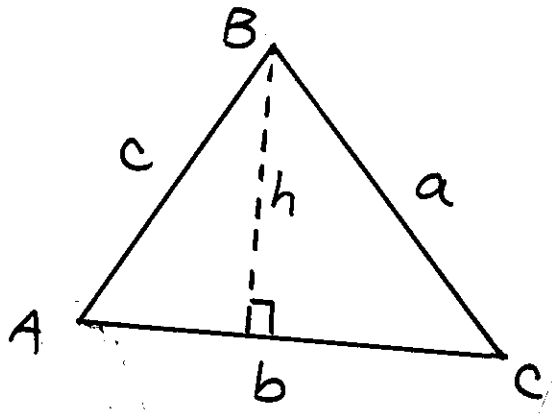
Proof of Law of Sines



Given $\triangle ABC$, construct an altitude from any vertex. Let h be the length of the altitude. This breaks $\triangle ABC$ into smaller right $\triangle$s. So...

$$\sin A = \frac{h}{c} \quad \text{and} \quad \sin C = \frac{h}{a}$$

$$h = c(\sin A) \quad \text{and} \quad h = a(\sin C)$$

$$c(\sin A) = a(\sin C) \quad \text{by trans. prop. =}$$

$$c = \frac{a(\sin C)}{\sin A}$$

$$\frac{c}{\sin C} = \frac{a}{\sin A}$$

The same approach is applied with another altitude from a second vertex to reach $\frac{c}{\sin C} = \frac{a}{\sin A} = \frac{b}{\sin B}$ by trans. prop. =