QUADRATIC EQUATIONS

PPT3

SUBJECT: MATHEMATICS
CHAPTER NUMBER: 04
CHAPTER NAME : QUADRATIC EQUATIONS

Quadratic Equation

When we equate a quadratic polynomial to a constant, we get a quadratic equation.

Any equation of the form p(x)= ax^2+bx+c, where p(x) is a polynomial of degree 2 and c is a constant, is a quadratic equation.

The standard form of a Quadratic Equation

The standard form of a quadratic equation is ax^2+bx+c=0, where a,b and c are real numbers and a≠0.

'a' is the coefficient of x^2. It is called the quadratic coefficient. 'b' is the coefficient of x. It is called the linear coefficient. 'c' is the constant term.

LEARNING OUTCOME

1.Students will be able to find roots of a quadratic equation by factorization

2. Students will be able to represent situations in the form of Quadratic Equations and hence find Solutions .

Find two consecutive positive integers, sum of whose squares is 365.

https://youtu.be/DFie-I6xrE4 (4.45)

Find two consecutive positive integers, sum of whose squares is 365.

Sol. Let the two consecutive integers be x and $x + 1$

ATQ $\qquad\qquad x^2 + (x + 1)^2 = 365$

$\Rightarrow \qquad\qquad x^2 + x^2 + 2x + 1 = 365$

$\Rightarrow \qquad\qquad 2x^2 + 2x - 364 = 0$

$\Rightarrow \qquad\qquad x^2 + x - 182 = 0$

$\Rightarrow \qquad x^2 + 14x - 13x - 182 = 0$

$\Rightarrow \qquad x(x + 14) - 13(x + 14) = 0$

$\Rightarrow \qquad\qquad (x - 13)(x + 14) = 0$

$\Rightarrow \qquad x = 13, -14 \qquad$ (−14 is rejected because it is a negative integer)

Hence, the two consecutive positive integers are 13 and $13 + 1 = 14$.

Find two numbers whose sum is 27 and product is 182.

Let one number be x, then other number be $27 - x$

ATQ $\qquad x(27 - x) = 182$

$\Rightarrow \qquad x^2 - 27x + 182 = 0$

$\Rightarrow \qquad x^2 - 14x - 13x + 182 = 0$

$\Rightarrow \qquad x(x - 14) - 13(x - 14) = 0$

$\Rightarrow \qquad (x - 13)(x - 14) = 0$

$\Rightarrow \qquad x - 13 = 0$ or $x - 14 = 0$

$\Rightarrow \qquad x = 13$ or $x = 14$

Hence, the numbers are 13 and 14.

A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If the total cost of production on that day was ` 90, find the number of articles produced and the cost of each article

Let total number of pottery articles produced in a day be x

$$\text{Cost of production } = ₹\frac{90}{x}$$

ATQ

$$2x + 3 = \frac{90}{x}$$

$$\Rightarrow \quad x(2x + 3) = 90$$

$$\Rightarrow \quad 2x^2 + 3x = 90$$

$$\Rightarrow \quad 2x^2 + 3x - 90 = 0$$

$$\Rightarrow \quad 2x^2 + 15x - 12x - 90 = 0$$

$$\Rightarrow \quad x(2x + 15) - 6(2x + 15) = 0$$

$$\Rightarrow \quad (2x + 15)(x - 6) = 0$$

$$\Rightarrow \quad 2x = -15 \text{ or } x - 6 = 0$$

$$\Rightarrow \quad x = -\frac{15}{2} \left(-\frac{15}{2} \text{ is rejected}\right) \text{ or } x = 6$$

∴ Number of articles produced per day = 6

Cost of production per article $= \frac{90}{6} = ₹ 15$

AHA

- A two digit number is four times the sum of the digits. It is also equal to 3 times the product of digits. Find the number.
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