Name _____ Hour _____

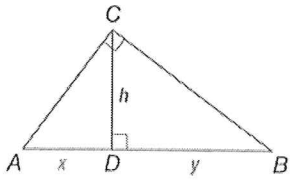
GEOMETRIC MEAN NOTES

Theorems

For Your FOLDABLE

Right Triangle Geometric Mean Theorems

8.2 **Geometric Mean (Altitude) Theorem** The altitude drawn to the hypotenuse of a right triangle separates the hypotenuse into two segments. The length of this altitude is the geometric mean between the lengths of these two segments.

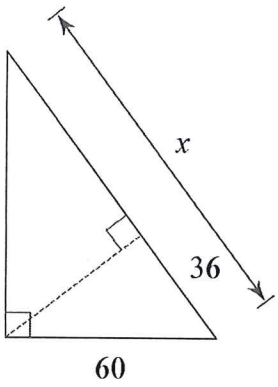


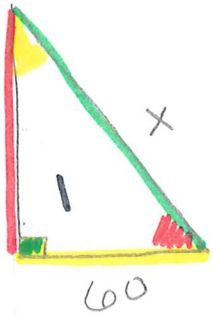
Example If $\overline{CD}$ is the altitude to hypotenuse $\overline{AB}$ of right $\triangle ABC$, then $\frac{x}{h} = \frac{h}{y}$ or $h = \sqrt{xy}$.

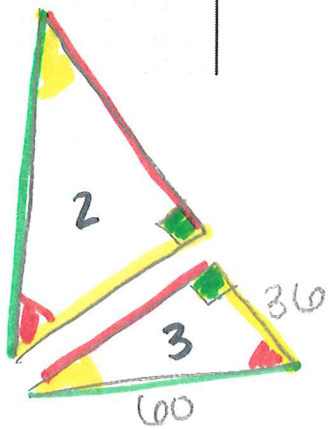
Review Vocabulary

altitude (of a triangle) a segment from a vertex to the line containing the opposite side and perpendicular to the line containing that side (Lesson 5-2)

Example 1





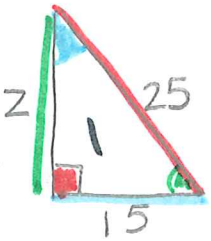


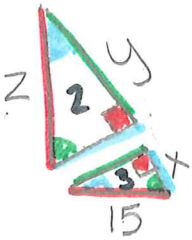
$\frac{x}{60} = \frac{60}{36}$

$3600 = 36x$

$\boxed{x = 100}$

Example 2 ~~3~~



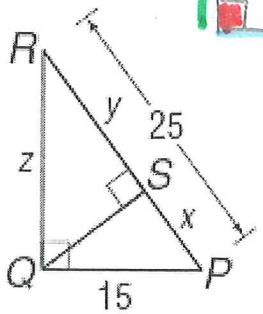


Using $\triangle$'s 1 & 3, find x: (use ~ $\triangle$s)

largest → $\frac{25}{15} = \frac{15}{x}$ ← smallest

$25x = 225$

$\boxed{x = 9}$



To find y, use segment addition:

$25 = y + x$ (we know $x = 9$)

$25 = y + 9 \Rightarrow y = 16$

To find z, use $\triangle$s 1 & 2:

$\triangle 1 \rightarrow \frac{z}{y} = \frac{25}{z} \Rightarrow \frac{z}{16} = \frac{25}{z}$

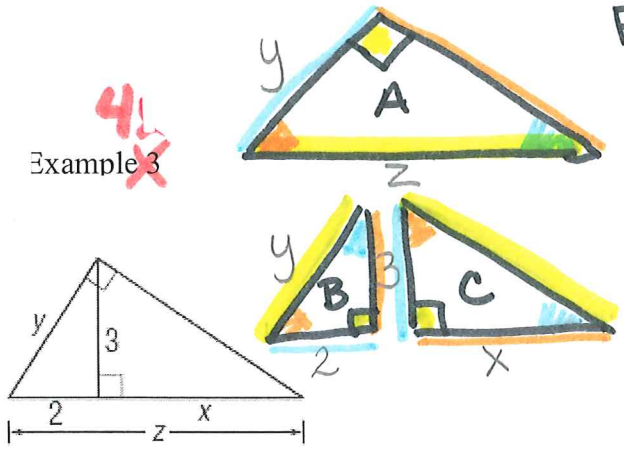
$\triangle 2 \rightarrow$

$z^2 = 400$

$\sqrt{z^2} = \sqrt{400}$

$\boxed{z = 20}$

Example 3



Find x using similar △s: (B & C)

$\triangle C \rightarrow \frac{x}{3} = \frac{3}{2}$

$\triangle B \rightarrow$

$2x = 9$

$\boxed{x = 4.5}$

Find z using segment addition:

$z = 2 + x$ (and $x = 4.5$)

$z = 2 + 4.5$

$\boxed{z = 6.5}$

To find y, we need blue & yellow so use △s A & B

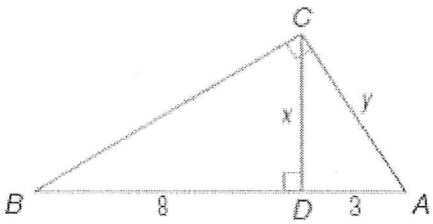
$\triangle A \rightarrow \frac{y}{2} = \frac{z}{y} \Rightarrow \frac{y}{2} = \frac{6.5}{y}$

$\triangle B \rightarrow$

$\sqrt{y^2} = \sqrt{13}$

$\boxed{y = \sqrt{13}}$

Example 4



Find x, use similar △s w/ B & C:

$\triangle B \rightarrow \frac{x}{3} = \frac{8}{x}$

$\triangle C \rightarrow$

$x^2 = 24$

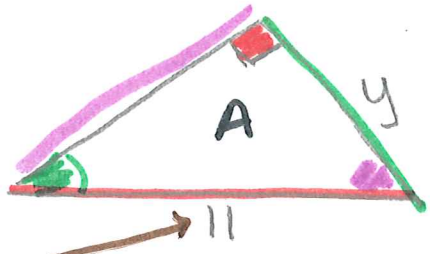
$x = \sqrt{24}$

$\boxed{x = 2\sqrt{6}}$

$\sqrt{4}$ $\sqrt{6}$

2

You MUST simplify radicals!



To find y, use similar △s w/ A & C:

$\triangle A \rightarrow \frac{y}{3} = \frac{11}{y}$

$\triangle C \rightarrow$

$\sqrt{y^2} = \sqrt{33}$

$\boxed{y = \sqrt{33}}$

you get by adding 8+3