NCERT Solutions Class 10 Maths
Chapter 4: Quadratic Equations
Exercise 4.1

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Quick Summary: In NCERT Solutions Class 10 Maths Chapter 4 Exercise 4.1, students learn the fundamental concepts of quadratic equations and their standard form. This exercise covers identifying quadratic equations, converting real-life problems into mathematical statements, and understanding the standard form ax^2 + bx + c = 0 which forms the foundation for advanced topics in CBSE Class 10 board exams.

Key Takeaways:

- Standard form of quadratic equation: ax^2 + bx + c = 0 where a ≠ 0
- Learn to identify and distinguish quadratic equations from linear and other polynomial equations
- Convert word problems and real-life situations into quadratic equation format
- Master the foundational concepts needed for solving quadratic equations using various methods in upcoming exercises

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Question 1

QUESTION

Check whether the following are quadratic equations:

(i) $(x + 1)^2 = 2(x - 3)$

(ii) $x^2 - 2x = (-2)(3 - x)$

(iii) $(x - 2)(x + 1) = (x - 1)(x + 3)$

(iv) $(x - 3)(2x + 1) = x(x + 5)$

(v) $(2x - 1)(x - 3) = (x + 5)(x - 1)$

(vi) $x^2 + 3x + 1 = (x - 2)^2$

(vii) $(x + 2)^3 = 2x(x^2 - 1)$

(viii) $x^3 - 4x^2 - x + 1 = (x - 2)^3$

SOLUTION

Quick reminder: A quadratic equation in is any equation that can be written in the form with . That means, after expanding and bringing all terms to one side, the **highest power of** must be 2.

(i) Check

Step 1: Expand the left-hand side: .

Step 2: Expand the right-hand side: .

Step 3: Bring all terms to the left: , i.e. .

Step 4: Simplify: . Highest power is 2, so this **is a quadratic**.

(ii) Check

Step 1: Expand the right-hand side: .

Step 2: Bring everything to the left: , i.e. .

Step 3: Combine like terms: . Highest power is 2, so this **is a quadratic**.

(iii) Check

Step 1: Expand LHS: .

Step 2: Expand RHS: .

Step 3: Move RHS to LHS: .

Step 4: Simplify: . This is , degree 1, so it is **not quadratic**.

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(iv) Check

Step 1: Expand LHS: .

Step 2: Expand RHS: .

Step 3: Bring all terms to LHS: .

Step 4: Simplify: . Highest power is 2, so this **is a quadratic**.

(v) Check

Step 1: Expand LHS: .

Step 2: Expand RHS: .

Step 3: Bring RHS to LHS: .

Step 4: Simplify: . Highest power is 2, so this **is a quadratic**.

(vi) Check

Step 1: Expand RHS: .

Step 2: Move RHS to LHS: .

Step 3: Simplify: . Degree is 1, so this is **not quadratic**.

(vii) Check

Step 1: Expand LHS: .

Step 2: Expand RHS: .

Step 3: Bring RHS to LHS: .

Step 4: Simplify: . Degree is 3, so this is **not quadratic**.

(viii) Check

Step 1: Expand RHS: .

Step 2: Move RHS to LHS: .

Step 3: Simplify carefully: .

Step 4: Highest power of is 2, so this **is a quadratic**.

Bottom line: For each equation: (1) expand both sides, (2) move all terms to one side, (3) simplify, and (4) look at the highest power of . If it is 2 and the coefficient is not zero, the equation is quadratic.

ANSWER

(i) Yes

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(ii) Yes

(iii) No

(iv) Yes

(v) Yes

(vi) No

(vii) No

(viii) Yes

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Question 2

QUESTION

Represent the following situations in the form of quadratic equations:

(i) The area of a rectangular plot is 528 m². The length of the plot is one more than twice its breadth. Find the length and breadth.

(ii) The product of two consecutive positive integers is 306. Find the integers.

(iii) Rohan's mother is 26 years older than him. The product of their ages (in years) 3 years from now will be 360. Find Rohan's present age.

(iv) A train travels a distance of 480 km at a uniform speed. If the speed were 8 km/h less, the journey would take 3 hours more. Find the speed of the train.

SOLUTION

Goal: Convert each real-life condition into a mathematical statement and simplify it to the standard form of a quadratic equation.

(I) RECTANGULAR PLOT

1. Let the breadth of the plot be metres.

2. The length is given as "one more than twice the breadth," so length = .

3. Area of a rectangle = length × breadth. Therefore, .

4. Expand the product: .

5. Bring all terms to one side: .

(II) TWO CONSECUTIVE INTEGERS

1. Let the smaller integer be .

2. The next consecutive integer is .

3. Their product is 306: .

4. Expand: .

5. Rearrange to standard form: .

(III) ROHAN AND HIS MOTHER

1. Let Rohan's present age be years.

2. Mother's present age = .

3. After 3 years, Rohan's age = . Mother's age = .

4. Their age product after 3 years is 360, so: .

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5. Expand the LHS: .

6. Equation becomes: .

7. Move 360 to the LHS: .

(IV) TRAIN SPEED PROBLEM

1. Let the speed of the train be km/h.

2. Time = distance ÷ speed. So original time = .

3. Reduced speed = , so new time = .

4. According to the problem, the slower speed increases travel time by 3 hours: .

5. Multiply both sides by to clear denominators: .

6. Expand and simplify: .

7. Combine like terms to get: .

8. Divide through by 3: .

Final: Each situation now gives a quadratic equation in the required standard form.

ANSWER

(i) 2x^2 + x - 528 = 0, where x is the breadth (in metres).

(ii) x^2 + x - 306 = 0, where x is the smaller integer.

(iii) x^2 + 32x - 273 = 0, where x (in years) is Rohan's present age.

(iv) u^2 - 8u - 1280 = 0, where u (in km/h) is the speed of the train.

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Key Formulas

Important Formulas for Exercise 4.1

Formula / Concept	Description
Definition of a Quadratic Equation	A quadratic equation is a polynomial equation of the second degree. This means it contains at least one term that is squared.
Standard Form of a Quadratic Equation	The standard form of a quadratic equation in one variable x is: ax^2 + bx + c = 0 where a, b, and c are real numbers and a ≠ 0.
The Quadratic Formula	The roots of a quadratic equation can be found using the quadratic formula: x = -b ± √b^2 - 4ac2a This formula gives two possible values for x.
Discriminant	The discriminant of a quadratic equation is the expression under the square root in the quadratic formula: D = b^2 - 4ac The value of the discriminant determines the nature of the roots.
Nature of Roots (Based on Discriminant)	• If D > 0, the equation has two distinct real roots. • If D = 0, the equation has two equal real roots (coincident roots). • If D < 0, the equation has no real roots.

Top FAQs

Q1. How many questions are there in NCERT Solutions for Class 10 Maths Chapter 4 Quadratic Equations Exercise 4.1?

Exercise 4.1 of NCERT Solutions for Class 10 Maths Chapter 4 Quadratic Equations contains exactly 2 questions. These questions focus on identifying whether given equations are quadratic equations or not and understanding the standard form $ax^2 + bx + c = 0$. The step by step solutions help students master the introduction to quadratic equations for CBSE board exam 2025-26.

Q2. Where can I download free PDF of NCERT Solutions for Class 10 Maths Chapter 4 Quadratic Equations Exercise 4.1 for session 2025-26?

You can download the free PDF of NCERT Solutions for Class 10 Maths Chapter 4 Quadratic Equations Exercise 4.1 from official NCERT website or trusted educational portals. The PDF includes step by step solutions for all 2 questions with detailed explanations aligned with CBSE syllabus 2025-26. These solutions are prepared by expert mathematics teachers to help students prepare effectively for board exams.

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Q3. How many marks does Chapter 4 Quadratic Equations carry in CBSE Class 10 Maths board exam 2025-26?

Quadratic Equations from NCERT Class 10 Maths Chapter 4 carries approximately 5 marks in CBSE board exam 2025-26 as part of Unit II - Algebra. Questions from Exercise 4.1, 4.2, 4.3, and 4.4 may appear in various forms including MCQs, short answer, and long answer questions. Understanding concepts like quadratic formula and discriminant is crucial for scoring full marks.

Q4. Which is the most difficult question in NCERT Solutions Class 10 Maths Chapter 4 Quadratic Equations Exercise 4.1?

Exercise 4.1 of Class 10 Maths Chapter 4 Quadratic Equations is introductory in nature with only 2 questions, making it relatively simple. Question 2 which asks to represent given situations as quadratic equations in standard form might require more understanding of algebraic manipulation. The step by step solutions in NCERT help students grasp these fundamental concepts easily for CBSE board exam 2025-26.

Q5. What is the Quadratic Formula in NCERT Solutions for Class 10 Maths Chapter 4 Quadratic Equations?

The Quadratic Formula in NCERT Class 10 Maths Chapter 4 is $x = [-b \pm \sqrt{(b^2 - 4ac)}] / 2a$, where a, b, and c are coefficients from the standard form $ax^2 + bx + c = 0$. This formula is used to find the roots of any quadratic equation and is covered in detail in Exercise 4.3. Understanding this formula is essential for solving complex problems in CBSE board exam 2025-26 and competitive exams.

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