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) \(x^2 - 2x + k = 0, k \in \mathbb{R}\)
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 $D = b^2 - 4ac$
$D = (2\sqrt{2})^2 - (4 \times \sqrt{3} \times -2\sqrt{3})$
$D = 8 + 24 = 32$
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.