QUADRATIC EQUATIONS

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10^{th} Maths - Chapter 4

This is Problem-2.1 from Exercise 4.2

1. Solve $x^2 - 3x - 10 = 0$

Solution: Using the formula for the quadratic equation roots

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \tag{1}$$

For root 1,
Substituting

$$a = 1, b = -3, c = -10, \tag{2}$$

$$x_1 = \frac{3 + \sqrt{(-3)^2 - 4 \times 1 \times (-10)}}{2 \times 1} \tag{3}$$

$$= \frac{3 + \sqrt{9 + 40}}{2} \tag{4}$$

$$= \frac{3 + \sqrt{49}}{2} \tag{5}$$

$$= \frac{3 + 7}{2} \tag{6}$$

$$= \frac{10}{2} \tag{7}$$

$$= 5 \tag{8}$$

For root 2,
Substituting

$$x_2 = \frac{3 - \sqrt{(-3)^2 - 4 \times 1 \times (-10)}}{2 \times 1} \tag{9}$$

$$= \frac{3 - \sqrt{9 + 49}}{2} \tag{10}$$

$$= \frac{3 - \sqrt{49}}{2} \tag{11}$$

$$= \frac{3 - 7}{2} \tag{12}$$

$$= \frac{-4}{2} \tag{13}$$

$$= -2 \tag{14}$$