NCERT Solutions Class 10 Maths
Chapter 4: Quadratic Equations
Exercise 4.3

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Quick Summary: In NCERT Solutions Class 10 Maths Chapter 4 Exercise 4.3, students learn to solve quadratic equations using the completing the square method and quadratic formula. This exercise covers finding roots of quadratic equations and determining their nature using the discriminant, which are essential concepts for CBSE Class 10 board exams and competitive tests.

Key Takeaways:

- Quadratic formula: x = -b ± √b^2 - 4ac2a for solving ax^2 + bx + c = 0
- Discriminant \Delta = b^2 - 4ac determines nature of roots: real and distinct (\Delta > 0), real and equal (\Delta = 0), or no real roots (\Delta < 0)
- Completing the square method transforms ax^2 + bx + c = 0 into perfect square form for easier solving
- Word problems involving age, area, and consecutive numbers can be solved by forming quadratic equations

Complete Solutions

Question 1

QUESTION

Find the nature of the roots of the following quadratic equations. If the real roots exist, find them:

(i) $2x^2 - 3x + 5 = 0$

(ii) $3x^2 - 4\sqrt{3}x + 4 = 0$

(iii) $2x^2 - 6x + 3 = 0$

SOLUTION

Key idea: For a quadratic equation , the discriminant is .

• If : two distinct real roots.
• If : two equal real roots.
• If : no real roots (roots are non-real complex).

(I)

Step 1: Identify coefficients.

Here, .

Step 2: Compute the discriminant.

Step 3: Interpret the discriminant.

Since , the equation has **no real roots**. Its roots are non-real complex.

Conclusion for (i): Real roots do not exist.

(II)

Step 1: Identify coefficients.

Here, .

Step 2: Compute the discriminant.

First, .

So,

Step 3: Interpret the discriminant.

Since , the equation has **two equal real roots**.

Step 4: Find the equal root. For , the root is

Substitute and :

So both roots are the same.

Conclusion for (ii): Equal real roots .

(III)

Step 1: Identify coefficients.

Here, .

Step 2: Compute the discriminant.

Step 3: Interpret the discriminant.

Since , the equation has **two distinct real roots**.

Step 4: Use the quadratic formula.

Simplify :

So,

Combine over a common denominator:

Conclusion for (iii): Two distinct real roots: and .

ANSWER

(i) Real roots do not exist.

(ii) Equal roots: (2)/(√3), (2)/(√3)

(iii) Distinct roots: 3 ± √32

Question 2

QUESTION

Find the values of k for each of the following quadratic equations, so that they have two equal roots:

(i) $2x^2 + kx + 3 = 0$

(ii) $kx(x - 2) + 6 = 0$

SOLUTION

Key fact: For a quadratic equation , the roots are equal (a repeated root) exactly when the discriminant is zero.

Discriminant: .

Condition for equal roots: .

(I)

Step 1: Identify .

Compare with :

Step 2: Write the discriminant.

Simplify:

Step 3: Use the equal-root condition.

For equal roots, set :

Step 4: Solve for .

Conclusion for (i): .

(II)

Step 1: Expand to standard quadratic form.

First expand :

So the equation becomes:

Step 2: Identify .

Comparing with :

Step 3: Write the discriminant.

Simplify each term:

So,

Step 4: Use the equal-root condition.

Set :

Factor out :

Step 5: Solve for .

From , we get .

From , we get .

Step 6: Check the validity of . For a quadratic equation, must not be zero. Here . If , the equation becomes:

which is impossible. So is not allowed.

Therefore, the only acceptable value is:

Conclusion for (ii): gives equal roots.

ANSWER

(i) $k = \pm 2\sqrt{6}$

(ii) $k = 6$

Question 3

QUESTION

Is it possible to design a rectangular mango grove whose length is twice its breadth, and the area is 800 m²? If so, find its length and breadth.

SOLUTION

Step 1: Define the variables.

Let the breadth of the rectangular mango grove be metres.

Then, according to the question, the length is twice the breadth, so:

Step 2: Use the area condition.

Area of a rectangle = length × breadth.

We are given that the area is 800 m². So:

That is,

Step 3: Form and solve the equation.

Divide both sides by 2:

Take square roots of both sides:

Since breadth is a physical length, it must be positive, so:

Step 4: Find the length.

Length = .

Step 5: Check if the design is possible.

Check the area with these dimensions:

The condition is satisfied.

Conclusion: Yes, such a rectangular mango grove is possible. The breadth is **20 m** and the length is **40 m**.

ANSWER

Yes. Length = 40 m, Breadth = 20 m

Question 4

QUESTION

Is the following situation possible? If so, determine their present ages. The sum of the ages of two friends is 20 years. Four years ago, the product of their ages in years was 48.

SOLUTION

Step 1: Represent the present ages.

Let the present age of one friend be years.

Since their sum is 20 years, the present age of the other friend is:

Step 2: Write their ages four years ago.

Four years ago, each friend was 4 years younger, so their ages then were:

First friend:

Second friend:

Step 3: Use the product condition from four years ago.

We are told that four years ago, the product of their ages was 48. Therefore:

Step 4: Expand and simplify the equation.

Expand the left-hand side:

So the equation becomes:

Move 48 to the left-hand side:

Multiply the whole equation by to make the coefficient of positive:

Step 5: Use the discriminant to check for real solutions.

For , the discriminant is .

Here, , , .

Compute the discriminant:

Step 6: Interpret the discriminant.

Since , the quadratic equation has **no real roots**.

This means there is **no real value of** that satisfies the given conditions for the ages.

Conclusion: The situation described is **not possible**; there are no real ages that meet both the sum and product conditions.

ANSWER

No

Question 5

QUESTION

Is it possible to design a rectangular park of perimeter 80 m and area 400 m²? If so, find its length and breadth.

SOLUTION

Step 1: Define the variables.

Let the length of the rectangular park be metres and the breadth be metres.

Step 2: Use the perimeter condition.

Perimeter of a rectangle is given by .

We are told the perimeter is 80 m, so:

Divide both sides by 2:

Express in terms of :

Step 3: Use the area condition.

Area of a rectangle is .

We are told the area is 400 m², so:

Substitute :

Step 4: Form the quadratic equation.

Expand the left-hand side:

Rearrange to bring all terms to one side:

Multiply the whole equation by to make the coefficient of positive:

Step 5: Use discriminant to check possibility.

For , discriminant is .

Here, , , .

Compute:

Since , there are **equal real roots**, so a real solution exists and the design is possible.

Step 6: Find .

When , the root is:

So, m.

Step 7: Find .

Recall :

Step 8: Verify the conditions.

Perimeter: ✓

Area: ✓

Conclusion: Yes, such a park is possible. It must be a square with length 20 m and breadth 20 m.

ANSWER

Yes. Length = 20 m, Breadth = 20 m

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🔢 Key Formulas

Important Formulas for Exercise 4.3

Formula / Concept	Description
Standard Form of a Quadratic Equation	A quadratic equation is in the form ax^2 + bx + c = 0, where a, b, and c are real numbers and a ≠ 0.
Method of Completing the Square	A technique to solve a quadratic equation by converting it into a perfect square trinomial. The steps are: 1. Rewrite the equation as ax^2 + bx = -c. 2. If a ≠ 1, divide all terms by 'a'. 3. Add ((b)/(2a))^2 to both sides of the equation. 4. The left side becomes a perfect square: (x + (b)/(2a))^2. 5. Take the square root of both sides and solve for x.
	The roots of a quadratic equation ax^2 + bx + c = 0 are given by the formula:

Formula / Concept	Description
Quadratic Formula (Sridharacharya's Formula)	x = -b ± √b^2 - 4ac2aThis formula is derived using the method of completing the square.
Discriminant	The discriminant of a quadratic equation ax^2 + bx + c = 0 is given by the expression: D = b^2 - 4acThe discriminant determines the nature of the roots.
Nature of Roots	Based on the value of the discriminant (D), the nature of the roots is as follows: • If D > 0, the equation has two distinct real roots. • If D = 0, the equation has two equal real roots (or one real root). • If D < 0, the equation has no real roots.

Top FAQs

Q1. How many questions are in NCERT Solutions Class 10 Maths Chapter 4 Quadratic Equations Exercise 4.3?

Exercise 4.3 of NCERT Solutions for Class 10 Maths Chapter 4 Quadratic Equations contains exactly 5 questions. These questions focus on solving quadratic equations using the quadratic formula and determining the nature of roots using the discriminant method. Students preparing for CBSE board exam 2025-26 should practice all these questions with step by step solutions for better understanding.

Q2. Where can I download free PDF of NCERT Solutions for Class 10 Maths Chapter 4 Quadratic Equations Exercise 4.3?

You can download the free PDF of NCERT Solutions for Class 10 Maths Chapter 4 Quadratic Equations Exercise 4.3 from the official NCERT website or various educational portals offering CBSE study materials. These PDF solutions provide step by step explanations for all 5 questions covering the quadratic formula and discriminant concepts. Ensure you download the updated version for CBSE board exam 2025-26 session to align with the latest syllabus.

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

Quadratic Equations Chapter 4 carries approximately 5 marks in CBSE Class 10 Maths board exam 2025-26 as part of Unit II - Algebra. The weightage is shared with other algebra topics, making NCERT Solutions for Class 10 Maths Chapter 4 Exercise 4.3 crucial for scoring well. Students should thoroughly practice completing the square method, quadratic formula, and discriminant-based questions for optimal exam preparation.

Q4. Which is the most difficult question in Exercise 4.3 of NCERT Solutions Class 10 Maths Chapter 4 Quadratic Equations?

Question 5 in Exercise 4.3 of NCERT Solutions for Class 10 Maths Chapter 4 Quadratic Equations is generally considered the most challenging as it involves finding the nature of roots using discriminant for multiple quadratic equations. This question requires understanding of the relationship between coefficients and discriminant (b^2-4ac) along with interpretation skills. Practicing step by step solutions for this question is essential for CBSE board exam 2025-26 preparation.

Q5. What is the Quadratic Formula explained in NCERT Solutions Class 10 Maths Chapter 4 Exercise 4.3?

The Quadratic Formula in NCERT Solutions for Class 10 Maths Chapter 4 Exercise 4.3 is $x = [-b \pm \sqrt{(b^2-4ac)}] / 2a$, where a, b, and c are coefficients of the quadratic equation $ax^2 + bx + c = 0$. This formula is derived using the completing the square method and helps solve any quadratic equation directly. Exercise 4.3 focuses extensively on applying this formula with step by step solutions for CBSE board exam 2025-26.

More Exercises

Visit all exercises from Chapter 4:

Exercise 4.1 →

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