Important Questions for CBSE Class 10 Mathematics

Quadratic Equations – Chapter 4/Extra Questions for Practice

Answer the following:

1. If x = $\frac{2}{5}$ and x = -2 are roots of the quadratic equation ax^2+ 8x + c = 0, find the values of a and b.

Solution:

We know that $\alpha + \beta = \frac{-b}{a}$

$\frac{2}{5}$ + (-2) = $\frac{-8}{a}$

$\frac{2+(-10)}{5} = \frac{-8}{a}$

$\frac{-8}{5} = \frac{-8}{a}$

a = 5

$\alpha\beta = \frac{c}{a}$

$\frac{2}{5} \times$(-2) = $\frac{c}{5}$

$\frac{-4}{5} = \frac{c}{5}$

c = -4

2. If -3 is a root of the quadratic equation 3x^2 + px – 12 = 0, find the value of p?

Solution:

Given f(x) = 3x^2 + px – 12 = 0

Since -3 is a root, 3 $(-3)^2$+ p (-3) – 12 = 0

3 $\times$ 9 – 3p – 12 = 0

27 – 3p – 12 = 0

15 – 3p = 0

15 = 3p

p = $\frac{15}{3}$ = 5

3. The sum of the squares of two consecutive odd positive integers is 514. Find the numbers?

Solution:

Let the two consecutive odd positive integers be x and x+2.

Given $x^2 + (x + 2)^2$= 514

$x^2 + x^2$ +4x + 4 = 514

2x^2+4x + 4 = 514

2x^2 + 4x -510 = 0

2(x^2 – 2x – 255) = 0

x^2 + 17x – 15x – 255 = 0

x(x + 17) – 15(x + 17) = 0

(x + 17) (x – 15) = 0

x = -17 or x = 15

Since x is a positive integer, take x as 15.

So x + 2 = 15 + 2 = 17

Therefore, the two consecutive odd positive integers are 15 and 17.

4. If the discriminant of 4x^2- 7x + k = 0 is 65, find the value of k?

Solution:

Discriminant = b^2- 4ac = $(-7)^2$ – 4 $\times$ 4 $\times$ k = 65

49 – 16k = 65

49 – 16k – 65 = 0

-16 – 16k = 0

-16 = 16k

k = $\frac{-16}{16}$ = -1

5. Find the values of k for which the quadratic equation 5x^2 - 4x + k = 0 has equal roots.

Solution:

For equal roots, we have b^2 – 4ac = 0

$(-4)^2$ – 4 $\times$ 5 $\times$k = 0

16 – 20k = 0

16 = 20k

k = $\frac{16}{20} \div \frac{4}{4} = \frac{4}{5}$.

6. Find the value of k for which the quadratic equation kx(x – 2) + 6 = 0 has two equal roots.

Solution:

If a quadratic equation has two real roots, we have b^2 – 4ac = 0

kx (x – 2) + 6 = 0

kx^2 – 2kx + 6 = 0

Here a = k, b = -2k, c = 6

b^2 – 4ac = $(-2k)^2$ – 4 $\times$ k $\times$6 = 0

$4k^2$ – 24k = 0

4k (k – 6) = 0

k = 6

7. If the roots of the quadratic equation (a - c)x^2 + (a+ c) x + (c + a) = 0are equal. Prove that 3a^2 - 5c^2 = 2ac.

Solution:

Since roots are equal, b^2 – 4ac = 0

$(a + c)^2$ – 4 (a - c) (c + a) = 0

$a^2 + c^2$ + 2ac – 4($a^2 - c^2$) = 0

$a^2 + c^2$ + 2ac – 4$a^2 + 4c^2$= 0

-3a^2+ 5c^2+2ac = 0

3a^2- 5c^2 = 2ac