RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.1: Expert Mathematics Teachers have solved Exercise 10.1 of RS Aggarwal Solutions Class 10 Chapter 10 - Quadratic Equations (Ex 10A). For RS Aggarwal Class 10 Maths, all Ex 10.1 Questions and Answers are provided to assist you in reviewing the entire syllabus and getting higher grades. To improve your exam scores and help you review the entire syllabus, you can also download the NCERT Solutions for Class 10 Math.

RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.1 Overview

RS Aggarwal Solutions for Class 10 Maths Chapter 10, Exercise 10.1, focuses on "Quadratic Equations." This exercise helps students understand how to solve quadratic equations using different methods, such as factoring, completing the square, and applying the quadratic formula.

The solutions provide clear, step-by-step explanations for each problem, making it easier for students to grasp the concepts and apply them effectively. By working through these solutions, students gain a solid foundation in solving quadratic equations, which is essential for their exams and future math topics.

What are Quadratic Equations?

Quadratic equations are polynomial equations of the second degree, which means they involve the square of the unknown variable. Quadratic equations are fundamental in algebra and are used in various applications across mathematics, physics, engineering, and many other fields.

Methods to Solve Quadratic Equations:

- **Factoring**: Express the quadratic equation as a product of two binomials and solve for xxx.
- **Completing the Square**: Transform the quadratic equation into a perfect square trinomial, then solve for xxx.
- **Quadratic Formula**: Use the quadratic formula to find the roots of the equation.

RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.1

Below we have provided RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.1 Quadratic Equations -

Question

Solve each of the following quadratic equations:
$(2x - 3)(3x + 1) = 0$

Solution

given
$(2x-3)(3x+1)=0$
then
$(2x-3)=0 \text{ or } (3x+1)=0$
$2x=3 \quad \text{or} \quad 3x=-1$
$x=\frac{3}{2} \quad \text{or} \quad x=\frac{-1}{3}$

Question

Which of the following are the roots of $3x^2 + 2x - 1 = 0$?

(i)-1
(ii)$\frac{1}{3}$
(iii) $-\frac{1}{2}$

Solution

$$when \quad x^2+bx+c=0$$
$$then$$
$$x=\frac{-b\pm\sqrt{b^2-4\ \ c}}{2}$$
$$in\ these\ question$$
$$3x^2+2x-1=0$$
$$=3, b=2, c=-1$$
$$x=\frac{-b\pm\sqrt{b^2-4\ \ c}}{2}$$
$$x=\frac{-2\pm\sqrt{4-4x3x-1}}{2x3}$$
$$=\frac{-2\pm\sqrt{4+12}}{6}$$
$$=\frac{-2\pm\sqrt{16}}{6}$$
$$=\frac{-2\pm4}{6}$$
$$x=\frac{-2+4}{6}\ or\frac{-2-4}{6}$$
$$x=\frac{1}{3}or-1$$

Question

Solve each of the following quadratic equations:
$3x^2243 = 0$

Solution

$3x^2 - 243 = 0$

$\Rightarrow 3x^2 = 243$

$\Rightarrow x^2 = \frac{243}{3} = 81$

$\Rightarrow x = \sqrt{81} = \pm 9$

$\therefore x = +9 \text{ or } -9$

Question

Solve each of the following quadratic equations:

$9x^2 - 3x - 2 = 0$

Solution

$x^2+bx+c=0$

then

$$x=\frac{-b\pm\sqrt{b^2\cdot\cdot 4\ \ c}}{2}$$

in these question

$9x^2-3x-2=0$

$=9,b=-3,c=-2$

$$x=\frac{3\pm\sqrt{9-4x9x-2}}{2x9}$$

$$x=\frac{3\pm\sqrt{9+72}}{18}$$

$$x=\frac{3\pm\sqrt{81}}{18}$$

$$x=\frac{3\pm 9}{18}$$

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

Question

Solve each of the following quadratic equations:

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

Solution

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

$6x^2 + (9 + 2)x + 3 = 0$

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

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

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

when
$2x + 3 = 0$ then
$x = (\frac{-3}{2})$

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

so $x = (\frac{-3}{2})$ and $(\frac{-1}{3})$

Question

Solve each of the following quadratic equations:
$15x^2 - 28 = x$

Solution

Bringing the x to the LHS,

$15x^2 - x - 28 = 0$

$15x^2 + 20x - 21x - 28 = 0$

$5x(3x + 4) - 7(3x + 4) = 0$

$(5x - 7)(3x + 4) = 0$

Hence, $5x - 7 = 0$

$5x = 7$

$x = 7/5$

(or)

$3x + 4 = 0$

$3x = -4$

$x = -4/3$

Hence solved!!

Question

Solve each of the following quadratic equations:

$\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

Solution

$x^2 + bx + c = 0$ *is qu dr tic equ tion*

then

$$x = \frac{-b \pm \sqrt{b^2 - 4 \ c}}{2}$$

in this question

$\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

$= \sqrt{2}, b = 7, c = 5\sqrt{2}$

then

$$x = \frac{-b \pm \sqrt{b^2 - 4 \ c}}{2}$$

$$x = \frac{-7 \pm \sqrt{49 - 4 \times \sqrt{2} \times 5\sqrt{2}}}{2\sqrt{2}}$$

$$x = \frac{-7 \pm \sqrt{9}}{2\sqrt{2}}$$

$$x = \frac{-7 \pm 3}{2\sqrt{2}}$$

$$x = \frac{-2}{\sqrt{2}} \ or \ \frac{-5}{\sqrt{2}}$$

Question

Solve each of the following quadratic equations:

$10x - \frac{1}{x} = 3$

Solution

$x^2 + bx + c = 0$ *is qu dr tic equ tion*

then

$$x = \frac{-b \pm \sqrt{b^2 - 4\ c}}{2}$$

given

$$10x - \frac{1}{x} = 3$$

$$10x^2 - 3x - 1 = 0$$

$$= 10, b = -3, c = -1$$

then

$$x = \frac{-b \pm \sqrt{b^2 - 4\ c}}{2}$$

$$x = \frac{3 \pm \sqrt{9 - 4 \times 10 \times -1}}{2 \times 10}$$

$$x = \frac{3 \pm \sqrt{49}}{20}$$

$$x = \frac{3 \pm 7}{20}$$

$$x = \frac{1}{2} \text{ or } \frac{-1}{5}$$

Question

Solve each of the following quadratic equations:

$12abx^2 - (9a^2 - 8b^2)x - 6ab = 0$

Solution

(1) Using factorization

$12abx^2 - (9a^2 - 8b^2)x - 6ab = 0$

$\Rightarrow 12abx^2 - 9xa^2 - 8b^2x - 6ab = 0$

$\Rightarrow 3ax(4bx - 3a) + 2b(4bx - 3a) = 0$

$\Rightarrow (3ax + 2b)(4bx - 3a) = 0$

$\therefore 3ax + 2b = 0$ or $4bx - 3a = 0$

$\Rightarrow x = \frac{-2b}{3a}$ or $\frac{3a}{4b}$

(2) Using quadratic formula

$12abx^2 - (9a^2 - 8b^2)x - 6ab = 0$

Discriminant, $D = b^2 - 4ac$

$= [-(9a^2 \quad 8b^2)]^2 - 4(12ab)(-6ab)$

$= 81a^4 + 144a^2b^2 + 64b^4 + 288a^2b^2$

$= 81a^4 + 144a^2b^2 + 64b^4$

$= (9a^2 + 8b^2)^2 \geq 0$

As $D \geq 0$, therefore, the roots are real.

$x = \frac{-b \pm \sqrt{D}}{2a}$

$= \frac{(9a^2 - 8b^2) \pm \sqrt{(9a^2 + 8b^2)^2}}{2(12ab)}$

$= \frac{(9a^2 - 8b^2) \pm (9a^2 + 8b^2)}{24ab}$

$= \frac{(9a^2 - 8b^2) + (9a^2 + 8b^2)}{24ab}$ or $\frac{(9a^2 - 8b^2) - (9a^2 + 8b^2)}{24ab}$

$= \frac{9a^2 - 8b^2 + 9a^2 + 8b^2}{24ab}$ or $\frac{9a^2 - 8b^2 - 9a^2 - 8b^2}{24ab}$

$= \frac{18a^2}{24ab}$ or $\frac{-16b^2}{24ab}$

or $\frac{-2b}{3a}$

Question

Solve each of the following quadratic equations:

$a^2b^2x^2 + b^2x - a^2x - 1 = 0$

Solution

$a^2b^2x^2 + b^2x - a^2x - 1 = 0$

$b^2x(a^2x + 1) - 1(a^2x + 1) = 0$

$(b^2x - 1)(a^2x + 1) = 0$

$if b^2x - 1 = 0$

$b^2x = 1$

$x = \frac{1}{b^2}$

if $a^2x + 1 = 0$

$a^2x = -1$

$x = \frac{-1}{a^2}$

Question

Solve each of the following quadratic equations:

$9x^2 - 9(a + b)x + (2a^2 + 5ab + 2b^2) = 0$

Solution

Consider, $9x^2 - 9(a + b)x + (2a^2 + 5ab + 2b^2) = 0$

$9x^2 - 9(a + b)x + (2a^2 + 4ab + ab + 2b2) = 0$

$9x^2 - 9(a + b)x + [2a(a + 2b) + b(a + 2b)] = 0$

$9x^2 - 9(a + b)x + [(a + 2b)(2a + b)] = 0$

$9x^2 - 3[(a + 2b) + (2a + b)]x + [(a + 2b)(2a + b)] = 0$

$9x^2 - 3(a + 2b)x - 3(2a + b)x + [(a + 2b)(2a + b)] = 0$

$3x[3x - (a + 2b)] - (2a + b)[3x + (a - 2b)] = 0$

$[3x - (a + 2b)][3x - (2a + b)] = 0$

$[3x - (a + 2b)] = 0$ or $[3x - (2a + b)] = 0$

$3x = (a + 2b)$ or $3x = (2a + b)$

$x = \frac{(a+2b)}{3}$ or $x = \frac{(2a+b)}{3}$

Question

Solve each of the following quadratic equations:

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

Solution

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

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

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

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

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

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

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

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

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

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

when

$x + 2 = 0$

$x = -2$

and

$x - 1 = 0$

$x = 1$

So x= 1 and -2

Question

Solve each of the following quadratic equations:

$\frac{x+3}{x-2} - \frac{1-x}{x} = 4\frac{1}{4}, x \neq 2, 0$

Solution

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

Taking the LCM of (x − 2) and x, we get

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

$\frac{[x^2+3x-(x-x^2-2+2x)]}{x^2-2x} = \frac{17}{4}$

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

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

$17x^2 - 34x = 8x2 + 8$

$9x^2 - 34x - 8 = 0$

$9x^2 - 36x + 2x - 8 = 0$

$9x(x - 4) + 2(x - 4) = 0$

$(x - 4)(9x + 2) = 0$

so $x = 4$ and $x = \frac{-2}{9}$

Benefits of RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.1

RS Aggarwal Solutions for Class 10 Maths Chapter 10, Exercise 10.1, which focuses on "Quadratic Equations," offer several benefits for students studying this important mathematical topic. Here are the key advantages:

1. **Deep Understanding of Quadratic Equations**

Concept Explanation: The solutions provide clear explanations of quadratic equations, including how to solve them using various methods such as factoring, completing the square, and using the quadratic formula.

Application of Formulas: Students learn to apply essential formulas and techniques effectively, which are crucial for solving quadratic equations accurately.

2. **Improved Problem-Solving Skills**

Variety of Problems: Exercise 10.1 includes a range of problems that help students practice different aspects of quadratic equations, from simple factoring to more complex applications.

Step-by-Step Solutions: Detailed, step-by-step solutions guide students through the problem-solving process, demonstrating how to approach and solve each type of problem systematically.

3. **Enhanced Exam Preparation**

Syllabus Alignment: The solutions align with the Class 10 syllabus, ensuring that students are practicing problems relevant to their exams.

Model Answers: Provides model answers that students can use as a reference for writing clear, accurate responses in exams.

4. **Concept Reinforcement**

Clarification of Doubts: Helps clarify common doubts and misconceptions about quadratic equations, reinforcing understanding and reducing errors.

Reinforcement Through Practice: Regular practice with these solutions reinforces key concepts, making it easier to recall and apply them in different contexts.

5. **Effective Study Aid**

Self-Assessment: Allows students to check their work against the solutions, facilitating self-assessment and helping identify and correct mistakes.

Review and Revision: Acts as a useful tool for reviewing and revising quadratic equations, aiding in better preparation and retention of the topic.

6. **Foundation for Advanced Topics**

Preparation for Future Topics: Mastery of quadratic equations provides a strong foundation for more advanced algebraic concepts and topics in higher mathematics.

Skill Development: Develops essential algebraic skills that are crucial for tackling more complex problems and concepts in future studies.

7. **Boost in Confidence**

Confidence Building: Regular practice with well-explained solutions helps build confidence in solving quadratic equations, which is important for performing well in exams and understanding advanced topics.