RD Sharma Solutions Class 10 Maths Chapter 8 Exercise 8.4: Chapter 8 of RD Sharma Class 10 Maths, titled Quadratic Equations, focuses on solving quadratic equations using various methods. Exercise 8.4 specifically deals with the factorization method for finding the roots of quadratic equations.

In this exercise, students learn to express a quadratic equation in the standard form and split the middle term to factorize it into two linear factors. The roots are then obtained by equating each factor to zero. This method strengthens algebraic manipulation skills and lays a foundation for more advanced mathematical concepts in higher classes.

RD Sharma Solutions Class 10 Maths Chapter 8 Exercise 8.4 Overview

RD Sharma's Class 10 Maths Chapter 8: Quadratic Equations is a crucial topic for strengthening problem-solving and analytical skills. Exercise 8.4 focuses on solving quadratic equations using the factorization method, an essential technique for breaking down complex problems into simpler steps.

Mastering this method is vital as quadratic equations form the foundation for higher mathematics and practical applications in physics, engineering, and economics. This exercise sharpens logical reasoning and enhances understanding of roots and coefficients. Practicing these problems ensures students are well-prepared for board exams and competitive tests, while also building confidence in handling real-life scenarios involving quadratic relationships.

RD Sharma Solutions Class 10 Maths Chapter 8 Exercise 8.4 Quadratic Equations

Below is the RD Sharma Solutions Class 10 Maths Chapter 8 Exercise 8.4 Quadratic Equations -

Find the roots of the following quadratic equations (if they exist) by the method of completing the square.

1. $x^2 – 4\sqrt{2}\, x + 6 = 0$

Solution:

Given equation,

$$x^2 - 4\sqrt{2x} + 6 = 0$$

$$x^2 - 2 \times x \times 2\sqrt{2} + \left(2\sqrt{2}\right)^2 - \left(2\sqrt{2}\right)^2 + 6 = 0$$

$$\left(x - 2\sqrt{2}\right)^2 = \left(2\sqrt{2}\right)^2 - 6$$

$$\left(x - 2\sqrt{2}\right)^2 = (4 \times 2) - 6 \quad = 8 - 6$$

$$\left(x - 2\sqrt{2}\right)^2 = 2$$

$$\left(x - 2\sqrt{2}\right) = \pm\sqrt{2}$$

$$\left(x - 2\sqrt{2}\right) = \sqrt{2} \text{ or } \left(x - 2\sqrt{2}\right) = -\sqrt{2}$$

$$x = \sqrt{2} + 2\sqrt{2} \text{ or } x = -\sqrt{2} + 2\sqrt{2}$$

$$\Rightarrow x = 3\sqrt{2} \text{ or } x = \sqrt{2}$$

Thus, the roots of the given quadratic equation are x = 3√2 and x = √2.

2. $2x^2 – 7x + 3 = 0$

Solution:

Given equation,

$2x^2 – 7x + 3 = 0$

$$2\left(x^2-\frac{7x}{2}+\frac{3}{2}\right)=0$$

$$x^2-2\times\frac{7}{2}\times\frac{1}{2}\times x+\frac{3}{2}=0$$

$$x^2-2\times\frac{7}{4}\times x+\left(\frac{7}{4}\right)^2-\left(\frac{7}{4}\right)^2+\frac{3}{2}=0$$

$$x^2-2\times\frac{7}{4}\times x+\left(\frac{7}{4}\right)^2-\left(\frac{49}{16}\right)+\frac{3}{2}=0$$

$$\left(x-\frac{7}{4}\right)^2-\frac{49}{16}+\frac{3}{2}=0$$

$$\left(x-\frac{7}{4}\right)^2=\frac{49}{16}-\frac{3}{2}$$

$$\left(x-\frac{7}{4}\right)^2=\frac{49-26}{16}$$

$$\left(x-\frac{7}{4}\right)^2=\frac{25}{16}$$

$$\left(x-\frac{7}{4}\right)^2=\left(\frac{5}{4}\right)^2$$

$$x-\frac{7}{4}=\pm\frac{5}{4}$$

$$x-\frac{7}{4}=\frac{5}{4}\text{ or }x-\frac{7}{4}=-\frac{5}{4}$$

$$x=\frac{7}{4}+\frac{5}{4}\text{ or }x=\frac{7}{4}-\frac{5}{4}$$

$$2\left(x^2-\frac{7x}{2}+\frac{3}{2}\right)=0$$

$$x^2-2\times\frac{7}{2}\times\frac{1}{2}\times x+\frac{3}{2}=0$$

$$x^2-2\times\frac{7}{4}\times x+\left(\frac{7}{4}\right)^2-\left(\frac{7}{4}\right)^2+\frac{3}{2}=0$$

$$x^2-2\times\frac{7}{4}\times x+\left(\frac{7}{4}\right)^2-\left(\frac{49}{16}\right)+\frac{3}{2}=0$$

$$\left(x-\frac{7}{4}\right)^2-\frac{49}{16}+\frac{3}{2}=0$$

$$\left(x-\frac{7}{4}\right)^2=\frac{49}{16}-\frac{3}{2}$$

$$\left(x-\frac{7}{4}\right)^2=\frac{49-26}{16}$$

$$\left(x-\frac{7}{4}\right)^2=\frac{25}{16}$$

$$\left(x-\frac{7}{4}\right)^2=\left(\frac{5}{4}\right)^2$$

$$x-\frac{7}{4}=\pm\frac{5}{4}$$

$$x-\frac{7}{4}=\frac{5}{4}\text{ or }x-\frac{7}{4}=-\frac{5}{4}$$

$$x=\frac{7}{4}+\frac{5}{4}\text{ or }x=\frac{7}{4}-\frac{5}{4}$$

⇒ x = 12/4 = 3 or x = 2/4 = 1/2

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

3. $3x^2 + 11x + 10 = 0$

Solution:

Given equation,

$$x^2 + \frac{11x}{3} + \frac{10}{3} = 0$$

$$x^2 + 2 \times \frac{1}{2} \times \frac{11x}{3} + \frac{10}{3} = 0$$

$$x^2 + 2 \times \frac{11x}{6} + \left(\frac{11}{6}\right)^2 - \left(\frac{11}{6}\right)^2 + \frac{10}{3} = 0$$

$$\left(x + \frac{11}{6}\right)^2 = \left(\frac{11}{6}\right)^2 - \frac{10}{3}$$

$$\left(x + \frac{11}{6}\right)^2 = \frac{121}{36} - \frac{10}{3}$$

$$\left(x + \frac{11}{6}\right)^2 = \frac{121 - 120}{36}$$

$$\left(x + \frac{11}{6}\right)^2 = \frac{1}{36}$$

$$\left(x + \frac{11}{6}\right)^2 = \left(\frac{1}{6}\right)^2$$

$$x + \frac{11}{6} = \pm\frac{1}{6}$$

$$x + \frac{11}{6} = \frac{1}{6} \text{ or } x + \frac{11}{6} = \frac{-1}{6}$$

$$x = \frac{1}{6} - \frac{11}{6} \text{ or } x = \frac{-1}{6} - \frac{11}{6}$$

$$x = \frac{-10}{6} \text{ or } x = \frac{-12}{6} = -2$$

$$x^2 + \frac{11x}{3} + \frac{10}{3} = 0$$

$$x^2 + 2 \times \frac{1}{2} \times \frac{11x}{3} + \frac{10}{3} = 0$$

$$x^2 + 2 \times \frac{11x}{6} + \left(\frac{11}{6}\right)^2 - \left(\frac{11}{6}\right)^2 + \frac{10}{3} = 0$$

$$\left(x + \frac{11}{6}\right)^2 = \left(\frac{11}{6}\right)^2 - \frac{10}{3}$$

$$\left(x + \frac{11}{6}\right)^2 = \frac{121}{36} - \frac{10}{3}$$

$$\left(x + \frac{11}{6}\right)^2 = \frac{121 - 120}{36}$$

$$\left(x + \frac{11}{6}\right)^2 = \frac{1}{36}$$

$$\left(x + \frac{11}{6}\right)^2 = \left(\frac{1}{6}\right)^2$$

$$x + \frac{11}{6} = \pm\frac{1}{6}$$

$$x + \frac{11}{6} = \frac{1}{6} \text{ or } x + \frac{11}{6} = \frac{-1}{6}$$

$$x = \frac{1}{6} - \frac{11}{6} \text{ or } x = \frac{-1}{6} - \frac{11}{6}$$

$$x = \frac{-10}{6} \text{ or } x = \frac{-12}{6} = -2$$

⇒ x = -5/3 = 3 or x = -2

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

4. $2x^2 + x – 4 = 0$

Solution:

Given equation,

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

$$2\left(x^2+\frac{x}{2}-\frac{4}{2}\right)=0$$

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

$$x^2+2\times\frac{1}{4}\times x+\left(\frac{1}{4}\right)^2-\left(\frac{1}{4}\right)^2-2=0$$

$$\left(x+\frac{1}{4}\right)^2=\left(\frac{1}{4}\right)^2+2$$

$$\left(x+\frac{1}{4}\right)^2=\frac{1}{16}+2$$

$$\left(x+\frac{1}{4}\right)^2=\frac{1+2\times16}{16}$$

$$\left(x+\frac{1}{4}\right)^2=\frac{1+32}{16}$$

$$\left(x+\frac{1}{4}\right)^2=\frac{33}{16}$$

$$\left(x+\frac{1}{4}\right)=\pm\sqrt{\frac{33}{16}}$$

$$\left(x+\frac{1}{4}\right)=\sqrt{\frac{33}{16}}$$

$$\text{or } \left(x+\frac{1}{4}\right)=-\sqrt{\frac{33}{16}}$$

$$x=\frac{\sqrt{33}}{4}-\frac{1}{4} \text{ or } x=-\frac{\sqrt{33}}{4}-\frac{1}{4}$$

$$x=\frac{\sqrt{33}-1}{4} \text{ or } x=-\frac{\sqrt{33}-1}{4}$$

$$x=\frac{\sqrt{33}-1}{4} \text{ or } x=\frac{-\sqrt{33}-1}{4}$$

$$2\left(x^2+\frac{x}{2}-\frac{4}{2}\right)=0$$

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

$$x^2+2\times\frac{1}{4}\times x+\left(\frac{1}{4}\right)^2-\left(\frac{1}{4}\right)^2-2=0$$

$$\left(x+\frac{1}{4}\right)^2=\left(\frac{1}{4}\right)^2+2$$

$$\left(x+\frac{1}{4}\right)^2=\frac{1}{16}+2$$

$$\left(x+\frac{1}{4}\right)^2=\frac{1+2\times16}{16}$$

$$\left(x+\frac{1}{4}\right)^2=\frac{1+32}{16}$$

$$\left(x+\frac{1}{4}\right)^2=\frac{33}{16}$$

$$\left(x+\frac{1}{4}\right)=\pm\sqrt{\frac{33}{16}}$$

$$\left(x+\frac{1}{4}\right)=\sqrt{\frac{33}{16}}$$

$$\text{or } \left(x+\frac{1}{4}\right)=-\sqrt{\frac{33}{16}}$$

$$x=\frac{\sqrt{33}}{4}-\frac{1}{4} \text{ or } x=-\frac{\sqrt{33}}{4}-\frac{1}{4}$$

$$x=\frac{\sqrt{33}-1}{4} \text{ or } x=-\frac{\sqrt{33}-1}{4}$$

Thus, the roots of the given quadratic equation are

5. $2x^2 + x + 4 = 0$

Solution:

Given equation,

$2x^2 + x + 4 = 0$

$x^2 + x/2 + 2 = 0$

$$x^2 + 2 \times \frac{1}{2} \times \frac{1}{2} \times x + 2 = 0$$

$$x^2 + 2 \times \frac{1}{4} \times x + \left(\frac{1}{4}\right)^2 - \left(\frac{1}{4}\right)^2 + 2 = 0$$

$$x^2 + 2 \times \frac{1}{4} \times x + \left(\frac{1}{4}\right)^2 = \left(\frac{1}{4}\right)^2 - 2$$

$$\left(x + \frac{1}{4}\right)^2 = \frac{1 - 32}{16}$$

$$\left(x + \frac{1}{4}\right)^2 = \frac{-31}{16}$$

$$\left(x + \frac{1}{4}\right) = \pm\sqrt{-\frac{31}{16}}$$

$$\left(x + \frac{1}{4}\right) = \frac{\sqrt{-31}}{4} \text{ or } \left(x + \frac{1}{4}\right) = \frac{-\sqrt{-31}}{4}$$

$$x = \frac{\sqrt{-31 - 1}}{4} \text{ or } x = \frac{-\sqrt{-31 - 1}}{4}$$

$$x^2 + 2 \times \frac{1}{2} \times \frac{1}{2} \times x + 2 = 0$$

$$x^2 + 2 \times \frac{1}{4} \times x + \left(\frac{1}{4}\right)^2 - \left(\frac{1}{4}\right)^2 + 2 = 0$$

$$x^2 + 2 \times \frac{1}{4} \times x + \left(\frac{1}{4}\right)^2 = \left(\frac{1}{4}\right)^2 - 2$$

$$\left(x + \frac{1}{4}\right)^2 = \frac{1 - 32}{16}$$

$$\left(x + \frac{1}{4}\right)^2 = \frac{-31}{16}$$

$$\left(x + \frac{1}{4}\right) = \pm\sqrt{-\frac{31}{16}}$$

$$\left(x + \frac{1}{4}\right) = \frac{\sqrt{-31}}{4} \text{ or } \left(x + \frac{1}{4}\right) = \frac{-\sqrt{-31}}{4}$$

$$x = \frac{\sqrt{-31} - 1}{4} \text{ or } x = \frac{-\sqrt{-31} - 1}{4}$$

Thus, the above are the two roots of the given quadratic equation.

Benefits of Solving RD Sharma Solutions Class 10 Maths Chapter 8 Exercise 8.4

Below we have provided some of the benefits of solving RD Sharma Solutions Class 10 Maths Chapter 8 Exercise 8.4 Quadratic Equations -

Enhanced Understanding of Quadratic Equations
This exercise focuses on solving quadratic equations using various methods like factorization, completing the square, and the quadratic formula. Practicing these methods builds a strong conceptual foundation.

Improves Problem-Solving Skills
Solving a variety of problems in Exercise 8.4 helps develop logical thinking and problem-solving abilities, which are crucial for exams like board exams and competitive tests.

Preparation for Exams
The solutions in RD Sharma are designed according to the CBSE syllabus and exam pattern.

Practicing these questions helps students become familiar with the types of questions that might appear in the Class 10 board exams.

Strengthens Calculation Accuracy
Quadratic equations require careful calculations, especially while using the quadratic formula. Regular practice reduces errors and improves accuracy.

Boosts Confidence
Successfully solving problems from this exercise instills confidence, helping students tackle similar or more challenging questions in exams.

Time Management
RD Sharma solutions include problems of varying difficulty levels. Practicing these problems trains students to manage their time effectively during exams.

Clarification of Doubts
Detailed step-by-step solutions provided in RD Sharma allows students to understand the approach to each problem and clear any conceptual doubts.