QUADRATIC EQUATIONS

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10^{th} Maths - Chapter 4

This is Problem-2.1 from Exercise 4.2

1. Rohan's mother is 26 years older than him. The product of their ages (in years) 3 years from now will be 360. We would like to find Rohan's present age.

Solution: : Rohan age = x
His mother's age = $(x + 26)$
After three years
Rohan's age = $(x + 3)$
His mother's age = $(x + 29)$
$(x + 3)(x + 29) = 360$
$x^2 + 29x + 3x + 87 = 360$
$x^2 + 32x - 273 = 0$
Using the formula for the quadratic equation

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

Substituting

$$a = 1, b = 32, c = -273 \tag{2}$$

(3)

$$x = \frac{-32 \pm \sqrt{32^2 - 4 \times 1 \times 273}}{2 \times 1} \tag{4}$$

$$= \frac{32 \pm \sqrt{1024 + 1092}}{2} \tag{5}$$

$$= \frac{32 \pm \sqrt{2116}}{2} \tag{6}$$

$$= \frac{-32 \pm 46}{2} \tag{7}$$

$$x_1 = \frac{14}{2} \tag{8}$$

$$= 7 \tag{9}$$

$$x_2 = \frac{-78}{2} \tag{10}$$

$$x_2 = -39 \tag{11}$$

$$\tag{12}$$