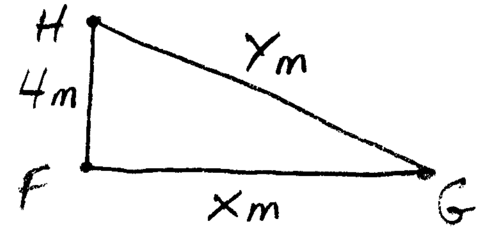
BE - GEOMETRY I | TUESDAY 11-2-10

ACT PRACTICE

① IN ΔFGH, 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

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

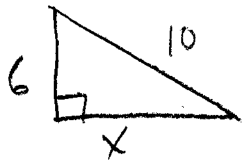
③ Eq #2 must be a multiple (times 3) of Eq #1 $\therefore$ $4a = 3 \cdot 8$

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

1

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

(4)



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

$100 - 36 = x^2$

$64 = x^2 \therefore \boxed{x = 8}$

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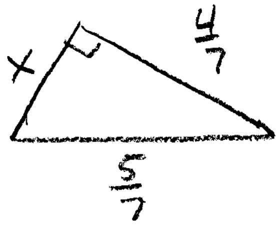
(5)



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

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

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

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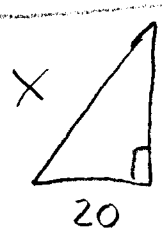
(6)



$37.5 = 37\frac{1}{2} = \frac{75}{2}$

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

$$\begin{array}{r} 75 \\ \times 75 \\ \hline 375 \\ 525 \\ \hline 5625 \end{array}$$

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

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

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

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

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

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

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

$$\begin{array}{r} 15 \\ \times 15 \\ \hline 75 \\ 15 \\ \hline 225 \end{array} \quad + \quad \begin{array}{r} 36 \\ \times 36 \\ \hline 216 \\ 108 \\ \hline 1296 \end{array} \quad \stackrel{?}{=} \quad \begin{array}{r} 39 \\ \times 39 \\ \hline 351 \\ 117 \\ \hline 1521 \end{array}$$

$$\begin{array}{r} 1296 \\ +225 \\ \hline 1521 \end{array} \stackrel{?}{=} 1521 \checkmark$$

Yes

Pythagorean Triple $\Rightarrow$ 15, 36, 39

(ALL integers)

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

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

$$40 + 400 \stackrel{?}{=} 21^2 \qquad \boxed{\text{No}}$$

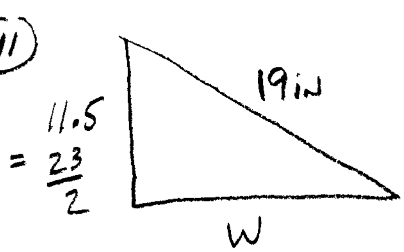
(10) $\sqrt{44}$, 8, $\sqrt{108}$

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

$$44 + 64 = 108 \checkmark$$

Yes, NOT A Pythagorean Triple, NOT ALL integers

(11)



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

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

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

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

$$\boxed{\frac{\sqrt{915}}{2} = w} \qquad \boxed{w \approx \frac{30.25}{2} \approx 15.1 \text{ in}}$$

$$\begin{array}{r} 23 \\ \times 23 \\ \hline 69 \\ 46 \\ \hline 529 \end{array} \qquad \begin{array}{r} 1444 \\ -529 \\ \hline 915 \end{array}$$

915 = (5) · 183

183 = (3) · 61

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

Pythagorean Triples that are multiples of a primitive Pythagorean Triple are called families of Pythagorean Triples

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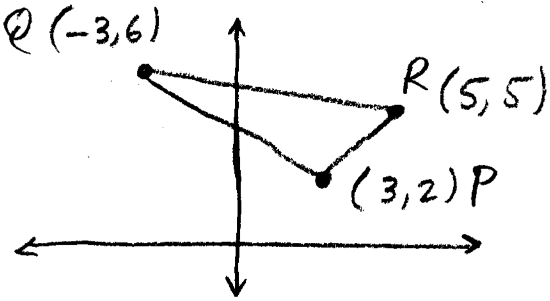
Ex

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

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

$\overline{\text{Ex 3}}$
$\underline{\text{pg 352}}$

IS $\triangle PQR$ A RIGHT $\triangle$?



FIND THE measure of each leg using distance formula

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

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

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

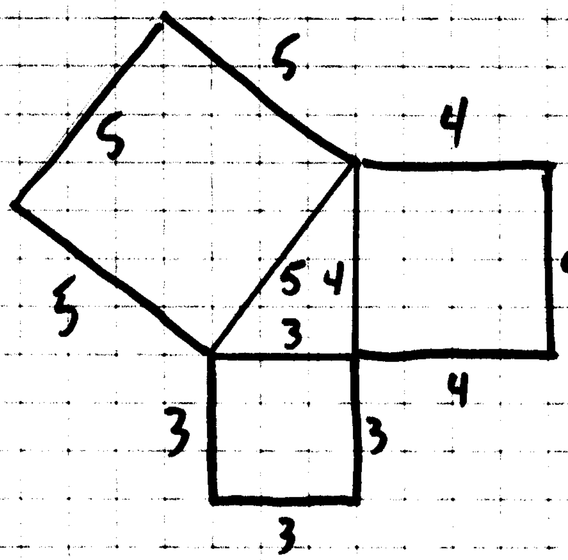
$\sqrt{13},\ 2\sqrt{13},\ \sqrt{65}$ ⟸ hypotenuse ?

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

$$13 + (4 \cdot 13) \stackrel{?}{=} 65 \ \checkmark$$

$\boxed{\text{Yes, A RIGHT } \triangle}$

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 $\Rightarrow$ 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.