Chapter-04
Quadratic Equation

- **Quadratic Polynomial:** A polynomial of the form ax^2+bx+c is called a quadratic expression in the variable x. This is a polynomial of the second degree. In quadratic expression ax^2+bx+c, a is the coefficient of x^2, b is the coefficient of x and c is the constant term (or coefficient of x°..
- **Quadratic Equation:** An equation of the form $ax^2+bx+c=0$, $a\neq 0$, is called a quadratic equation in one variable x, where a, b, c are constants.
- The equation $^2 + bx + c = 0, \quad a \neq 0$ is the standard form of a quadratic equation, where a, b and c are real numbers.
- A real number α is said to be a root of the quadratic equation $^2 + bx + c = 0, \quad a \neq 0$. If $a\alpha^2+b\alpha+c=0$, the zeroes of quadratic polynomial $^2 + bx + c$ and the roots of the quadratic equation $^2 + bx + c = 0$ are the same.
- If we can factorise $^2 + bx + c = 0, \quad a \neq 0$ into product of two linear factors, then the roots of the quadratic equation can be found by equating each factors to zero.
- The roots of a quadratic equation $^2 + bx + c = 0, \quad a \neq 0$ are given by $\frac{-b\pm\sqrt{b^2 \quad 4ac}}{2a}$, provided that $b^2 - 4ac \geq 0$.
- A quadratic equation $^2 + bx + c = 0, \quad a \neq 0$ has _____

  (a) Two distinct and real roots, if $b^2-4ac>0$.

  (b) Two equal and real roots, if $b^2-4ac=0$.

  (c) Two roots are not real, if $b^2-4ac<0$.
- A quadratic equation can also be solved by the method of completing the square.

  (i) $a^2 + 2ab + b^2 = (a + b)^2$

  (ii) $a^2 - 2ab + b^2 = (a - b)^2$
- Discriminant of the quadratic equation $^2 + bx + c = 0, \quad a \neq 0$ is given by $D=b^2-4ac$.