

QUADRATIC EQUATIONS

Solving a quadratic equation, $5x^2 - 2x + 1 = 0$ using quadratic formula gives

$$x = \frac{2 \pm \sqrt{-16}}{10} = \frac{2}{10} \pm \frac{\sqrt{16(-1)}}{10} = 0.2 \pm \frac{\sqrt{16}\sqrt{-1}}{10}$$

$= 0.2 \pm \frac{4\sqrt{-1}}{10} = 0.2 \pm 0.4\sqrt{-1}$. In real terms it is impossible to evaluate $\sqrt{-1}$. In complex numbers $\sqrt{-1}$ is set to be equal to i so that $\sqrt{-1} = i \Rightarrow -1 = i^2$, i.e.

$$\sqrt{-1} = \sqrt{i^2} = i. \text{ Therefore}$$

$$x = 0.2 \pm 0.4\sqrt{-1}$$

$$= 0.2 \pm 0.4i$$

page 2 of 2

$x = 0.2 \pm i0.4$ is a Cartesian complex number, where 0.2 is the REAL PART and 0.4 is the IMAGINARY PART

NB:

Complex Numbers