Ncert Solutions Chapter 4 Quadratic Equations Exercise 4.1

Question 2. Represent the following situations in the form of Quadratic Equations:

$(\mathbf{i})$ The area of rectangular plot is 528 m^2. The length of the plot (in metres) is one more than twice its breadth. We need to find the length and breadth of the plot.

Solution:

We are given that area of a rectangular plot is 528 m^2.
Let breadth of rectangular plot be x metres
Length is one more than twice its breadth. Therefore, length of rectangular plot is $(2x+1)$ metres

Area of rectangle = length × breadth
$\Rightarrow 528 = x(2x+1)$
$\Rightarrow 528 = 2x^2 + x$
$\Rightarrow 2x^2 + x - 528 = 0$ which is a **Quadratic Equation**.

$(\mathbf{ii})$ The product of two consecutive numbers is 306. We need to find the integers.

Solution:
Let two consecutive numbers be x *and* $(x+1)$.
It is given that $x(x+1) = 306$
$\Rightarrow x^2 + x = 306$
$\Rightarrow x^2 + x - 306 = 0$ which is a **Quadratic Equation**.

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

Solution:

Let present age of Rohan = x years
Let present age of Rohan's mother = $x + 26$ years
Age of Rohan after 3 years = $(x+3)$ years
Age of Rohan's mother after 3 years = $x+26+3 = x+29$ years

According to given condition:
$(x+3)(x+29)=360$
$\Rightarrow x^2+29x+3x+87=360$
$\Rightarrow x^2+32x-273=0,$ which is a **Quadratic Equation**.

(**iv**) A train travels a distance of 480 km at uniform speed. If, the speed had been 8 km/hr less, then it would have taken 3 hours more to cover the same distance. We need to find speed of the train.

Solution: Let speed of train be x km/h

Time taken by train to cover 480 km $= \frac{480}{x}$ hours

If, speed had been 8km/hr less then time taken would be $\frac{480}{x-8}$ hours

According to given condition, if speed had been 8km/hr less then time taken would be 3 hours less.

$\Rightarrow \frac{480}{x-8} = \frac{480}{x} + 3$

$$\Rightarrow \mathbf{480}\left(\frac{\mathbf{1}}{x-8}-\frac{\mathbf{1}}{x}\right)=\mathbf{3}$$

$$\Rightarrow \mathbf{480}\left(\frac{x-x+8}{x(x-8)}\right)=\mathbf{3}$$

$$\Rightarrow \mathbf{480}\times\mathbf{8}=\mathbf{3}(x)(x-\mathbf{8})$$

$$\Rightarrow \mathbf{3840}=\mathbf{3}x^2-\mathbf{24}x$$

$$\Rightarrow \mathbf{3}x^2-\mathbf{24}x-\mathbf{3840}=\mathbf{0}$$

Dividing equation by 3, we get

$x^2-8x-1280=0$ **which is a Quadratic Equation.**