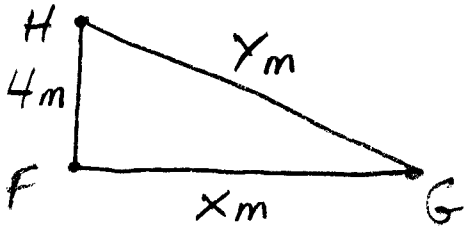
BE-Geometry 1 | Tuesday 11-8-11

ACT practice ① In $\triangle FGH$, find an expression for y in terms of x.



② What is the surface area of a $\frac{1}{2}$ inch cube?

③ For what value of a would the following* system of equations have an infinite number of solutions?*

$2x-y=8$
$6x-3y=4a$

Ans ① $y=\sqrt{x^2+16}$

② $\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)=\frac{1}{4}$ in^2 per side

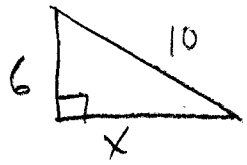
$\frac{1}{4}\cdot\frac{6}{1}=\frac{6}{4}=\boxed{\frac{3}{2}\text{ in}^2}$

③ Eq #2 must be a multiple (times 3) of Eq #1 ∴ $4a=3\cdot 8$

$4a=24$ $\boxed{a=6}$

Homework: Pg 353-354 #4-6, 8-11

④



$10^2 - 6^2 = x^2$

$100 - 36 = x^2$

$64 = x^2$ ∴ $\boxed{x = 8}$

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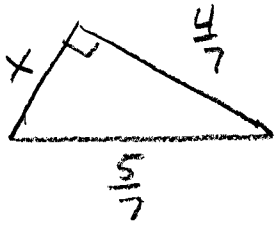
⑤



$x^2 = \left(\frac{5}{7}\right)^2 - \left(\frac{4}{7}\right)^2$

$x^2 = \frac{25}{49} - \frac{16}{49} = \frac{9}{49}$

$\boxed{x = \frac{3}{7}}$

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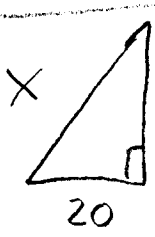
⑥



$325 = 37\frac{1}{2} = \frac{75}{2}$

$x^2 = \left(\frac{75}{2}\right)^2 + 20^2$

$x^2 = \frac{5625}{4} + 400$

$x^2 = \frac{5625}{4} + \frac{1600}{4}$

$x^2 = \frac{7225}{4}$

$x = \frac{\sqrt{7225}}{2}$

$\boxed{x = \frac{85}{2}}$

75 × 75 = 375 + 5250 = 5625

7225
5 | 1445
5 | 289
17 | 17

$\therefore 5^2 \cdot 17^2 = 7225$

$\sqrt{5^2} \cdot \sqrt{17^2} = \sqrt{7225}$

$5 \cdot 17 = \sqrt{7225}$

$85 = \sqrt{7225}$

(8) 15, 36, 39

$15^2 + 36^2 \stackrel{?}{=} 39^2$

$\times 15$ $\quad \times 36$ $\quad \times 39$

75 $\quad 216$ $\quad 351$

$225 + 1296 \stackrel{?}{=} 1521$

$1521 \stackrel{?}{=} 1521$ ✓

Yes

Pythagorean Triple ⇒ 15, 36, 39 (ALL INTEGERS)

(9) $\sqrt{40}, 20, 21$

$(\sqrt{40})^2 + 20^2 \stackrel{?}{=} 21^2$

$40 + 400 \stackrel{?}{=} 21^2$

NO

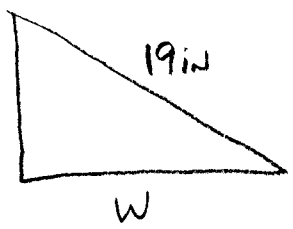
(10) $\sqrt{44}, 8, \sqrt{108}$

$(\sqrt{44})^2 + 8^2 = (\sqrt{108})^2$

$44 + 64 = 108$ ✓

Yes, NOT A PYTHAGOREAN TRIPLE, NOT ALL INTEGERS

(11)



$19^2 - \left(\frac{23}{2}\right)^2 = w^2$

$361 - \frac{529}{4} = w^2$

$\frac{1444}{4} - \frac{529}{4} = w^2$

$\frac{915}{4} = w^2$

$\frac{\sqrt{915}}{2} = w$

$w \approx \frac{30.25}{2} \approx 15.1$ in

915
5 183
3 61

23
×23
69
46
529

1444
−529
915

A <u>primitive (simple) Pythagorean Triple</u> is a Pythagorean Triple with no common factors except 1.

Pythagorean Triples that are <u>multiples</u> of a primitive Pythagorean Triple are called <u>families</u> of Pythagorean Triples

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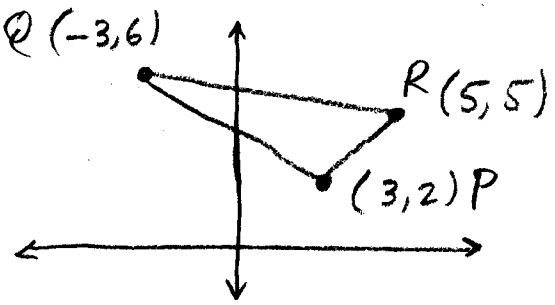
(Ex)

a	b	c	
3	4	5	Primitive
6	8	10	families
9	12	15	
12	16	20	
⋮	⋮	⋮	

All of the Δ^{le} are similar since they all have a common scale factor, in this case is a multiple of 3, 4, and 5

Ex 3 Pg 352 Is $\triangle PQR$ a right $\triangle$?



Find the measure of each leg using distance formula

$\overline{QR} = \sqrt{(6-5)^2 + (-3-5)^2} = \sqrt{1+64} = \sqrt{65}$

$\overline{QP} = \sqrt{(6-2)^2 + (-3-3)^2} = \sqrt{16+36} = \sqrt{52} = 2\sqrt{13}$

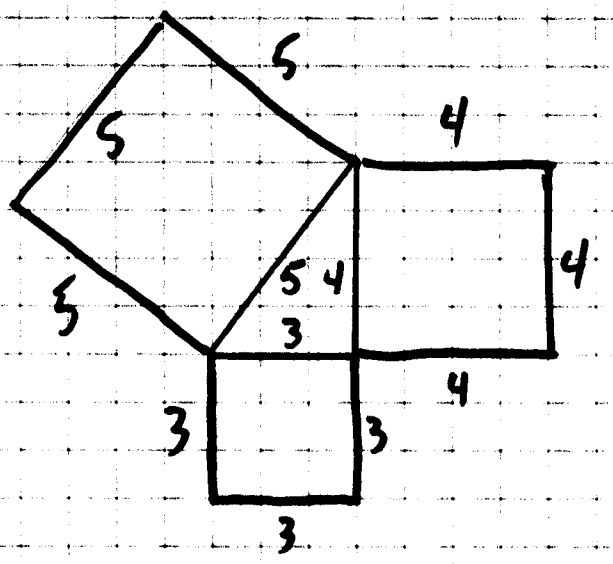
$\overline{RP} = \sqrt{(5-2)^2 + (5-3)^2} = \sqrt{9+4} = \sqrt{13}$

$\sqrt{13}, 2\sqrt{13}, \sqrt{65}$ ← hypotenuse ?

$(\sqrt{13})^2 + (2\sqrt{13})^2 \stackrel{?}{=} (\sqrt{65})^2$

$13 + (4 \cdot 13) \stackrel{?}{=} 65$ ✓ Yes, A right $\triangle$

Is the Square of the Hypotenuse Equal to the Sum of the Squares of the other 2 sides in a right Δ?



This is the general approach taken by Pythagoras ⇒ prove the areas of the squares are equal.

Garfield's Proof involved Triangles and Trapezoids.

James A. Garfield – 20th president

Poor Docs

Born in Ohio. Assassinated after only 200 days in office. Shot in 1881. A.G. Bell metal det! Civil war general – battles inc. Shiloh.

Homework: Pg 354 #18, 19, 22, 26, 27, 30 and 31

↑

"Complete" the table means fill in the missing information.