

Quadratic equations - Points to Remember

1. General Form of a Quadratic Polynomial:

A polynomial of degree 2 is called a quadratic polynomial. The general form of a quadratic polynomial is ax^{2+bx+c} where a, b, c are real numbers such that $a\neq 0$ and x is a real variable.

2. Value of a Quadratic Polynomial:

If px=ax2+bx+c, $a\neq 0$ is a quadratic polynomial and a is a real number, then $p\alpha=a\alpha 2+b\alpha+c$ is known as the value of the quadratic polynomial px.

3. Zeros of a Quadratic Polynomial:

A real number α is said to be a zero of the quadratic polynomials px=ax2+bx+c, if p $\alpha=0$.

4. Quadratic Equation:

If $px=ax^2+bx+c$ is a quadratic polynomial, then px=0 i.e. $ax^2+bx+c=0$, $a\neq 0$ is called a quadratic equation.

5. Roots of a Quadratic Equation:

A real number α is said to be a root of the quadratic equation ax2+bx+c=0, if a α 2+b α +c=0.

In other words, α is a root of ax2+bx+c=0 if and only if α is a zero of the polynomials px=ax2+bx+c.

6. Methods to Find the Roots of a Quadratic Equation:

(i) Factorisation:

If ax^2+bx+c , $a\neq 0$ is factorisable into a product of two linear factors, then the roots of the quadratic equation $ax^2+bx+c=0$ can be found by equating each factor to zero.

(ii) Completing the square method:

The roots of a quadratic equation can also be found by using the method of completing the square.

(iii) Quadratic formula:

The roots of a quadratic equation ax2+bx+c=0 are given by

x=-b \pm b2-4ac2a provided b2-4ac \ge 0.

7. Nature of the Roots:

- A quadratic equation ax2+bx+c=0 has
- (i) Two distinct real roots, if b2-4ac>0,
- (ii) Two equal roots (i.e., coincident roots), if b2-4ac=0, and
- (iii) No real roots, if b2-4ac<0.