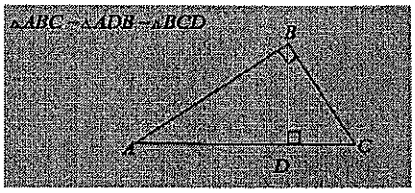
Cornell Notes

Main Ideas/Questions

7.4

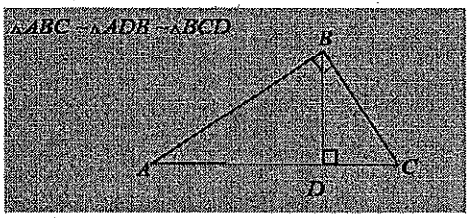
Title of Notes: **Right Triangle Similarity**

Theorem:
The altitude to the hypotenuse of a right triangle divides the triangle into two triangles that are similar to the original triangle and to each other.



Corollary: *The altitude to the hypotenuse of a right triangle separates the hypotenuse so that the length of each leg of the triangle is the geometric mean of the length of the adjacent hypotenuse segment and the length of the hypotenuse.*

Translation:



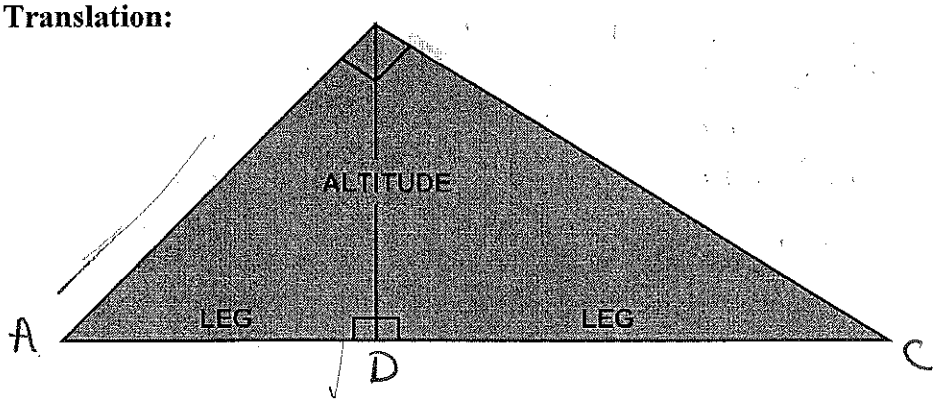
$$\frac{AD}{AB} = \frac{BD}{BC} = \frac{AB}{AC} \qquad \frac{AD}{AB} = \frac{DC}{BC} = \frac{AB}{AC}$$

$$\frac{\text{Long Leg}}{\text{Hypotenuse}} = \frac{\text{Long Leg}}{\text{Hypotenuse}} \qquad \frac{\text{Short Leg}}{\text{Hypotenuse}} = \frac{\text{Short Leg}}{\text{Hypotenuse}}$$

Corollary: *The length of the altitude to the hypotenuse of a right triangle is the geometric mean of the lengths of the segments of the hypotenuse.*

geometric mean

Translation:

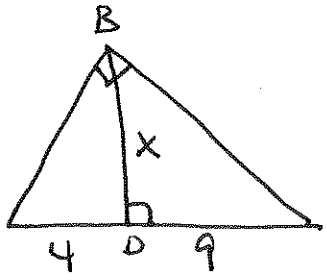


$$\frac{\text{LEG}}{\text{ALTITUDE}} = \frac{\text{ALTITUDE}}{\text{LEG}}$$

① $\frac{AD}{BD} = \frac{BD}{DC}$

② $\frac{AD}{BA} = \frac{BA}{AC}$

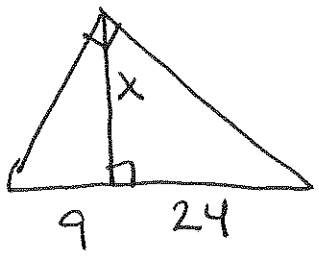
③ $\frac{CD}{BC} = \frac{BC}{CA}$

① 

$\frac{4}{x} \times \frac{x}{9}$

$x^2 = 36$

$x = 6$

② 

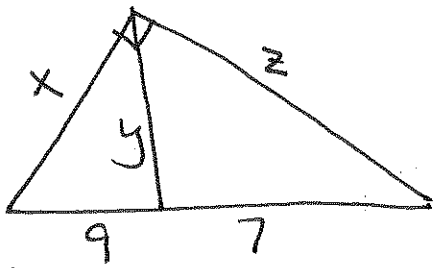
$\frac{9}{x} = \frac{x}{24}$

$x^2 = 216$

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

$x = 6\sqrt{6}$

216 → 2, 108 → 2, 54 → 2, 27 → 3, 9 → 3, 3

③ 

$\frac{9}{x} = \frac{x}{16}$

$x^2 = 144$

$x = 12$

$\frac{9}{y} = \frac{y}{7}$

$y^2 = 63$

$y = 3\sqrt{7}$

63 → 3, 21 → 3, 7

$\frac{7}{z} = \frac{z}{16}$

$z^2 = 112$

$z = 2 \cdot 2\sqrt{7}$

$z = 4\sqrt{7}$

112 → 2, 56 → 8, 7; 4 → 2, 2, 2