Name _______________________________________ Hour __________

ACC: 8.1 GEOMETRIC MEAN NOTES

Geometric Mean When the means of a proportion are the same number, that number is called the geometric mean of the extremes. The **geometric mean** between two numbers is the positive square root of their product.

$$\text{extreme} \rightarrow \frac{a}{x} = \frac{x}{b} \leftarrow \text{mean}, \quad \text{mean} \rightarrow x, \quad b \leftarrow \text{extreme}$$

Key Concept — **Geometric Mean** — For Your FOLDABLE

Words The geometric mean of two positive numbers a and b is the number x such that $\frac{a}{x} = \frac{x}{b}$. So, $x^2 = ab$ and $x = \sqrt{ab}$.

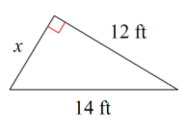
Example The geometric mean of $a = 9$ and $b = 4$ is 6, because $6 = \sqrt{9 \cdot 4}$.

Example #1: Find the geometric mean between 2 and 8.

Example #2: Find the geometric mean between $\sqrt{15}$ and $\sqrt{101}$.

Ex. 3Pythagorean Theorem: Review

Find x.



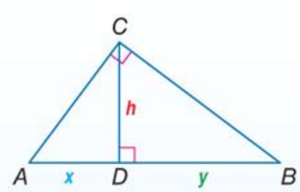
GEOMETRIC MEAN IN RIGHT TRIANGLES

Geometric Means in Right Triangles In a right triangle, an altitude drawn from the vertex of the right angle to the hypotenuse forms two additional right triangles. These three right triangles share a special relationship.

Theorems — For Your FOLDABLE

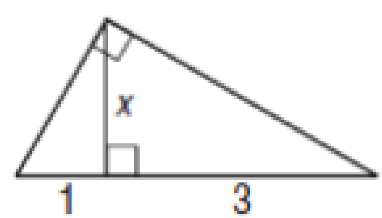
Right Triangle Geometric Mean Theorems

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.

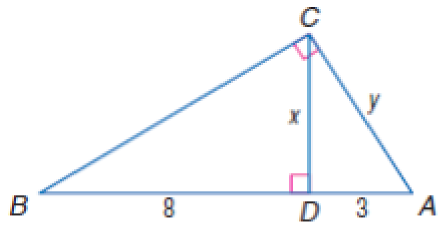


Example If $\overline{CD}$ is the altitude to hypotenuse $\overline{AB}$ of right $\triangle ABC$, then $\frac{x}{h} = \frac{h}{y}$ or $h = \sqrt{xy}$.

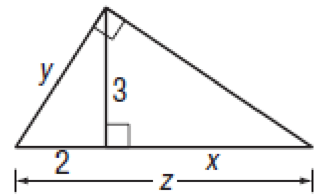
Example 4.



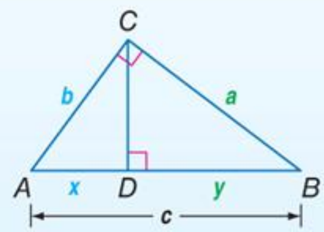
Example #5:



Example #6

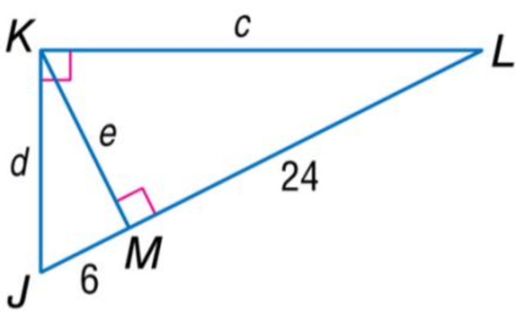


8.3 Geometric Mean (Leg) Theorem The altitude drawn to the hypotenuse of a right triangle separates the hypotenuse into two segments. The length of a leg of this triangle is the geometric mean between the length of the hypotenuse and the segment of the hypotenuse adjacent to that leg.



Example If $\overline{CD}$ is the altitude to hypotenuse $\overline{AB}$ of right $\triangle ABC$, then $\frac{c}{b} = \frac{b}{x}$ or $b = \sqrt{xc}$ and $\frac{c}{a} = \frac{a}{y}$ or $a = \sqrt{yc}$.

Example 7.



Example 8.