Exercise 10C

Question 15:

The given equation is $9x^2 + 8kx + 16 = 0$

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

$a = 9, b = 8k, c = 16$

$$\therefore D = b^2 - 4ac = (8k)^2 - 4 \times 9 \times 16 = 64k^2 - 576$$

For real and equal root, we must have, $D = 0$

Now, $D = 0 \Rightarrow 64k^2 - 576 = 0$

$$\Rightarrow \quad 64k^2 = 576$$

$$\Rightarrow \quad k^2 = \frac{576}{64} = 9$$

$$\Rightarrow \quad k = \pm 3$$

Hence, $k = 3$ or $k = -3$

Question 16:

The given equation is $(k+4)x^2 + (k+1)x + 1$

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

$a = k+4, b = k+1, c = 1$

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

$$= k^2 + 1 + 2k - 4k - 16$$

$$= k^2 - 2k - 15$$

For real and equal roots we must have $D = 0$

$$\text{Now,} \quad D = 0 \Rightarrow k^2 - 2k - 15 = 0$$

$$\Rightarrow k^2 - 5k + 3k - 15 = 0$$

$$\Rightarrow k(k-5) + 3(k-5) = 0$$

$$\Rightarrow (k-5)(k+3) = 0$$

$$\Rightarrow \quad (k-5) = 0 \quad \text{or} \quad k+3 = 0$$

$$k = 5 \quad \text{or} \quad k = -3$$

Question 17:

$3x^2 - 2kx^2 + 27 = 0$

$a = 3, b = -2k, c = 27$

$$D = b^2 - 4ac = (-2k)^2 - 4 \times 3 \times 27$$

$$= 4k^2 - 324$$

Roots of $3x^2 - 2kx + 27 = 0$ are real and equal if $D = 0$

$\Rightarrow 4K^2 - 324 = 0$ or $k^2 = \frac{324}{4} = 81$

$\therefore \; k = \pm 9$

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