Quadratic equations

harshitaa@sripraka(paidisettyharshitshschools.com)

August 4, 2023

10^{th} Maths - Chapter 4

This is problem 2.2from Exercise 4.2

1. Type your question
   A cottage industry produces a certain number of toys in a day. The cost of production of each toy was found to be 55 minus the number of toys produced in a day. On a particular day, the total cost of production was Rs 750. We would like to find out the number of toys produced on that day.

   Solution:
   let the number of toys produced on that be x therefore, the cost of production (in rupees) of each toy that day=55-x so, the total cost of production that day = $\big(x \times (55 - x) = 750\big)$
   $55 \times x - x^2$
   $-x^2 + 55x - 750 = 0$
   hence the equation is $x^2 - 55x + 750 = 0$
   Given Data:
   $x^2 - 45x + 324 = 0$

This can also be written as:

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

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

$$x = \frac{55 \pm \sqrt{-55^2 - 4 \times 1 \times 750}}{2 \times 1} \tag{3}$$

$$x = \frac{55 + \sqrt{3025 - 3000}}{2} \tag{4}$$

$$x = \frac{55 + \sqrt{25}}{2} \tag{5}$$

$$\tag{6}$$

$$1st condition \tag{7}$$

$$x = \frac{55 + 5}{2} \tag{8}$$

$$x = \frac{60}{2} \tag{9}$$

$$x = 30 \tag{10}$$

$$2nd condition \tag{11}$$

$$x = \frac{55 - 5}{2} \tag{12}$$

$$x = \frac{50}{2} \tag{13}$$

$$x = 25 \tag{14}$$

Hence the roots are x=30 and x=25