1 How to Solve quadratic equation

$$ax^2 + bx + c = 0 \quad \text{such as} \quad a \neq 0$$

Divide the equation by a such as

$$\frac{a}{a}x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$

$$\Rightarrow x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$

$$\Rightarrow x^2 + \frac{b}{a}x + (\frac{b}{2a})^2 - (\frac{b}{2a})^2 + \frac{c}{a} = 0$$

$$\Rightarrow (x + \frac{b}{2a})^2 - (\frac{b}{2a})^2 + \frac{c}{a} = 0$$

$$\Rightarrow (x + \frac{b}{2a})^2 = (\frac{b}{2a})^2 - \frac{c}{a}$$

$$\Rightarrow (x + \frac{b}{2a})^2 = \frac{b^2}{4a^2} - \frac{c}{a}$$

$$\Rightarrow (x + \frac{b}{2a})^2 = \frac{b^2}{4a^2} - \frac{4ac}{4a^2}$$

$$\Rightarrow (x + \frac{b}{2a})^2 = \frac{b^2 - 4ac}{4a^2}$$

$$\Rightarrow (x + \frac{b}{2a}) = \pm\sqrt{\frac{b^2 - 4ac}{4a^2}}$$

$$\Rightarrow x = -\frac{b}{2a} \pm \sqrt{\frac{b^2 - 4ac}{4a^2}}$$

$$\Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$