RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.2: A step-by-step solution to the chapter 10 quadratic equations in the textbook RS Aggarwal class 10 has been developed by the Physics Wallah academic team. The RS Aggarwal class 10 solution for chapter 10 Quadratic Equations Exercise-10B is uploaded for reference only; do not copy the solutions.

Before going through the solution of chapter 10 Quadratic Equations Exercise-10B, one must have a clear understanding of the chapter-10 Quadratic Equations. Therefore, read the theory of Chapter 10 Quadratic Equations, and then try to solve all numerical of exercise-10B. The NCERT solutions for class 10 maths are developed by the academic team of Physics Wallah, and they may be used to answer all of the problems in the exercise.

RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.2 Overview

RS Aggarwal Solutions for Class 10 Maths Chapter 10, Exercise 10.2, focuses on solving quadratic equations. This exercise helps students practice various methods for solving these equations, including factoring, completing the square, and using the quadratic formula.

The solutions offer step-by-step explanations for each problem, making it easier for students to understand and apply different techniques. By working through this exercise, students reinforce their knowledge of quadratic equations, improve their problem-solving skills, and prepare effectively for exams.

What are Quadratic Equations?

A polynomial equation of second degree, or one that has at least one squared term, is referred to as a quadratic. Another name for it is quadratic equations. The quadratic equation has the following generic form:

$ax^2 + bx + c = 0$

where a, b, and c are numerical coefficients and x is an unknown variable. An example of a quadratic or quadratic equation is x2 + 2x +1. In this case, a ≠ 0 since if it does, the equation will no longer be quadratic and will instead become linear, as in the following cases:

bx+c=0

RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.2

Below we have provided RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.2 for the ease of the students –

Question

Solve each of the following equations by using the method of completing the square:
$x^2 - 6x + 3 = 0$

Solution

$x^2 - 6x + 3 = 0$
$x^2 - 6x = -3$
$x^2 - 6x + 3^2 = -3 + 3^2$
$(x - 3)^2 = -3 + 9$
$(x - 3)^2 = 6$
$x - 3 = \pm\sqrt{6}$
$x = 3 \pm \sqrt{6}$
So the value of x are $3 + \sqrt{6}$ or $3 - \sqrt{6}$

Question

Solve each of the following equations by using the method of completing the square:
$x^2 - 4x + 1 = 0$

Solution

$x^2 - 4x + 1 = 0$
$x^2 - 4x = -1$
$x^2 - 4x + 2^2 = -1 + 2^2$
$(x - 2)^2 = -1 + 4$
$(x - 2)^2 = 3$
$x - 2 = \pm\sqrt{3}$
$x = 2 \pm \sqrt{3}$
So the value of x are $2 + \sqrt{3}$ or $2 - \sqrt{3}$

Question

Solve each of the following equations by using the method of completing the square:
$x^2 + 8x - 2 = 0$

Solution

given

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

it become

$x^2+8x+(16-18)=0$ ..... $(2=18-16)$

$x^2+8x+16=18$

$(x+4)^2=18$

$x+4=\pm\sqrt{18}$

$x=-4\pm3\sqrt{2}$

$x=-4+3\sqrt{2}$ *or* $-4-3\sqrt{2}$

Question

Solve each of the following equations by using the method of completing the square:
$4x^2 + 4\sqrt{3}x + 3 = 0$

Solution

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

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

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

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

$x=\dfrac{-\sqrt{3}}{2}$

Question

Solve each of the following equations by using the method of completing the square:
$2x^2 + 5x - 3 = 0$

Solution

$2x^2 + 5x - 3 = 0$

$2x^2 + 5x = 3$

$x^2 + \frac{5}{2}x = \frac{3}{2}$

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

$(x + \frac{5}{2})^2 = \frac{3}{2} + \frac{25}{4} = \frac{12+50}{8} = \frac{62}{8} = \frac{31}{4}$

$x + \frac{5}{2} = \sqrt{\frac{31}{4}} = \pm\frac{\sqrt{31}}{2}$

$x = \pm\frac{\sqrt{31}}{2} - \frac{5}{2}$

$x = \frac{\sqrt{31}}{2} - \frac{5}{2}$ or $\frac{-\sqrt{31}}{2} - \frac{5}{2}$

$x = \frac{\sqrt{31}-5}{2}$ or $\frac{-\sqrt{31}-5}{2}$

Question

Solve each of the following equations by using the method of completing the square

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

Solution

We have,

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

Dividing the whole equation by 3,

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

$x^2 - 2 * x * \frac{1}{6} + (\frac{1}{6})^2 - (\frac{1}{6})^2 - \frac{2}{3} = 0$

$(x - \frac{1}{6})^2 = \frac{1}{36} + \frac{2}{3}$

$(x - \frac{1}{6})^2 = \frac{27}{36}$

Taking square roots on both sides,

$x - \frac{1}{6} = \sqrt{\frac{27}{36}}$

$x - \frac{1}{6} = \frac{3\sqrt{3}}{6}$

$x = \frac{3\sqrt{3} + 1}{6}$

Question

Solve each of the following equations by using the method of completing the square:
$8x^2 - 14x - 15 = 0$

Solution

$8x^2 - 14x \cdot 15 = 0$

$x^2 - \frac{14}{8}x - \frac{15}{8} = 0$

$x^2 - \frac{7}{4}x = \frac{15}{8}$

Taking half of $\frac{7}{4}$ and is squared to add on both sides.

$x^2 - \frac{7}{4}x + \frac{49}{64} = \frac{15}{8} + \frac{49}{64}$

$(x - \frac{7}{8})^2 = \frac{169}{64}$

Take the square root of both sides

$x - \frac{7}{8} = \sqrt{\frac{169}{64}} = \pm\frac{13}{8}$

$\therefore x = \frac{7}{8} \pm \frac{13}{8}$

i. e, $x = \frac{7}{8} + \frac{13}{8}$ or $x = \frac{7}{8} - \frac{13}{8}$

$x = \frac{20}{8}$ or $x = \frac{-6}{8}$

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

Question

Solve each of the following equations by using the method of completing the square

$7x^2 + 3x - 4 = 0$

Solution

$7x^2+3x-4=0$

Dividing the equ tion by 7.

We h ve,

$$x^2+\frac{3}{7}x-\frac{4}{7}=0$$

$$x^2+2*x*\frac{3}{14}+(\frac{3}{14})^2-(\frac{3}{14})^2-\frac{4}{7}=0$$

$$(x+\frac{3}{14})^2=\frac{9}{196}+\frac{4}{7}$$

$$(x+\frac{3}{14})^2=\frac{121}{196}$$

T king qu re roots on both sides,

$$x+\frac{3}{14}=\sqrt{\frac{121}{196}}$$

$$x+\frac{3}{14}=\pm\frac{11}{14}$$

$$x+\frac{3}{14}=\frac{11}{14} \quad ; \quad x+\frac{3}{14}=-\frac{11}{14}$$

$$x=-\frac{3}{14}+\frac{11}{14} \quad ; \quad x=-\frac{3}{14}-\frac{11}{14}$$

$$x=\frac{8}{14}=\frac{4}{7} \quad ; \quad x=\frac{-14}{14}=-1$$

Question

Solve each of the following equations by using the method of completing the square:
$3x^2 - 2x - 1 = 0$

Solution

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

Dividing the whole equation by 3,

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

$x^2 - 2 * x * \frac{2}{6} + (\frac{2}{6})^2 - (\frac{2}{6})^2 - \frac{1}{3} = 0$

$(x - \frac{2}{6})^2 = \frac{1}{9} + \frac{1}{3}$

$(x - \frac{1}{3})^2 = \frac{4}{9}$

Taking square roots on both sides,

$x - \frac{1}{3} = \sqrt{\frac{4}{9}}$

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

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

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

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

Question

Solve each of the following equations by using the method of completing the square:
$5x^2 - 6x - 2 = 0$

Solution

given

$5x^2 - 6x - 2 = 0$

the equation divided by

then

$x^2 - \frac{6}{5}x - \frac{2}{5} = 0$

adding and substracting by the half of the square of the coifficient of x term

then

$x^2 - \frac{6}{5}x + \left(\frac{3}{5}\right)^2 - \left(\frac{3}{5}\right)^2 - \frac{2}{5} = 0$

$\left(x - \frac{3}{5}\right)^2 = \frac{19}{25}$

$x - \frac{3}{5} = \pm\frac{\sqrt{19}}{5}$

$x = \frac{3+\sqrt{19}}{5}$ *or* $\frac{3-\sqrt{19}}{5}$

Question

Solve each of the following equations by using the method of completing the square

$\frac{2}{x^2} - \frac{5}{x} + 2 = 0$

Solution

$$\frac{2}{x^2} - \frac{5}{x} + 2 = 0$$

Multiplying the equation by x^2

$$2 - 5x + 2x^2 = 0$$

$$2x^2 - 5x + 2 = 0$$

Dividing by 2

$$x^2 \quad \frac{5}{2}x + 1 = 0$$

$$x^2 - 2 * x * \frac{5}{4} + (\frac{5}{4})^2 - (\frac{5}{4})^2 + 1 = 0$$

$$(x - \frac{5}{4})^2 = \frac{25}{16} - 1$$

$$(x - \frac{5}{4})^2 = \frac{9}{16}$$

Taking square roots on both sides,

$$x - \frac{5}{4} = \sqrt{\frac{9}{16}}$$

$$x - \frac{5}{4} = \pm\frac{3}{4}$$

$$x = \frac{5}{4} + \frac{3}{4} \; ; \qquad x = \frac{5}{4} \quad \frac{3}{4}$$

$$x = \frac{8}{4} = 2 \; ; \qquad x = \frac{2}{4} = 1/2$$

Question

Solve each of the following equations by using the method of completing the square:
$4x^2 + 4bx - (a^2 - b^2) = 0$

Solution

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

$4x^2 + 4bx - a^2 + b^2 = 0$

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

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

use formula,

$a^2 - b^2 = (a - b)(a + b)$

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

$x = \frac{(a-b)}{2}, -\frac{(a+b)}{2}$

Question

Solve each of the following equations by using the method of completing the square
$x^2 - (\sqrt{2} + 1)x + \sqrt{2} = 0$

Solution

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

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

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

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

or , $-\frac{\sqrt{2}-1}{2}$

$= x = \sqrt{2}$, or, 1

ANS= $x = \sqrt{2}$ or 1.

Question

Solve each of the following equations by using the method of completing the square:
$4x^2 + 4bx - (a^2 - b^2) = 0$

Solution

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

$4x^2 + 4bx - a^2 + b^2 = 0$

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

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

use formula,

$a^2 - b^2 = (a - b)(a + b)$

$\{2x + b - a\}\{2x + b + a\} = 0$

$x = (a - b)/2 , - (a + b)/2$

Question

Solve each of the following equations by using the method of completing the square:
$\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$

Solution

$\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$

$x^2 + \frac{10}{\sqrt{3}} + 7 = 0$

$x^2 + \frac{10}{\sqrt{3}} = -7$

Third term = $(\frac{1}{2} \times \text{coefficient of } x)^2$

$= (\frac{1}{2} \times \frac{10}{\sqrt{3}})^2$

$= (\frac{5}{\sqrt{3}})^2$

$= \frac{25}{3}$

Therefore,

$x^2 + \frac{10}{\sqrt{3}} + \frac{25}{3} = -7 + \frac{25}{3}$.. (adding to both sides)

$x^2 + \frac{10}{\sqrt{3}} + \frac{25}{3} = \frac{4}{3}$

$(x - \frac{5}{\sqrt{3}}) = \pm \frac{2}{\sqrt{3}}$ ... (taking square roots)

Hence,

$\underline{x = \frac{7}{\sqrt{3}}, \sqrt{3}}$

Question

By using the method of completing the square, show that the equation $2x^2 + x + 4 = 0$ has no real roots.

Solution

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

a=2 b=1 c=4

If the quadratic equation has no real roots

$b^2 - 4ac < 0$

$1- 4 \times 2 \times 4 < 0$

$1-32<0$

$-31<0$

hence it's prove that equation has no real roots.

$2x^2 + x = -4$

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

$(x + \frac{1}{2})^2 = \frac{-7}{4}$

$(x + \frac{1}{2}) = \pm\frac{\sqrt{-7}}{2}$

$x = \frac{\sqrt{-7}}{2}-\frac{1}{2}=\sqrt{-7}-\frac{1}{2}$

as there is negative sign present in the root, the roots are not real.

Benefits of RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.2

The RS Aggarwal Solutions for Class 10 Maths Chapter 10, Exercise 10.2, which focuses on quadratic equations, offers several benefits for students:

Clear Explanation of Concepts: The solutions provide a detailed explanation of quadratic equations, including the methods for solving them, such as factoring, completing the square, and using the quadratic formula. This clarity helps students grasp fundamental concepts effectively.

Step-by-Step Solutions: The exercise solutions break down each problem into clear, manageable steps. This step-by-step approach helps students understand the process and logic behind solving quadratic equations, making it easier to apply these techniques to similar problems.

Practice and Reinforcement: Exercise 10.2 includes various types of problems that reinforce understanding of quadratic equations. Regular practice with these solutions helps students become proficient in solving different forms of quadratic equations and applying the concepts in various contexts.

Enhanced Problem-Solving Skills: By working through a range of problems, students enhance their problem-solving skills. The solutions often include different methods for solving equations, which broadens students' abilities to tackle problems from different angles.

Preparation for Exams: The problems and solutions in Exercise 10.2 are representative of what students might encounter in exams. Familiarity with these types of problems and their solutions boosts confidence and preparation for exams.

Error Correction and Learning: If students make mistakes, the solutions provide correct methods and answers. This allows students to identify and understand errors, learn from them, and avoid similar mistakes in the future.