RD Sharma Solutions Class 10 Maths Chapter 8 Exercise 8.3: Chapter 8, Exercise 8.3 of RD Sharma's Class 10 Maths focuses on solving quadratic equations using the quadratic formula. This exercise emphasizes the formula, which is derived from the standard quadratic equation.

Students learn to calculate the discriminant (D), and its role in determining the nature of roots—real and distinct (D>0), real and equal (D=0), or imaginary (D<0). The problems enhance conceptual understanding and application skills for solving quadratic equations systematically.

RD Sharma Solutions Class 10 Maths Chapter 8 Exercise 8.3 Overview

Chapter 8 of RD Sharma's Class 10 Maths book focuses on Quadratic Equations, a foundational topic in algebra. Exercise 8.3 emphasizes solving quadratic equations using methods like factorization and the quadratic formula, offering practical applications in real-life problem-solving scenarios.

Mastery of these concepts is essential for understanding advanced mathematical topics in higher studies and for competitive exams. This exercise helps students develop analytical thinking and problem-solving skills, which are crucial for physics and engineering. By providing step-by-step solutions, RD Sharma ensures a deeper understanding of the topic, helping students build confidence in tackling quadratic equations systematically.

RD Sharma Solutions Class 10 Maths Chapter 8 Exercise 8.3 Quadratic Equations

Below is the RD Sharma Solutions Class 10 Maths Chapter 8 Exercise 8.3 Quadratic Equations -

Solve the following quadratic equation by factorization:

1. (x – 4)(x + 2) = 0

Solution:

Given,

(x – 4) (x + 2) = 0

So, either x – 4 = 0 ⇒ x = 4

Or, x + 2 = 0, ⇒ x = – 2

Thus, the roots of the given quadratic equation are 4 and -2, respectively.

2. (2x + 3) (3x – 7) = 0

Solution:

Given,

(2x + 3) (3x – 7) = 0.

So, either 2x + 3 = 0, ⇒ x = – 3/2

Or, 3x -7 = 0, ⇒ x = 7/3

Thus, the roots of the given quadratic equation are x = -3/2 and x = 7/3, respectively.

3. $3x^2 – 14x – 5 = 0$

Solution:

Given.

$3x^2 – 14x – 5 = 0$

⇒ $3x^2 – 14x – 5 = 0$

⇒ $3x^2 – 15x + x – 5 = 0$

⇒ $3x(x – 5) + 1(x – 5) = 0$

⇒ $(3x + 1)(x – 5) = 0$

Now, either 3x + 1 = 0 ⇒ x = -1/3

Or, x – 5 = 0 ⇒ x = 5

Thus, the roots of the given quadratic equation are 5 and x = – 1/3, respectively.

4. Find the roots of the equation $9x^2 – 3x – 2 = 0$.

Solution:

Given,

$9x^2 – 3x – 2 = 0$.

⇒ $9x^2 – 3x – 2 = 0$.

⇒ $9x^2 – 6x + 3x – 2 = 0$

⇒ $3x (3x – 2) + 1(3x – 2) = 0$

⇒ $(3x – 2)(3x + 1) = 0$

Now, either $3x – 2 = 0 ⇒ x = 2/3$

Or, $3x + 1= 0 ⇒ x = -1/3$

Thus, the roots of the given quadratic equation are $x = 2/3$ and $x = -1/3$, respectively.

$$\frac{1}{x-1}-\frac{1}{x+5}=\frac{6}{7}$$

5.

Solution:

Given,

$$\frac{1}{x-1}-\frac{1}{x+5}=\frac{6}{7}$$

$$\frac{x+5-x+1}{(x-1)(x+5)}=\frac{6}{7}$$

$$\frac{6}{x^2+4x-5}=\frac{6}{7}$$

Dividing by 6 on both sides and cross-multiplying, we get

$x^2+ 4x – 12 = 0$

⇒ $x^2 + 6x – 2x – 12 = 0$

⇒ $x(x + 6) – 2(x – 6) = 0$

⇒ $(x + 6)(x – 2) = 0$

Now, either $x + 6 = 0 ⇒x = -6$

Or, $x – 2 = 0 ⇒ x = 2$

Thus, the roots of the given quadratic equation are 2 and – 6, respectively.

6. $6x^2 + 11x + 3 = 0$

Solution:

Given equation is $6x^2 + 11x + 3 = 0$.

$\Rightarrow 6x^2 + 9x + 2x + 3 = 0$

$\Rightarrow 3x (2x + 3) + 1(2x + 3) = 0$

$\Rightarrow (2x +3) (3x + 1) = 0$

Now, either $2x + 3 = 0 \Rightarrow x = -3/2$

Or, $3x + 1= 0 \Rightarrow x = -1/3$

Thus, the roots of the given quadratic equation are $x = -3/2$ and $x = -1/3$, respectively.

7. $5x^2 – 3x – 2 = 0$

Solution:

Given equation is $5x^2 – 3x – 2 = 0$.

$\Rightarrow 5x^2 – 3x – 2 = 0.$

$\Rightarrow 5x^2 – 5x + 2x – 2 = 0$

$\Rightarrow 5x(x – 1) + 2(x – 1) = 0$

$\Rightarrow (5x + 2)(x – 1) = 0$

Now, either $5x + 2 = 0 \Rightarrow x = -2/5$

Or, $x -1= 0 \Rightarrow x = 1$

Thus, the roots of the given quadratic equation are 1 and $x = -2/5$, respectively.

8. $48x^2 – 13x – 1 = 0$

Solution:

Given equation is $48x^2 – 13x – 1 = 0$.

$\Rightarrow 48x^2 – 13x – 1 = 0.$

$\Rightarrow 48x^2 – 16x + 3x – 1 = 0.$

⇒ 16x(3x – 1) + 1(3x – 1) = 0

⇒ (16x + 1)(3x – 1) = 0

Either 16x + 1 = 0 ⇒ x = -1/16

Or, 3x – 1=0 ⇒ x = 1/3

Thus, the roots of the given quadratic equation are x = -1/16 and x = 1/3, respectively.

9. $3x^2 = -11x – 10$

Solution:

Given equation is $3x^2 = -11x – 10$

⇒ $3x^2 + 11x + 10 = 0$

⇒ $3x^2 + 6x + 5x + 10 = 0$

⇒ 3x(x + 2) + 5(x + 2) = 0

⇒ (3x + 5)(x + 2) = 0

Now, either 3x + 5 = 0 ⇒ x = -5/3

Or, x + 2 = 0 ⇒ x = -2

Thus, the roots of the given quadratic equation are x = -5/3 and -2, respectively.

10. 25x(x + 1) = – 4

Solution:

Given equation is 25x(x + 1) = -4

25x(x + 1) = -4

⇒ $25x^2 + 25x + 4 = 0$

⇒ $25x^2 + 20x + 5x + 4 = 0$

⇒ 5x (5x + 4) + 1(5x + 4) = 0

⇒ (5x + 4)(5x + 1) = 0

Now, either 5x + 4 = 0 therefore x = – 4/5

Or, 5x + 1 = 0 therefore x = -1 /5

Thus, the roots of the given quadratic equation are x = – 4/5 and x = -1/5, respectively.

11. 16x – 10/x = 27

Solution:

Given,

16x – 10/x = 27

On multiplying x on both sides we have,

⇒ $16x^2 – 10 = 27x$

⇒ $16x^2 – 27x – 10 = 0$

⇒ $16x^2 – 32x + 5x – 10 = 0$

⇒ 16x(x – 2) +5(x – 2) = 0

⇒ (16x + 5) (x – 2) = 0

Now, either 16x + 5 = 0 ⇒ x = -5/16

Or, x – 2 = 0 ⇒ x = 2

Thus, the roots of the given quadratic equation are x = – 5/16 and x = 2, respectively.

12. $\frac{1}{x} - \frac{1}{x-2} = 3$

Solution:

Given equation is,

$$\frac{1}{x} - \frac{1}{x-2} = 3$$

$$\frac{x-2-x}{x(x-2)} = 3$$

$$\frac{2}{x(x-2)} = 3$$

On cross multiplying on both the sides we get,

2 = 3x(x – 2)

$2 = 3x^2 – 6x$

$3x^2 – 6x – 2 = 0$

$\Rightarrow 3x^2 – 3x – 3x – 2 = 0$

$$3x^2 - (3+\sqrt{3})x - (3-\sqrt{3})x + [(\sqrt{3}^2) - 1^2] = 0$$

$$3x^2 - (3+\sqrt{3})x - (3-\sqrt{3})x + [(\sqrt{3}^2) - 1^2][(\sqrt{3}^2) - 1^2] = 0$$

$$\sqrt{3}^2x^2 - \sqrt{3}(\sqrt{3}+1)x - \sqrt{3}(\sqrt{3}-1)x + (\sqrt{3}+1)(\sqrt{3}-1) = 0$$

$$\sqrt{3}x(\sqrt{3}+1)x - (\sqrt{3}x - (\sqrt{3}+1))(\sqrt{3}-1) = 0$$

$$(\sqrt{3}x - \sqrt{3} - 1)(\sqrt{3}x - \sqrt{3} + 1)(\sqrt{3}-1) = 0$$

Now, either

$$(\sqrt{3}x - \sqrt{3} - 1) = 0 \quad \text{or} \quad (\sqrt{3}x - \sqrt{3} + 1)(\sqrt{3}-1) = 0$$

Thus,

$x = \frac{\sqrt{3}+1}{\sqrt{3}}$ or $x = \frac{\sqrt{3}-1}{\sqrt{3}}$ are the solutions of the given quadratic equations.

13. x – 1/x = 3, x ≠ 0

Solution:

Given,

x – 1/x = 3

On multiplying x on both sides, we have,

$\Rightarrow x^2 – 1 = 3x$

$\Rightarrow x^2 – 3x – 1 = 0$

$$x^2 - (\frac{3}{2} + \frac{3}{2})x - 1 = 0$$

$$x^2 - \frac{3+\sqrt{3}}{2}x - \frac{3-\sqrt{3}}{2}x - 1 = 0$$

$$x^2 - \frac{3+\sqrt{3}}{2}x - \frac{3-\sqrt{3}}{2}x - \frac{-4}{4} = 0$$

$$x^2 - \frac{3+\sqrt{3}}{2}x - \frac{3-\sqrt{3}}{2}x - \frac{9-13}{4} = 0$$

$$x^2 - \frac{3+\sqrt{3}}{2}x - \frac{3-\sqrt{3}}{2}x - \frac{(3)^2-(\sqrt{13}^2)}{(2)^2} = 0$$

$$x^2 - \frac{3+\sqrt{3}}{2}x - \frac{3-\sqrt{3}}{2}x + (\frac{3+\sqrt{13}}{2})(\frac{3-\sqrt{13}}{2}) = 0$$

$$(x - \frac{3+\sqrt{13}}{2})(x - \frac{3-\sqrt{13}}{2}) = 0$$

Either, $(x - \frac{3+\sqrt{13}}{2}) = 0$; $\Rightarrow \mathbf{x} = \frac{3+\sqrt{13}}{2}$

Or, $(x - \frac{3-\sqrt{13}}{2}) = 0$; $\Rightarrow \mathbf{x} = \frac{3-\sqrt{13}}{2}$

Therefore, the roots of the given quadratic equation are $\frac{3+\sqrt{13}}{2}$ and $\frac{3-\sqrt{13}}{2}$ respectively.

$$\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$$

14.

Solution:

Given,

$$\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$$

$$\frac{x-7-x-4}{(x+4)(x-7)} = \frac{11}{30}$$

$$\frac{-11}{(x+4)(x-7)} = \frac{11}{30}$$

Dividing by 11 both the sides and cross-multiplying, we get,

⇒ $x^2 – 3x – 28 = – 30$

⇒ $x^2 – 3x – 2 = 0$

⇒ $x^2 – 2x – x – 2 = 0$

⇒ $x(x – 2) – 1(x – 2) = 0$

⇒ $(x – 2)(x – 1) = 0$

Now, either $x – 2 = 0 ⇒ x = 2$

Or, $x – 1 = 0 ⇒ x = 1$

Thus, the roots of the given quadratic equation are 1 and 2, respectively.

$$\frac{1}{x-3}+\frac{2}{x-2}=\frac{8}{x}$$

15.

Solution:

Given,

$$\frac{1}{x-3}+\frac{2}{x-2}=\frac{8}{x}$$

$$\frac{x-2+2(x-3)}{(x-3)(x-2)}=\frac{8}{x}$$

$$\frac{3x-8}{(x-3)(x-2)}=\frac{8}{x}$$

On cross multiplying we get,

⇒ $x(3x – 8) = 8(x – 3)(x – 2)$

⇒ $3x^2 – 8x = 8(x^2 – 5x + 6)$

⇒ $8x^2 – 40x + 48 – (3x^2 – 8x) = 0$

⇒ $5x^2 – 32x + 48 = 0$

⇒ $5x^2 – 20x – 12x + 48 = 0$

⇒ 5x(x – 4) – 12(x – 4) = 0

⇒ (x – 4)(5x – 12) = 0

Now, either x – 4 = 0 ⇒ x = 4

Or, 5x – 12 = 0 ⇒ x = 12/5

Thus, the roots of the given quadratic equation are 12/5 and 4, respectively.

16. $a^2x^2 – 3abx + 2b^2 = 0$

Solution:

Given equation is $a^2x^2 – 3abx + 2b^2 = 0$

⇒ $a^2x^2 – abx – 2abx + 2b^2 = 0$

⇒ ax(ax – b) – 2b(ax – b) = 0

⇒ (ax – b)(ax – 2b) = 0

Now, either ax – b = 0 ⇒ x = b/a

Or, ax – 2b = 0 ⇒ x = 2b/a

Thus, the roots of the quadratic equation are x = 2b/a and x = b/a, respectively.

17. $9x^2 – 6b^2x – (a^4 – b^4) = 0$

Solution:

Given,

$$9x^2 - 6b^2x - (a^4 - b^4) = 0$$
$$\Rightarrow 9x^2 - 6b^2x - (a^2 - b^2)(a^2 + b^2) = 0$$
$$\Rightarrow 9x^2 + 3(a^2 - b^2)] - 3(a^2 + b^2)x - (a^2 - b^2)(a^2 + b^2) = 0$$
$$\Rightarrow 3x[3x + a^2 + b^2)] - (a^2 + b^2)[3x + (a^2 - b^2)] = 0$$
$$\Rightarrow [3x - (a^2 + b^2)][3x + (a^2 - b^2)] = 0$$
$$\Rightarrow 3x - (a^2 + b^2) = 0 \; or \; 3x + (a^2 - b^2) = 0$$
$$\Rightarrow x = \frac{a^2+b^2}{3} \; or \; x = \frac{b^2-a^2}{3}$$

Thus, the roots of the quadratic equation are x = $(b^2 – a^2)/3$ and x = $(a^2 + b^2)/3$, respectively.

18. $4x^2 + 4bx – (a^2 – b^2) = 0$

Solution:

Given,

$4x^2 + 4bx – (a^2 – b^2) = 0$

For factorizing,

$4(a^2 – b^2) = -4(a – b)(a + b) = [-2(a-b)][2(a + b)]$

$\Rightarrow 2(b – a)*2(b + a)$

$\Rightarrow 4x^2+ (2(b – a) + 2(b + a)) – (a – b)(a + b) = 0$

So, now

$4x^2 + 2(b – a)x++ 2(b + a)x + (b – a)(a + b) = 0$

$\Rightarrow 2x(2x + (b – a)) +(a + b)(2x + (b – a)) = 0$

$\Rightarrow (2x + (b – a))(2x + b + a) = 0$

Now, either $(2x + (b – a)) = 0 \Rightarrow x = (a – b)/2$

Or, $(2x + b + a) = 0 \Rightarrow x = -(a + b)/2$

Thus, the roots of the given quadratic equation are $x = -(a + b)/2$ and $x = (a – b)/2$, respectively.

19. $ax^2 + (4a^2 – 3b)x – 12ab = 0$

Solution:

Given equation is $ax^2 + (4a^2 – 3b)x – 12ab = 0$

$\Rightarrow ax^2 + 4a^2x – 3bx – 12ab = 0$

$\Rightarrow ax(x + 4a) – 3b(x + 4a) = 0$

$\Rightarrow (x + 4a)(ax – 3b) = 0$

Now, either $x + 4a = 0 \Rightarrow x = -4a$

Or, $ax – 3b = 0 \Rightarrow x = 3b/a$

Thus, the roots of the given quadratic equation are $x = 3b/a$ and $-4a$, respectively.

20. $2x^2 + ax – a^2 = 0$

Solution:

Given,

$$2x^2 + ax - a^2 = 0$$
$$\Rightarrow 2x^2 + 2ax - ax - a^2 = 0$$
$$\Rightarrow 2x(x + a) - a(x + a) = 0$$
$$\Rightarrow (2x - a)(x + a) = 0$$
$$\Rightarrow 2x - a = 0 \; or \; x + a = 0$$
$$\Rightarrow x = \frac{a}{2} \; or \; x = -a$$

Thus, the roots of the given quadratic equation are x = a/2 and -a, respectively.

21. $16/x – 1 = 15/(x + 1)$, $x \neq 0, -1$

Solution:

Given,

$$\frac{16}{x} - 1 = \frac{15}{x+1}$$
$$\Rightarrow \frac{16-x}{x} = \frac{15}{x+1}$$
$$\Rightarrow (16 - x)(x + 1) = 15x$$
$$\Rightarrow -x^2 + 16 + 15x = 15x$$
$$\Rightarrow -x^2 + 16 = 0$$
$$\Rightarrow -x^2 - 16 = 0$$
$$\Rightarrow (x - 4)(x + 4) = 0$$
$$\Rightarrow x - 4 = 0 \; x + 4 = 0$$
$$\Rightarrow x = 4 \; or \; x = -4$$

$$\frac{16}{x} - 1 = \frac{15}{x+1}$$

$$\Rightarrow \frac{16-x}{x} = \frac{15}{x+1}$$

$$\Rightarrow (16 - x)(x + 1) = 15x$$

$$\Rightarrow -x^2 + 16 + 15x = 15x$$

$$\Rightarrow -x^2 + 16 = 0$$

$$\Rightarrow -x^2 - 16 = 0$$

$$\Rightarrow (x - 4)(x + 4) = 0$$

$$\Rightarrow x - 4 = 0\ x + 4 = 0$$

$$\Rightarrow x = 4\ or\ x = -4$$

Thus, the roots of the given quadratic equation are x = 4 and -4, respectively.

$$\frac{x+3}{x+2} = \frac{3x-7}{2x-3}$$

22. x ≠ -2, 3/2

Solution:

Given,

$$\frac{x+3}{x+2} = \frac{3x-7}{2x-3}$$

On cross-multiplying we get,

(x + 3)(2x – 3) = (x + 2)(3x – 7)

⇒ $2x^2 – 3x + 6x – 9 = 3x^2 – x – 14$

⇒ $2x^2 + 3x – 9 = 3x^2 – x – 14$

⇒ $x^2 – 3x – x – 14 + 9 = 0$

⇒ $x^2 – 5x + x – 5 = 0$

⇒ x(x – 5) + 1(x – 5) = 0

⇒ (x – 5)(x + l) – 0

Now, either x – 5 = 0 or x + 1 = 0

⇒ x = 5 and x = -1

Thus, the roots of the given quadratic equation are 5 and -1, respectively.

$$\frac{2x}{x-4}+\frac{2x-5}{x-3}=\frac{25}{3}$$

23. x ≠ 3, 4

Solution:

The given equation is

$$\frac{2x}{x-4}+\frac{2x-5}{x-3}=\frac{25}{3}$$

$$\frac{2x(x-3)+(2x-5)(x-4)}{(x-4)(x-3)}=\frac{25}{3}$$

$$\frac{2x^2-6x+2x^2-5x-8x+20}{x^2-4x-3x+12}$$

$$\frac{4x^2-19x+20}{x^2-7x+12}=\frac{25}{3}$$

On cross-multiplying, we have

$3(4x^2 – 19x + 20) = 25(x^2 – 7x + 12)$

⇒ $12x^2 – 57x + 60 = 25x^2 – 175x + 300$

⇒$13x^2 – 78x – 40x + 240 = 0$

⇒$13x^2 – 118x + 240 = 0$

⇒$13x^2 – 78x – 40x + 240 = 0$

⇒13x(x – 6) – 40(x – 6) = 0

⇒ (x – 6)(13x – 40) = 0

Now, either x – 6 = 0 ⇒x = 6

Or, 13x – 40 = 0 ⇒x = 40/13

Thus, the roots of the given quadratic equation are 6 and 40/13, respectively.

$$\frac{x+3}{x-2}-\frac{1-x}{x}=\frac{17}{4}$$

24. x ≠ 0, 2

Solution:

Given equation is,

$$\frac{x+3}{x-2}-\frac{1-x}{x}=\frac{17}{4}$$

$$\frac{x(x+3)-(x-2)(1-x)}{x(x-2)}=\frac{17}{4}$$

$$\frac{x^2+3x-x+x^2+2-2x}{x^2-2x}=\frac{17}{4}$$

$$\frac{2x^2+2}{x^2-2x}=\frac{17}{4}$$

On cross-multiplying, we get

$4(2x^2 + 2) = 17(x^2 – 2x)$

$⇒ 8x^2 + 8 = 17x^2 – 34x$

$⇒ 9x^2 – 34x – 8 = 0$

$⇒ 9x^2 – 36x + 2x – 8 = 0$

⇒ 9x(x – 4) + 2(x – 4) = 0

⇒ 9x + 2)(x – 4) = 0

Now, either 9x + 2 = 0 ⇒x = -2/9

Or, x – 4 = 0 ⇒ x = 4

Thus, the roots of the given quadratic equation are x = -2/9 and 4, respectively.

$$\frac{x-3}{x+3}-\frac{x+3}{x-3}=\frac{48}{7}, x \neq 3, x \neq -3$$

25.

Solution:

Given equation is,

$$\frac{x-3}{x+3}-\frac{x+3}{x-3}=\frac{48}{7}$$

$$\Rightarrow \frac{(x-3)^2-(x+3)^2}{(x+3)(x-3)}=\frac{48}{7}$$

$$\Rightarrow \frac{\left(x^2-6x+9\right)-\left(x^2+6x+9\right)}{x^2-9}=\frac{48}{7}$$

$$\Rightarrow \frac{x^2-6x+9-x^2-6x-9}{x^2-9}=\frac{48}{7}$$

$$\Rightarrow \frac{-12x}{x^2-9}=\frac{48}{7}$$

On cross-multiplying, we get

$7(-12x) = 48(x^2 – 9)$

$\Rightarrow -84x = 48x^2 – 432$

$\Rightarrow 48x^2 + 84x – 432 = 0$

$\Rightarrow 4x^2 + 7x – 36 = 0$ dividing by 12]

$\Rightarrow 4x^2 + 16x – 9x – 36 = 0$

$\Rightarrow 4x(x + 4) – 9(x – 4) = 0$

$\Rightarrow (4x – 9)(x + 4) = 0$

Now, either $4x – 9 = 0 \Rightarrow x = 9/4$

Or, x + 4 = 0 ⇒ x = -4

Thus, the roots of the given quadratic equation are x = 9/4 and -4, respectively.

$$\frac{1}{x-2}+\frac{2}{x-1}=\frac{6}{x}$$

26.

, x **≠ 0**

Solution:

Given equation is,

$$\frac{1}{x-2}+\frac{2}{x-1}=\frac{6}{x}$$

$$\frac{(x-1)+2(x-2)}{(x-2)(x-1)}=\frac{6}{x}$$

$$\frac{(x-1)+2x-4}{(x^2-2x-x+2)}=\frac{6}{x}$$

$$\frac{3x-5}{(x^2-3x+2)}=\frac{6}{x}$$

$$\frac{1}{x-2}+\frac{2}{x-1}=\frac{6}{x}$$

$$\frac{(x-1)+2(x-2)}{(x-2)(x-1)}=\frac{6}{x}$$

$$\frac{(x-1)+2x-4}{(x^2-2x-x+2)}=\frac{6}{x}$$

$$\frac{3x-5}{(x^2-3x+2)}=\frac{6}{x}$$

On cross multiplying, we have

$x(3x – 5) = 6(x^2 – 3x + 2)$

⇒ $3x^2 – 5x = 6x^2 – 18x + 12$

⇒ $3x^2 – 13x + 12 = 0$

⇒ $3x^2 – 9x – 4x + 12 = 0$

⇒ $3x(x – 3) – 4(x – 3) = 0$

⇒ $(x – 3)(3x – 4) = 0$

Now, either $x – 3 = 0 ⇒ x = 3$

Or, $3x – 4 = 0 ⇒ 4/3$.

Thus, the roots of the given quadratic equation are 3 and 4/3, respectively.

$$\frac{x+1}{x-1}-\frac{x-1}{x+1}=\frac{5}{6}$$

27.

, x ≠ 1, -1

Solution:

The given equation is,

$$\frac{x+1}{x-1}-\frac{x-1}{x+1}=\frac{5}{6}$$

$$\frac{(x+1)^2-(x-1)^2}{x^2-1}=\frac{5}{6}$$

$$\frac{4x}{x^2-1}=\frac{5}{6}$$

On cross – multiplying we have,

⇒ $6(4x) = 5(x^2 – 1) = 24x$

⇒ $5x^2 – 5 = 5x^2 – 24x – 5 =0$

⇒ $5x^2 – 25x + x – 5 = 0$

⇒ $5x(x – 5) + 1(x – 5) = 0$

⇒ (5x + 1)(x – 5) = 0

Now, either x – 5 = 0 ⇒ x = 5

Or, 5x + 1 = 0 ⇒ x = −1/5

Thus, the roots of the given quadratic equation are x = −1/5 and 5, respectively.

$$\frac{x-1}{2x+1}+\frac{2x+1}{x-1}=\frac{5}{2}$$

28.

, x ≠ 1, -1/2

Solution:

The given equation is,

$$\frac{x-1}{2x+1}+\frac{2x+1}{x-1}=\frac{5}{2}$$

$$\frac{(x-1)^2+(2x+1)^2}{2x^2-2x+x-1}=\frac{5}{2}$$

$$\frac{x^2-2x+1+4x^2+4x+1}{2x^2-x-1}=\frac{5}{2}$$

$$\frac{5x^2+2x+2}{2x^2-x-1}=\frac{5}{2}$$

On cross – multiplying we have,

⇒ $2(5x^2 + 2x + 2) = 5(2x^2 – x – 1)$

⇒ $10x^2 + 4x + 4 = 10x^2 – 5x – 5$

⇒ 4x + 5x + 4 + 5 = 0

⇒ 9x + 9 = 0

⇒ 9x = -9

Thus, x = -1 is the only root of the given equation.

$$\frac{4}{x} - 3 = \frac{5}{2x+3}, x \neq 0, -\frac{3}{2}$$

29.

Solution:

Given equation is,

$$\Rightarrow \frac{4-3x}{x} = \frac{5}{(2x+3)}$$

$\Rightarrow 5x = (2x + 3)(4 - 3x)$

$\Rightarrow 5x = 8x - 6x^2 + 12 - 9x$

$\Rightarrow 5x - 8x + 6x^2 - 12 + 9x = 0$

$\Rightarrow 6x^2 + 6x - 12 = 0$

$\Rightarrow x^2 + x - 2 = 0$ (Dividing by 6)

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

$\Rightarrow x(x + 2) - 1(x + 2) = 0$

$\Rightarrow (x - 1)(x + 2) = 0$

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

$\therefore x = 1$ or $x = -2$

Thus, the roots of the given quadratic equation are x = 1 and x = -2, respectively.

30.

Solution:

Given equation is,

$$\frac{x-4}{x-5}+\frac{x-6}{x-7}=\frac{10}{3}$$

$$\frac{(x-4)(x-7)+(x-5)(x-6)}{(x-5)(x-7)}=\frac{10}{3}$$

$$\frac{x^2-7x-4x+28+x^2-6x-5x+30}{x^2-7x-5x+35}$$

$$\frac{2x^2-22x+58}{x^2-12x+35}=\frac{10}{3}$$

On cross-multiplying, we have,

$3(2x^2 – 22x + 58) = 10(x^2 – 12x + 35)$

$\Rightarrow 6x^2 – 66x + 174 = 10x^2 – 120x + 350$

$\Rightarrow 4x^2 – 54x + 176 = 0$

$\Rightarrow 2x^2 – 27x + 88 = 0$

$\Rightarrow 2x^2 – 16x – 11x + 88 = 0$

$\Rightarrow 2x(x – 8) – 11(x + 8) = 0$

$\Rightarrow (x – 8)(2x – 11) = 0$

Now, either $x – 8 = 0 \Rightarrow x = 8$

Or, $2x – 11 = 0 \Rightarrow x = 11/2$

Thus, the roots of the given quadratic equation are x = 11/2 and 8, respectively.

Benefits of Solving RD Sharma Solutions Class 10 Maths Chapter 8 Exercise 8.3

Conceptual Clarity

Exercise 8.3 focuses on methods to solve quadratic equations, including factorization, completing the square, and using the quadratic formula. Practicing these helps in mastering the fundamental concepts and ensures clarity on the topic.

Strengthening Problem-Solving Skills

This exercise offers a variety of problems, enabling students to apply different approaches to solving quadratic equations. Regular practice builds critical thinking and problem-solving abilities.

Preparation for Board Exams

Quadratic equations form an important part of the Class 10 Maths syllabus. Solving RD Sharma's problems ensures thorough preparation for board exams as the book aligns well with the NCERT syllabus and exam pattern.

Confidence Boost

RD Sharma solutions provide step-by-step explanations for each problem. Following these solutions helps students gain confidence in solving complex problems independently.

Enhances Speed and Accuracy

Solving numerous problems improves calculation speed and enhances accuracy, which is crucial for board exams and other competitive exams.

Application in Real-Life Problems

Quadratic equations have practical applications in physics, engineering, and other sciences. Understanding how to solve them equips students to handle real-life problems requiring mathematical solutions.

Foundation for Higher Studies

Quadratic equations are essential for advanced mathematics, especially in Algebra and Calculus. Solving RD Sharma exercises strengthens the foundation required for higher classes and competitive exams.