

x is short side  
y is long side

$$\frac{x}{y} = \frac{2y}{4x}$$

$$x = \frac{2y^2}{4x}$$

$$4x^2 = 2y^2$$

$$y = \sqrt{\frac{4x^2}{2}}$$

$$y = \frac{2x}{\sqrt{2}}$$

$$y = \frac{2x\sqrt{2}}{2}$$

$$2y = 2x\sqrt{2}$$

$$y = x\sqrt{2}$$

$$\frac{y}{x} = \sqrt{2}$$



$$\frac{y}{x} = \frac{4x}{2y}$$

$$\frac{y}{x} = \sqrt{2}$$

$$\sqrt{2} = \frac{4x}{2y}$$

$$\sqrt{2} = \frac{2x}{y}$$

$$\frac{\sqrt{2}}{2} = \frac{x}{y}$$

$$\frac{1}{\sqrt{2}} = \frac{x}{y}$$

$$1:\sqrt{2} = x:y$$