Simplify:

1. $\sqrt{112} = \sqrt{16 \cdot 7}$

   $= \sqrt{16}\,\sqrt{7}$

   $\boxed{= 4\sqrt{7}}$

2. $\sqrt{15 * 20} = \sqrt{15} \cdot \sqrt{4 \cdot 5}$

   $= 2\sqrt{15 \cdot 5}$

   $= 2\sqrt{75}$

   $= 2\sqrt{25 \cdot 3}$

   $= 2 \cdot 5\sqrt{3}$

   $\boxed{= 10\sqrt{3}}$

3. $\sqrt{32} = \sqrt{16 \cdot 2}$

   $\boxed{= 4\sqrt{2}}$

4. $\sqrt{90} = \sqrt{9 \cdot 10}$

   $\boxed{= 3\sqrt{10}}$

Geometric Mean:

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

The geometric mean of 2 positive numbers a and b is the number x such that $\frac{a}{x} = \frac{x}{b}$

$x^2 = ab$

$x = \sqrt{ab}$

1. Find the geometric mean between 8 and 10.

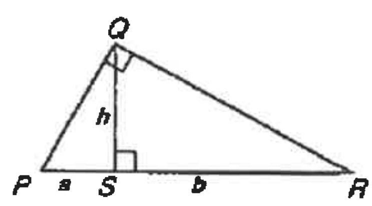
   $x = \sqrt{8 \cdot 10}$

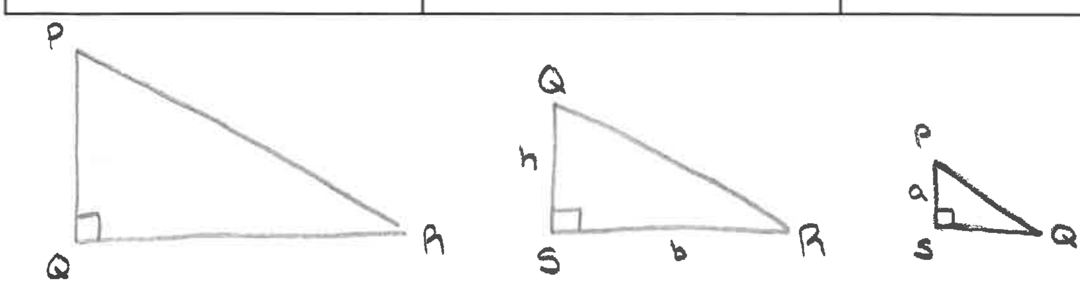
   $= \sqrt{80} = \sqrt{16 \cdot 5} = 4\sqrt{5}$

2. Find the geometric mean between 5 and 45.

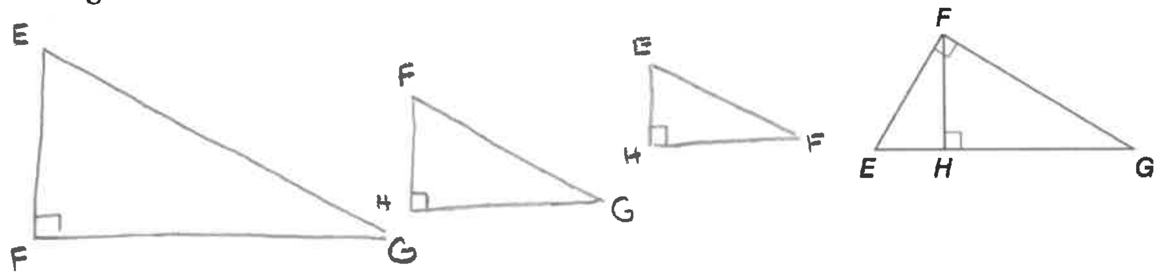
   $x = \sqrt{5 \cdot 45}$

   $= \sqrt{225} = \boxed{15}$

Theorem 8.1	If the altitude is drawn to the hypotenuse of a right triangle, then the two triangles formed are similar to the original triangle and to each other.	 $\triangle PQR \sim \triangle PSQ$ $\triangle PQR \sim \triangle RSQ$ $\triangle RSQ \sim \triangle PSQ$

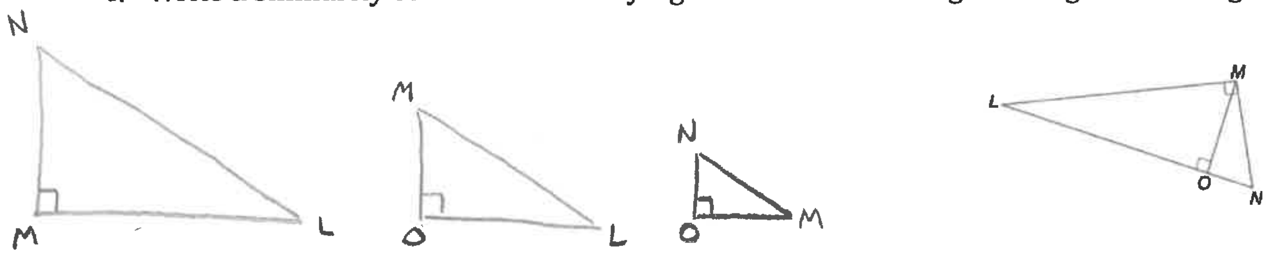


3. Write a similarity statement identifying the three similar right triangles in the figure.

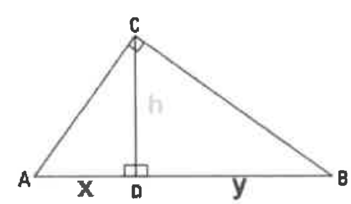
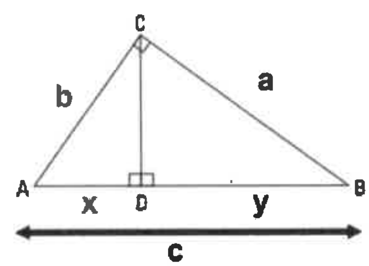


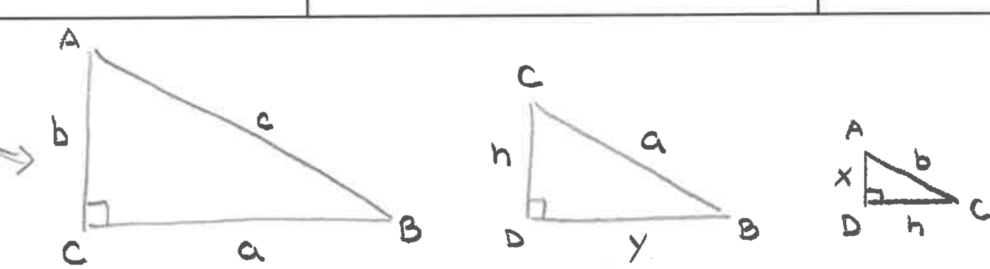
△EFG ~ △FHG ~ △EHF

4. Write a similarity statement identifying the three similar right triangles in the figure.



△NML ~ △MOL ~ △NOM

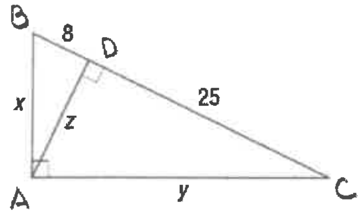
Geometric Mean (Altitude) Theorem	The altitude drawn to the hypotenuse of a right triangle separates the hypotenuse into two segments. The length of this altitude is the geometric mean between the lengths of these two segments.	 $\frac{x}{h} = \frac{h}{y}$ or $h = \sqrt{xy}$
Geometric Mean (Leg) Theorem	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.	 $\frac{c}{b} = \frac{b}{x}$ or $b = \sqrt{cx}$ And $\frac{c}{a} = \frac{a}{y}$ or $a = \sqrt{cy}$

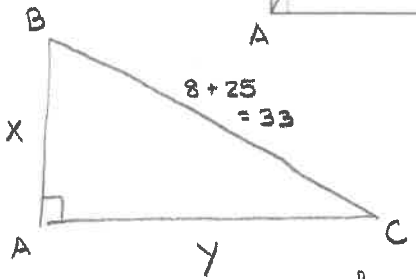


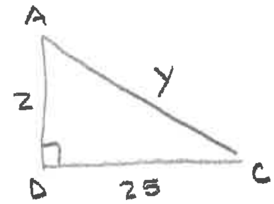
★ can use thm or can separate into 3 Δ's

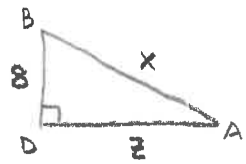
5. Find x, y, and z

a.









$\frac{x}{8} = \frac{33}{x}$

$x = \sqrt{8 \cdot 33}$

$x = \sqrt{264}$

$x = \sqrt{4 \cdot 66}$

$\boxed{x = 2\sqrt{66}}$

$\frac{33}{y} = \frac{y}{25}$

$y = \sqrt{25 \cdot 33}$

$\boxed{y = 5\sqrt{33}}$

$\frac{z}{25} = \frac{8}{z}$

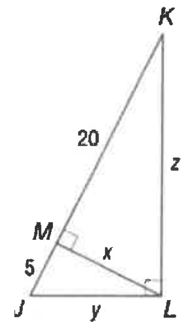
$z = \sqrt{8 \cdot 25}$

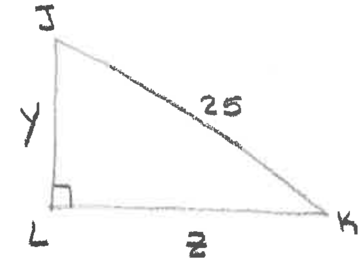
$z = \sqrt{4 \cdot 2 \cdot 25}$

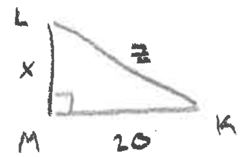
$z = 2 \cdot 5\sqrt{2}$

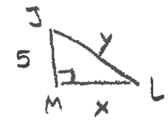
$\boxed{z = 10\sqrt{2}}$

b.









$\frac{x}{5} = \frac{20}{x}$

$x = \sqrt{20 \cdot 5}$

$x = \sqrt{100}$

$\boxed{x = 10}$

$\frac{y}{25} = \frac{5}{y}$

$y = \sqrt{5 \cdot 25}$

$\boxed{y = 5\sqrt{5}}$

$\frac{z}{25} = \frac{20}{z}$

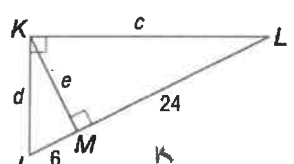
$z = \sqrt{20 \cdot 25}$

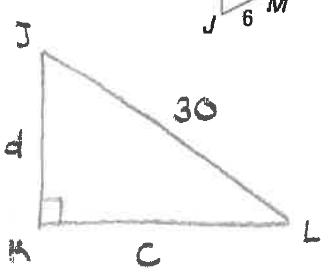
$z = \sqrt{4 \cdot 5 \cdot 25}$

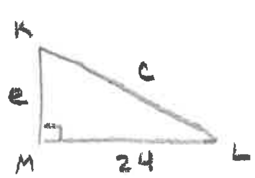
$z = 2 \cdot 5\sqrt{5}$

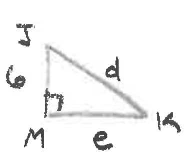
$\boxed{z = 10\sqrt{5}}$

6. Find c, d, and e









$\frac{e}{6} = \frac{24}{e}$

$e = \sqrt{6 \cdot 24}$

$e = \sqrt{6 \cdot 6 \cdot 4}$

$e = \sqrt{36 \cdot 4}$

$e = 6 \cdot 2$

$\boxed{e = 12}$

$\frac{c}{30} = \frac{24}{c}$

$c = \sqrt{24 \cdot 30}$

$c = \sqrt{6 \cdot 4 \cdot 6 \cdot 5}$

$c = \sqrt{36 \cdot 4 \cdot 5}$

$c = 6 \cdot 2\sqrt{5}$

$\boxed{c = 12\sqrt{5}}$

$\frac{d}{6} = \frac{30}{d}$

$d = \sqrt{30 \cdot 6}$

$d = \sqrt{6 \cdot 5 \cdot 6}$

$d = \sqrt{36 \cdot 5}$

$\boxed{d = 6\sqrt{5}}$