Exercise 8.5

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1. Write the discriminant of the following quadratic equations:

(i) $2x^2 – 5x + 3 = 0$

Solution:

Given equation,
$2x^2 - 5x + 3 = 0$
It is in the form of $ax^2 + bx + c = 0$
Where, a = 2, b = -5 and c = 3
So, the discriminant is given by $D = b^2 - 4ac$
$D = (-5)^2 – 4 \times 2 \times 3$
$D = 25 – 24 = 1$
Hence, the discriminant of the given quadratic equation is 1.

(ii) $x^2 + 2x + 4 = 0$

Solution:

Given equation,
$x^2 + 2x + 4 = 0$
It is in the form of $ax^2 + bx + c = 0$
Where, a = 1, b = 2 and c = 4
So, the discriminant is given by $D = b^2 - 4ac$
$D = (2)^2 - 4 \times 1 \times 4$
$D = 4 – 16 = - 12$
Hence, the discriminant of the given quadratic equation is - 12.

(iii) (x - 1)(2x - 1) = 0

Solution:

Given equation,
(x -1) (2x -1) = 0
On expanding it, we get
$2x^2 - 3x + 1 = 0$
It is in the form of $ax^2 + bx + c = 0$
Where, a = 2, b = -3, c = 1
So, the discriminant is given by $D = b^2 - 4ac$
$D = (-3)^2 - 4 \times 2 \times 1$
$D = 9 - 8 = 1$
Hence, the discriminant of the given quadratic equation is 1.

(iv) $x^2 -2x + k = 0, k \in R$

Solution:

Given equation,
$x^2 - 2x + k = 0$

It is in the form of $ax^2 + bx + c = 0$
Where, a = 1, b = -2, and c = k
So, the discriminant is given by $D = b^2 - 4ac$
$D = (-2)^2 - 4(1)(k)$
$= 4 - 4k$
Hence, the discriminant of the given equation is (4 - 4k).

(v) $\sqrt{3}x^2 + 2\sqrt{2}x - 2\sqrt{3} = 0$

Solution:

Given equation,
$\sqrt{3}x^2 + 2\sqrt{2}x - 2\sqrt{3} = 0$
It is in the form of $ax^2 + bx + c = 0$
Here $a = \sqrt{3}, b = 2\sqrt{2}x$ and $c = -2\sqrt{3}$
So, the discriminant is given by $D = b^2 - 4ac$
$= (2\sqrt{2})^2 - (4 \times \sqrt{3} \times -2\sqrt{3})$
$D = 8 + 24 = 32$
Thus, the discriminant of the given equation is 32.

(vi) $x^2 - x + 1 = 0$
Solution:

Given equation,
$x^2 - x + 1 = 0$ It is in the form of $ax^2 + bx + c = 0$
Where, a = 1, b = -1 and c = 1
So, the discriminant is given by $D = b^2 - 4ac$
$D = (-1)^2 - 4 \times 1 \times 1$
$D = 1 - 4 = -3$
Thus, the discriminant of the given equation is -3.