Ncert Solutions Class 10 Quadratic Equations
Exercise 4.1

2. Represent the following situations in the form of quadratic equations :

(i) The area of a 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.

(ii) The product of two consecutive positive integers is 306. We need to find the integers.

(iii) 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.

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

(i) Solution: Let breadth of rectangular plot = x m

and length of the plot = (2x + 1) m

area of plot = length x breadth = (2x + 1) (x) = 2x^2 + x

ATQ :-   2x^2 + x = 528

⇒   2x^2 + x – 528 = 0. which if of the form of quadratic equation.

(ii)

Let the no's be x and x+1.

ATQ :-   x (x + 1) = 306

⇒   x^2 + x – 306 = 0. which if of the form of quadratic equation.

(iii)

Let present age of Rohan = x yrs

and present age of Rohan's mother = (x + 26) yrs

after 3 yrs, Rohan's age = (x + 3) yrs

after 3 yrs, Rohan's mother's age = (x + 26) + 3 = (x + 29) yrs

ATQ :-   (x + 3) (x + 29) = 360

$\Rightarrow$ x² + 32x + 87 = 360 $\Rightarrow$ x² + 32x − 273 = 0.

which if of the form of quadratic equation.

(iv)

Let speed of the train = x km/h   and   Distance = 480 km

Time = $\dfrac{\text{distance}}{speed} = \dfrac{480}{x}$

When speed is decreased by 8 km/h , then new speed of train = (x − 8) km/h

And time taken by train = $\dfrac{480}{x-8}$

ATQ : - $\dfrac{480}{x-8} - \dfrac{480}{x} = 3$

$\Rightarrow$ $\dfrac{480x-480(x-8)}{x(x-8)} = \dfrac{3}{1}$ $\Rightarrow$ $\dfrac{480x-480x+3840}{x^2-8x} = \dfrac{3}{1}$

$\Rightarrow$ $x^2 - 8x - 1280 = 0$, which is of the form of a quadratic equation.