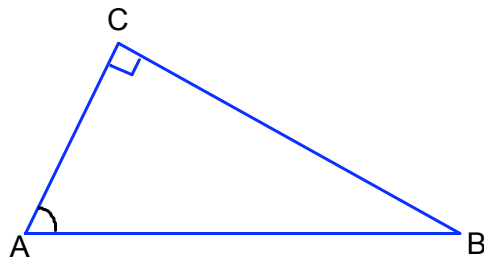
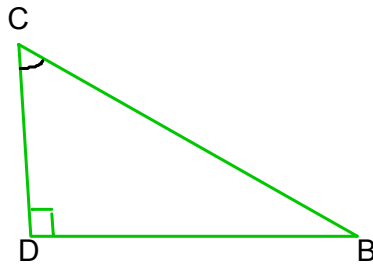
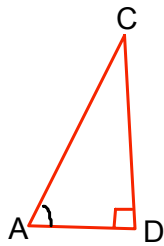
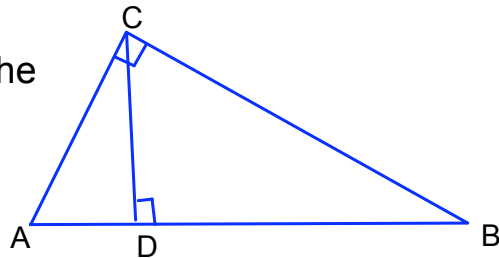
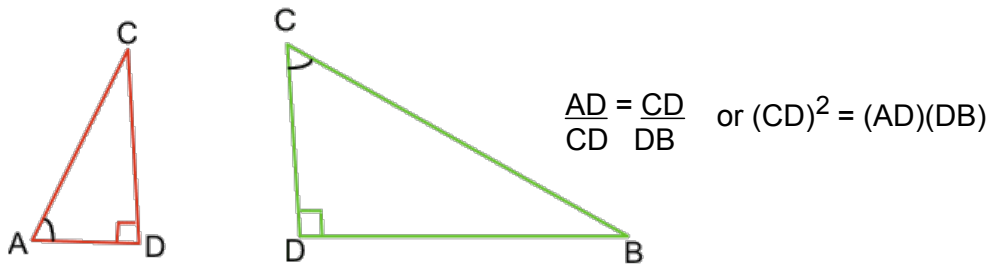
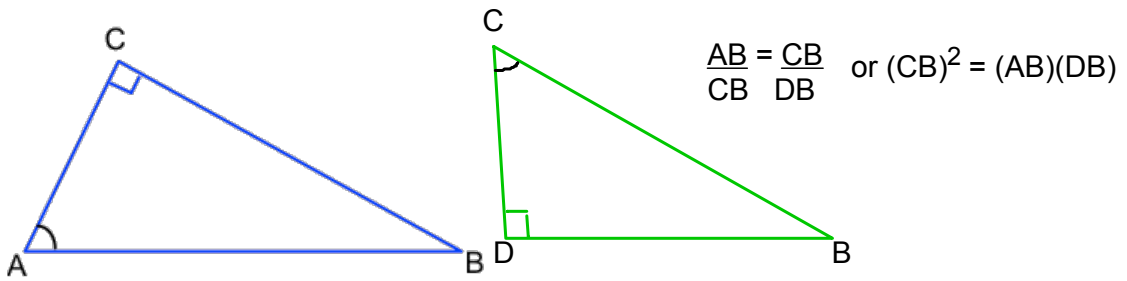
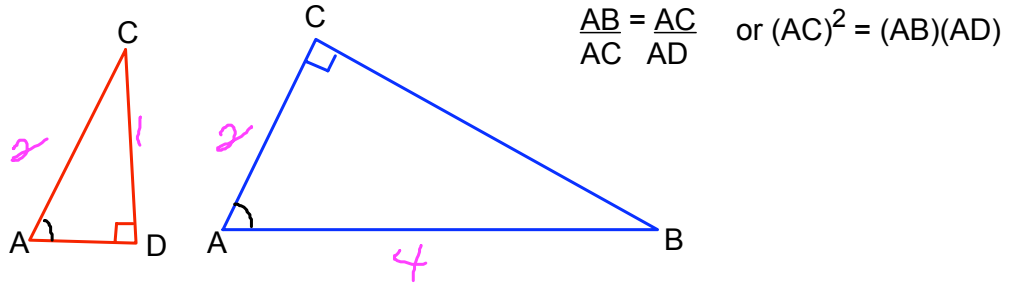
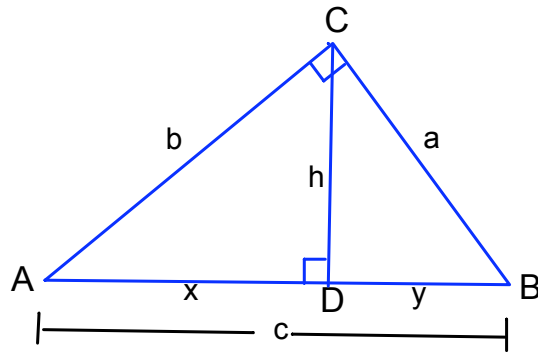


GEO Notes Lesson 9.3 "Altitude on the Hypotenuse"

When altitude CD is drawn to the hypotenuse of $\triangle ABC$, three similar triangles are formed.
 $\triangle ABC \sim \triangle ACD \sim \triangle CBD$





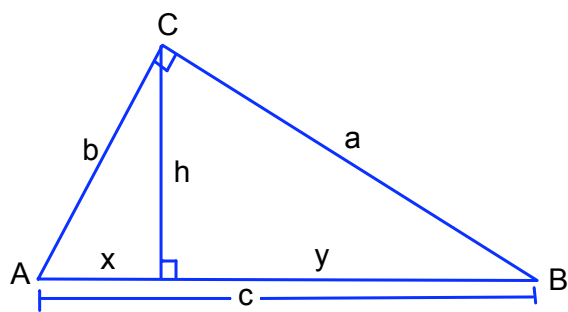


Theorem 68 - If an altitude is drawn to the hypotenuse of a right triangle, then

a. The two triangles formed are similar to the given right triangle and to each other $\triangle ADC \sim \triangle ACB \sim \triangle CDB$

b. The altitude to the hypotenuse is the mean proportional between the segments of the hypotenuse $\frac{x}{h} = \frac{h}{y}$ or $h^2 = xy$

c. Either leg of the given right triangle is the mean proportional between the hypotenuse of the given right triangle and the segment of the hypotenuse adjacent to that leg (i.e. the projection of that leg on the hypotenuse) $\frac{y}{a} = \frac{a}{c}$ or $a^2 = yc$ and $\frac{x}{b} = \frac{b}{c}$ or $b^2 = xc$



Parts b and c of Theorem 68 can be summarized as follows:

$$h^2 = x \cdot y$$

$$b^2 = x \cdot c$$

$$a^2 = y \cdot c$$