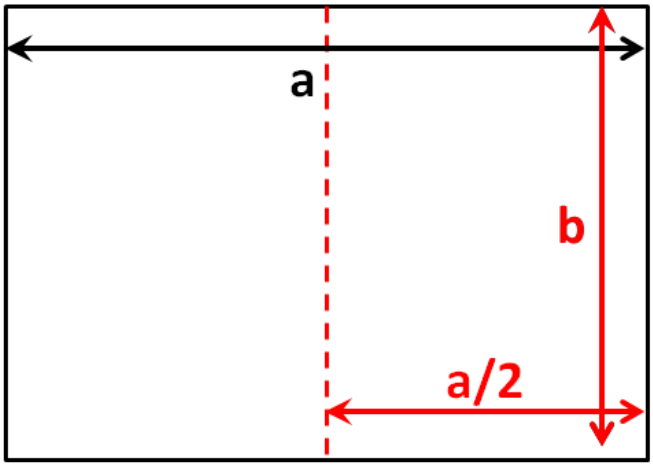
A4 Surds

Problem 1

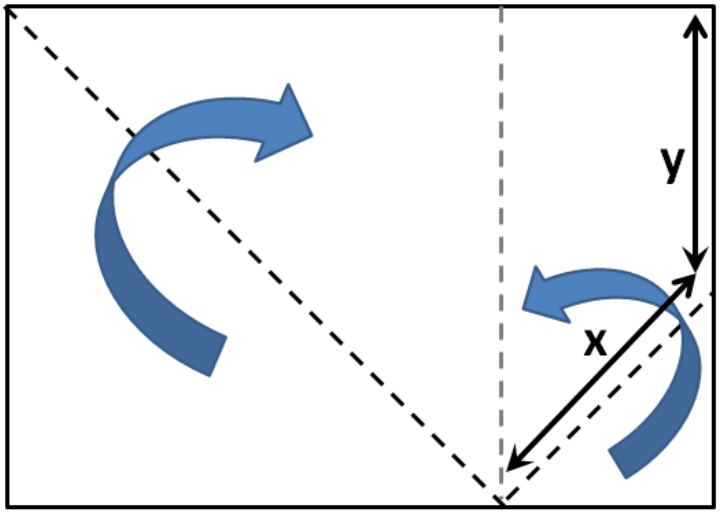
The width to height ratio of A4 paper remains unchanged when cut in half to make A5.

What must the ratio of the sides be to make this true?



Problem 2

When an A4 sheet is folded as shown, prove that length x is equal to length y:

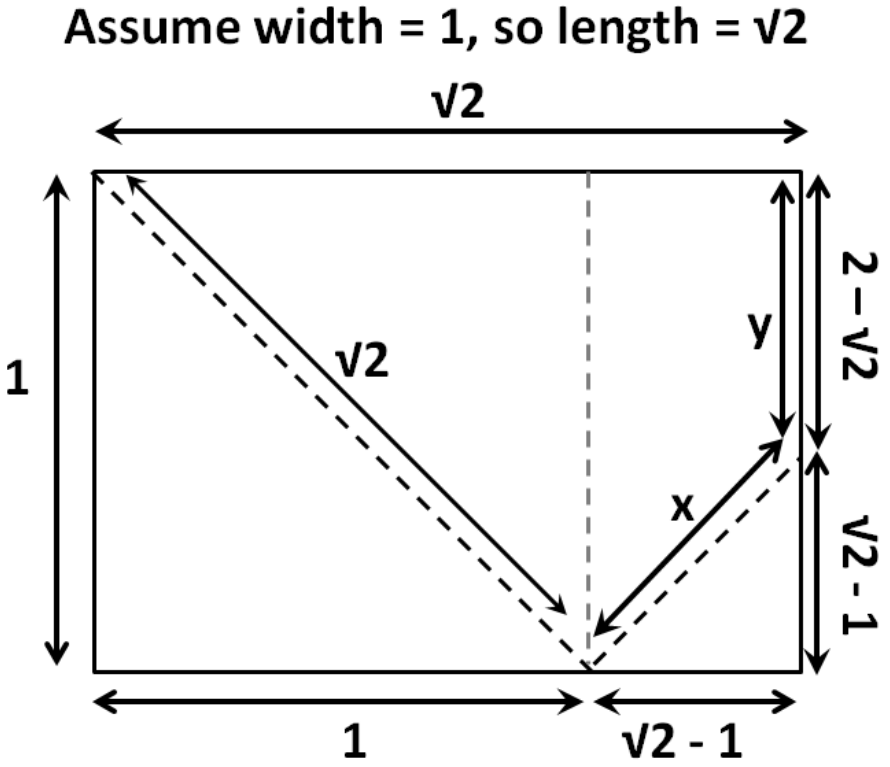


A4 Surds Solutions

Problem 1

$$\frac{a}{b} = \frac{b}{\frac{1}{2}a} = \frac{2b}{a} \quad \Rightarrow \quad a^2 = 2b^2 \quad \Rightarrow \quad \frac{a^2}{b^2} = 2 \quad \Rightarrow \quad \boldsymbol{\frac{a}{b} = \sqrt{2}}$$

Problem 2



$$\left(\sqrt{2}-1\right)^2 + \left(\sqrt{2}-1\right)^2 = x^2$$

$$2\left(2 - 2\sqrt{2} + 1\right) = x^2$$

$$6 - 4\sqrt{2} = x^2$$

$$y^2 = \left(2 - \sqrt{2}\right)^2 = 4 - 4\sqrt{2} + 2$$

$$y^2 = 6 - 4\sqrt{2}$$

$$\Rightarrow \quad x^2 = y^2 \quad \Rightarrow \quad \boldsymbol{x = y}$$