hyp = sq. leg + sq. leg

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

C. Finding the length of the hypotenuse (exact and approximate)

1. Find the distance between (-4, -2) and (3, 5)



x y

$7^2+7^2=c^2$

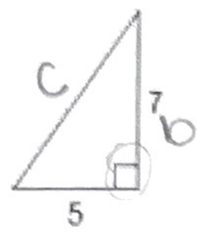
$49+49=c^2$

$\sqrt{98}=c^2$

exact → $\sqrt{98}=c$ $c \approx 9.90$ ← approx.

2. The following problems are even easier because the side lengths are given. Remember to label your triangle with a, b, and c. Then find the length of the hypotenuse. Give an exact answer and an answer rounded to the nearest hundredth (if necessary).

1)



$5^2 + 7^2 = c^2$

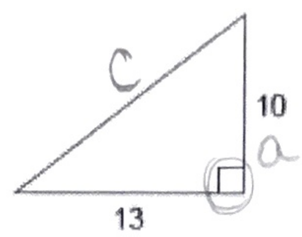
$25 + 49 = c^2$

$\sqrt{74} = \sqrt{c^2}$

$c = \sqrt{74} \approx 8.60$

exact approx.

2)



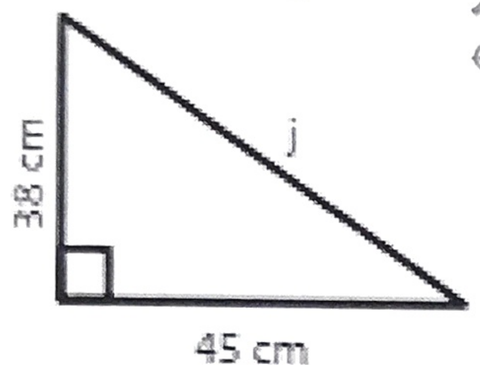
$10^2 + 13^2 = c^2$

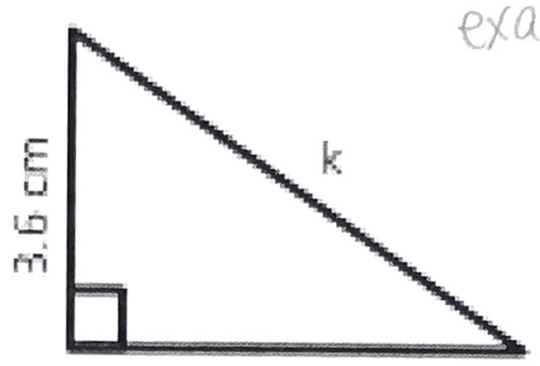
$100 + 169 = c^2$

$\sqrt{269} = \sqrt{c^2}$

$c = \sqrt{269} \approx 16.40$

exact





$\sqrt{51}\ cm$

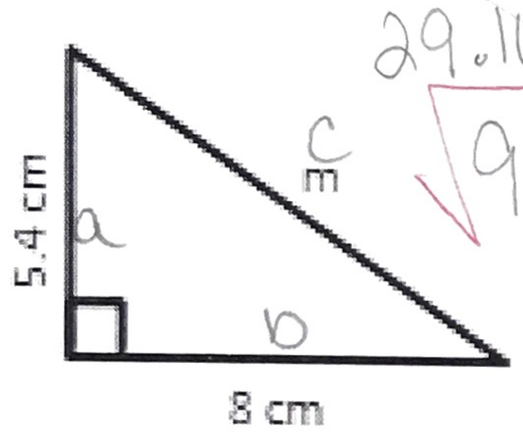
$5.4^2 + 8^2 = m^2$

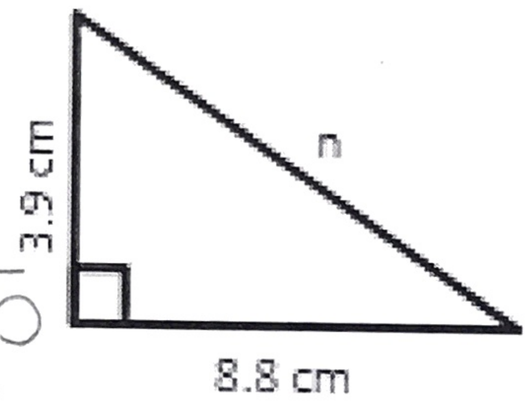
$29.16 + 64 = m^2$

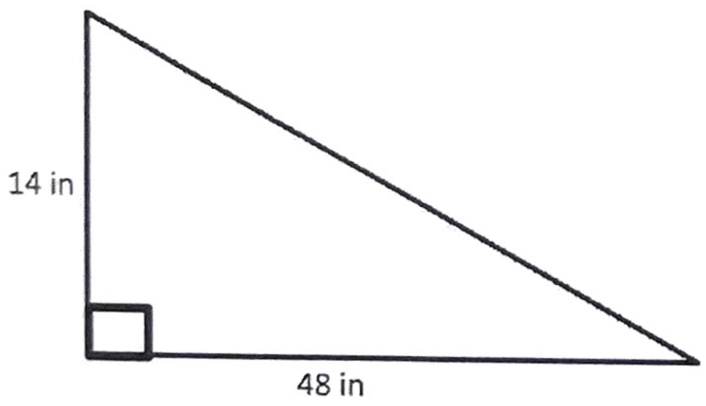
$\sqrt{93.16} = \sqrt{m^2}$

$m = \sqrt{93.16} \approx 9.65$

ex. app.







Jackie was asked to find the missing side length in the triangle at the left. Her work is below.

$$a^2 + b^2 = c^2$$
$$14^2 + 48^2 = c^2$$
$$28 + 96 = c^2$$
$$\sqrt{124} = \sqrt{c}^2$$
$$11.14 \approx c$$

Explain her error(s) in reasoning.