Exercise 10B

Question 1:

$$2x^2 - 7x + 6 = 0$$

Comparing it with $ax^2+bx+c=0$, we get
a = 2, b = -7 and c = 6

$$\therefore D = \left(b^2 - 4ac\right)$$
$$= \left[(-7)^2 - (4 \times 2 \times 6)\right]$$
$$= (49 - 48) = 1$$
$$\therefore D = 1$$

Question 2:

The given equation is $3x^2 - 2x + 8 = 0$

Comparing it with $ax^2+bx+c=0$, we get
a = 3, b = -2, c = 8

$$\therefore D = \left(b^2 - 4ac\right) = \left[(-2)^2 - (4 \times 3 \times 8)\right]$$
$$= (4 - 96) = -92$$

Question 3:

$$2x^2 - 5\sqrt{2}x + 4 = 0$$

Comparing it with $ax^2+bx+c=0$, we get
a = 2, b = -5

$$\therefore D = \left(b^2 - 4ac\right) = \left[\left(-5\sqrt{2}\right)^2 - (4 \times 2 \times 4)\right]$$
$$= (50 - 32)$$
$$\therefore D = 18$$

Question 4:

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

Comparing it with $ax^2+bx+c=0$,we get

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

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

$$= (8 + 24) = 32$$

$$D = 32$$

Question 5:

$$1 - x = 2x^2 \Rightarrow 2x^2 + x - 1 = 0$$

$$a = 2,\ b = 1,\ c = -1$$

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

$$= 1 + 8 = 9$$

$$D = 9$$

Question 6:

The given equation is $x^2 = 4x - c \Rightarrow x^2 - 4x + c = 0$

$$a = 1,\ b = -4,\ c = c$$

$$\therefore D = \left(b^2 - 4ac\right) = \left[(-4)^2 - (4 \times 1 \times c)\right]$$

$$\therefore D = (16 - 4c)$$

Question 7:

The given equation is $6x^2 + 7x - 10 = 0$

Comparing it with $ax^2 + bx + c = 0$, we get

$$a = 6,\ b = 7,\ c = -10$$

$$\therefore D = \left(b^2 - 4ac\right) = \left[7^2 - \left(4 \times 6 \times (-10)\right)\right]$$

$$\therefore D = 49 + 240 = 289 > 0$$

So the given equation has real roots, given by

$$\alpha = \frac{-b + \sqrt{D}}{2a} = \frac{-7 + \sqrt{289}}{2 \times 6} = \frac{-7 + 17}{12} = \frac{10}{12} = \frac{5}{6}$$

$$\beta = \frac{-b - \sqrt{D}}{2a} = \frac{-7 - \sqrt{289}}{2 \times 6} = \frac{-7 - 17}{12} = \frac{-24}{12} = -2$$

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