

Important Questions

Section A

1. The value(s) of k for which the quadratic equation $2x^2 + kx + 2 = 0$ has equal root is

Solution

The quadratic equation has equal roots if its discriminant is zero.

$$b^2 - 4ac = 0$$

$$k^2 - 4(2)(2) = 0 \quad (a=2; b=k; c=2)$$

$$k^2 = 16$$

$$k = \pm 4$$

2. Form a Quadratic Polynomial, the sum and product of whose zeroes are -3 and 2 respectively.

Solution

$$x^2 - (\text{sum of zeroes})x + \text{product of zeroes}$$

$$x^2 - (-3)x + 2$$

So, the required polynomial is $x^2 + 3x + 2$.

3. For what values of k , the roots of the equation $x^2 + 4x + k = 0$ are real?

Solution

$$b^2 - 4ac \geq 0$$

$$16 - 4(1)(k) \geq 0$$

$$16 \geq 4k$$

$$\frac{16}{4} \geq k$$

$$4 \geq k$$

4. Find the value of k, for which the roots of the equation $3x^2 - 10x + k = 0$ are reciprocal of each other?

Solution

$$3x^2 - 10x + k = 0$$

Roots are reciprocal to each other.

Let the roots be α and $\frac{1}{\alpha}$

$$\text{Product of the roots} = \frac{c}{a} = \frac{k}{3}$$

$$\alpha, \frac{1}{\alpha} = \frac{k}{3}$$

$$k = 3$$

5. If $x = 3$ is one of the quadratic equation $x^2 - 2kx - 6 = 0$, then find the value of k?

Solution

$$3^2 - 2 \cdot k \cdot 3 - 6 = 0$$

$$9 - 6k - 6 = 0$$

$$3 - 6k = 0$$

$$3 = 6k$$

$$\frac{3}{6} = k$$

$$k = \frac{1}{2}$$

6. If the quadratic equation $px^2 - 2\sqrt{5}px + 15 = 0$ has two equal roots then find the value of p?

Solution

For real equal roots, discriminant $b^2 - 4ac = 0$

$$(2\sqrt{5}p)^2 - (4 \times p \times 15) = 0$$

$$(4 \times 5 p^2) - 60p = 0$$

$$20p^2 = 60p$$

$$p = \frac{60}{20} = \frac{3}{1}$$

$$p = 3$$

7. If 1 is a root of the equations $ay^2+ay+3=0$ and $y^2+y+b=0$ then ab equals ___?

Solution

1 is a root of the equations

$$ay^2+ay+3=0 \text{ and } y^2+y+b=0$$

substitute $y=1 \rightarrow a.1^2+a.1+3=0$ and $1^2+1+b=0$

$$a+a+3=0 \text{ and } 2+b=0$$

$$2a=-3 \text{ and } b=-2$$

$$a = \frac{-3}{2} \quad b = -2$$

$$ab = \frac{-3}{2} \times -2$$

$$ab = 3$$

8. Find the discriminant of the quadratic equation $3\sqrt{3}x^2+10x+\sqrt{3}=0$

Solution

discriminant $b^2 - 4ac$

$$10^2 - (4 \times 3\sqrt{3} \times \sqrt{3})$$

$$100 - 36$$

$$64$$

9. Find the nature of the roots of the quadratic equation $2x^2-4x+3=0$.

Solution

$$D = b^2 - 4ac$$

$$(-4)^2 - (4 \times 2 \times 3)$$

$$16 - 24$$

$$-8 < 0$$

Hence $D < 0$, this shows that roots are imaginary.

10. If $x = \frac{-1}{2}$ is a solution of the quadratic equation $3x^2+2kx-3=0$, then find the value of k.

Solution

$$3x^2+2kx-3=0$$

$$3\left(\frac{-1}{2}\right)^2 + (2 \times k \times \frac{-1}{2}) - 3 = 0$$

$$\frac{3}{4} - k - 3 = 0$$

$$\frac{3}{4} - 3 = k$$

$$\frac{3-12}{4} = k = -\frac{9}{4}$$