SmartKalike

CBSE Class 10 · Maths

Quadratic Equations

10 most probable questions for Boards 2027

Q1. 1 mark · Multiple choice

Which statement correctly describes how a quadratic equation is obtained from a quadratic polynomial $ax^2 + bx + c$, where $a \neq 0$?
(A) Set it equal to 1. (B) Set it equal to zero. (C) Set its derivative equal to zero. (D) Divide it by x.

Answer

(B) Set the polynomial equal to zero — equating the quadratic polynomial to zero gives a quadratic equation.

Q2. 2 marks · Short answer

State the standard form of a quadratic equation in x and the conditions on its coefficients. What is the degree of its polynomial?

Answer

A quadratic equation in x has standard form $ax^2 + bx + c = 0$, where a, b and c are real numbers and $a \neq 0$. Its polynomial has degree 2.

Q3. 3 marks · Medium answer

For the equation $2x^2 - 5x + 3 = 0$, state its corresponding quadratic polynomial and explain the relationship between the roots of the equation and the zeroes of that polynomial.

Answer

1. The corresponding quadratic polynomial is $2x^2 - 5x + 3$, the left-hand expression in the equation. A zero is a value that makes this polynomial zero.
2. A real number α is a root of $2x^2 - 5x + 3 = 0$ when $2\alpha^2 - 5\alpha + 3 = 0$. Therefore, the roots of the equation and the zeroes of its corresponding polynomial are the same.

Q4. 4 marks · Long answer

Simplify each equation and determine whether it is quadratic: (i) $x(x + 1) + 8 = (x + 2)(x - 2)$; (ii) $(x + 2)^3 = x^3 - 4$. Give the resulting simplified equation in standard form whenever it is quadratic, and explain why simplification is needed before classification.

Answer

Simplifying an equation before classification reveals its actual polynomial degree and whether its quadratic terms remain.

1. For (i), $x(x + 1) + 8 = x^2 + x + 8$, while $(x + 2)(x - 2) = x^2 - 4$. Subtracting x^2 from both sides gives $x + 12 = 0$, a linear equation, so it is not quadratic.

2. For (ii), expansion gives $x^3 + 6x^2 + 12x + 8 = x^3 - 4$. Subtracting x^3 and simplifying gives $6x^2 + 12x +$

12 = 0; dividing by 6 gives $x^2 + 2x + 2 = 0$. This has standard form $ax^2 + bx + c = 0$ with $a = 1 \neq 0$, so it is quadratic.

3. These examples show that the appearance of the original expression is not decisive: equal terms can cancel, or expansion can reveal the remaining degree.

Classification depends on the simplified equation, which must be reduced to determine its true degree.

Q5. 5 marks · Long answer

Without solving the equations, classify the roots of each equation as two distinct real roots, two equal real roots, or no real roots: (i) $x^2 - 5x + 6 = 0$; (ii) $x^2 - 4x + 4 = 0$; (iii) $x^2 + x + 1 = 0$. Justify each classification using the discriminant.

Answer

The discriminant $b^2 - 4ac$ determines the nature of the real roots of a quadratic equation.

1. For $x^2 - 5x + 6 = 0$, $a = 1$, $b = -5$ and $c = 6$. The discriminant is $(-5)^2 - 4(1)(6) = 25 - 24 = 1$, which is positive; therefore, the equation has two distinct real roots.

2. For $x^2 - 4x + 4 = 0$, $a = 1$, $b = -4$ and $c = 4$. The discriminant is $(-4)^2 - 4(1)(4) = 16 - 16 = 0$; therefore, the equation has two equal real roots.

3. For $x^2 + x + 1 = 0$, $a = 1$, $b = 1$ and $c = 1$. The discriminant is $1^2 - 4(1)(1) = 1 - 4 = -3$, which is negative; therefore, the equation has no real roots.

Thus, the sign of the discriminant classifies each equation without finding its roots.

Q6. 17.5 marks · Essay answer

A park boundary contains a gate AB of length 13 m. A pole P is to be placed between A and B, with AP = x + 7 m and PB = x m, and ∠APB is a right angle. (a) Use Pythagoras' theorem to form a quadratic equation in x. (b) State the quadratic formula and explain the discriminant condition for real roots. (c) Use the discriminant to decide whether the placement is possible. (d) Find the roots and explain which root can represent the distance x.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/quadratic-equations

Q7. 1 mark · Multiple choice

A rectangular hall has breadth x metres and length one metre more than twice its breadth. Its area is 300 m^2. Which equation represents the area condition?
(A) $2x + 1 = 300$ (B) $x(2x + 1) = 300$ (C) $x + 2x + 1 = 300$ (D) $2x^2 + 1 = 300$

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/quadratic-equations

Q8. 2 marks · Short answer

John and Jivanti together have 45 marbles. After each loses 5 marbles, the product of their remaining amounts is 124. If John initially has x marbles, form a quadratic equation for x in standard form.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/quadratic-equations

Q9. 3 marks · Medium answer

Solve $6x^2 - x - 2 = 0$ by factorisation. Show the linear factors and the equations obtained by setting each factor equal to zero.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/quadratic-equations

Q10. 4 marks · Long answer

A factory produces x toys in a day, and the production cost per toy is (55 − x) rupees. The total production cost is ₹750. Form a quadratic equation in standard form to represent this situation, showing how the total cost is obtained.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/quadratic-equations

Unlock all answers on SmartKalike

Every probable question of every chapter, each with a full answer, plus study targets and answer-sheet checking.

https://smartkalike.com/cbse/class-10/maths/quadratic-equations

Sign up with a friend's email for 30% off their first purchase.