Exercise 10C

Question 1:

$$x^2 + 8x + 16 = 0$$

The given equation is

This is of the form $ax^2+bx+c=0$, we get

$$a = 1, b = 8,\ c = 16$$

$$\therefore D = b^2 - 4ac = \left[(8)^2 - 4 \times 1 \times 16\right] = (64 - 64) = 0$$

So the given equation has real and equal roots

Question 2:

$$x^2 - 6x + 6 = 0$$

The given equation is

This is of the form $ax^2+bx+c=0$, we get

$$a = 1, b = -6,\ c = 6$$

$$\therefore D = b^2 - 4ac = \left[(-6)^2 - 4 \times 1 \times 6\right] = 36 - 24 = 12$$

So the given equation has real and equal roots

Question 3:

$$9x^2 - 12x + 4 = 0$$

The given equation is

This is of the form $ax^2+bx+c=0$, we get

$$a = 9, b = -12, c = 4$$

$$\therefore D = b^2 - 4ac = \left[(-12)^2 - 4 \times 9 \times 4\right] = 144 - 144 = 0$$

So the given equation has real and equal roots

Question 4:

$$9x^2 - 6x + 4 = 0$$

The given equation is

This is of the form $ax^2+bx+c=0$, we get

$$a = 9, b = -6, c = 4$$

$$\therefore D = b^2 - 4ac = \left[(-6)^2 - 4 \times 9 \times 4\right] = 36 - 144 < 0$$

So the given equation has real and equal roots

Question 5:

The given equation is $3x^2 - 2\sqrt{6}x + 2 = 0$

This is the form $ax^2+bx+c=0$, we get

$a = 3,\ b = -2\sqrt{6},\ c = 2$

$$\therefore D = b^2 - 4ac = \left[\left(-2\sqrt{6}\right)^2 - 4\times 3\times 2\right] = 24 - 24 = 0$$

So the given equation has real and equal roots

Question 6:

The given equation is $12x^2 - 4\sqrt{15}x + 5 = 0$

This is of the form $ax^2+bx+c=0$, we get

Here $a = 12\ ,\ b = -4\sqrt{15}\ ,\ c = 5$

$$\therefore D = b^2 - 4ac = \left[\left(-4\sqrt{15}\right)^2 - 4\times 12\times 5\right] = 240 - 240 = 0$$

So the given equation has real and equal roots

Question 7:

The given equation is $x^2 + px - q^2 = 0$

This is the form of $ax^2+bx+c=0$

$$a = 1,\ b = p,\ \ c = -q^2$$

$$\therefore D = b^2 - 4ac = (p)^2 - 4\times 1\times\left(-q^2\right) = p^2 + 4q^2 \geq 0$$

Now $D \geq 0$

So, the roots of the given equation are real for all real value of p and q.

Question 8:

The given equation is $x^2 + ax - 1 = 0$

$a = 1, b = a, c = -1$

$$\therefore D = b^2 - 4ac = (a)^2 - 4\times 1\times(-1) = a^2 + 4 > 0$$

So, the roots of the given equation are real and distinct for all real values of a.

********** END **********