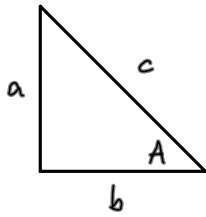


1. Prove that $\sin^2 A + \cos^2 A = 1$



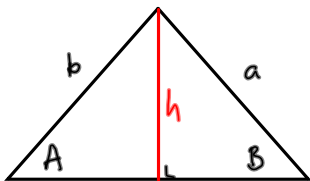
Pythagoras $a^2 + b^2 = c^2$

$$\sin A = \frac{a}{c}, \quad \sin^2 A = \frac{a^2}{c^2}$$

$$\cos A = \frac{b}{c}, \quad \cos^2 A = \frac{b^2}{c^2}$$

$$\sin^2 A + \cos^2 A = \frac{a^2}{c^2} + \frac{b^2}{c^2} = \frac{a^2 + b^2}{c^2} = \frac{c^2}{c^2} = 1$$

2. Prove that $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$



$$\sin A = \frac{h}{b} \quad \Rightarrow \quad h = b \sin A$$

$$\sin B = \frac{h}{a} \quad \Rightarrow \quad h = a \sin B$$

$$\Rightarrow a \sin B = b \sin A$$

$$\Rightarrow \frac{a}{\sin A} = \frac{b}{\sin B} \quad \left[= \frac{c}{\sin C} \quad \text{in the same way} \right]$$