

$$x^2 + 12x + 2$$

QUADRATIC EQUATIONS



1 CHAPTER SNAPSHOT



- ★ **Standard Form:** A quadratic equation in variable x is of the form $ax^2 + bx + c = 0$, where a, b, c are real numbers and $a \neq 0$.
- ★ **Roots:** The values of x that satisfy $ax^2 + bx + c = 0$ are called its roots or solutions.
- ★ **Methods of Solving:**
 1. Factorisation Method (Splitting the middle term),
 2. Quadratic Formula.

Key Terms

- Quadratic Equation
- Roots / Zeroes
- Discriminant
- Factorisation
- Factorisation

3 FORMULA BANK



Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \text{ where } b^2 - 4ac \geq 0$$

Discriminant:

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

5 SMART REVISION TIPS



- ★ Always verify that $a \neq 0$ before treating the equation as quadratic.
- ★ For factorisation, look for pairs of factors whose product is $a c$ and sum is b .
- ★ Use the discriminant D quickly to check if real roots even exist before attempting to solve.
- ★ For word problems, define the variable clearly and set up the quadratic equation carefully.

6 COMMON MISTAKES



- ✗ Taking $a = 0$ (which reduces it to a linear equation).
- ✗ Sign errors while evaluating $b^2 - 4ac$ (especially when c is 0 or negative).
- ✗ Forgetting to check the nature of roots before taking square roots.
- ✗ Writing " $-ac$ " instead of $b^2 - 4ac$.
- ✗ Incorrect factor sign choices during middle term splitting.

8 30-SECOND RAPID REVISION



- ▶ **Form:** $ax^2 + bx + c = 0$ ($a \neq 0$).
- ▶ **Discriminant:** $D = b^2 - 4ac$.

Nature of Roots:

- ▶ $D > 0 \rightarrow$ Two distinct real roots.
- ▶ $D = 0 \rightarrow$ Two equal real roots.
- ▶ $D < 0 \rightarrow$ No real roots.

Quadratic Formula:

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

- ▶ **Key Methods:** Factorisation & Quadratic Formula.

2 HIGH-YIELD CONCEPTS



- ★ **A Quadratic Equation:** $ax^2 + bx + c = 0$ ($a \neq 0$).
- ★ **Discriminant (D):** $D = b^2 - 4ac$.
- ★ **Nature of Roots:**
 - $D > 0 \rightarrow$ Two distinct real roots.
 - $D = 0 \rightarrow$ Two equal real roots (Coincident roots).
 - $D < 0 \rightarrow$ No real roots.
- ★ **Quadratic Formula:**

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

4 BOARD EXAM FOCUS & HOTSPOTS



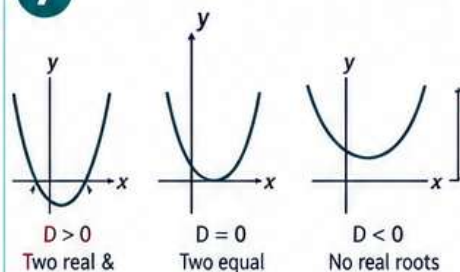
Frequently Asked Questions

- ✓ Find the nature of roots using the discriminant.
- ✓ Find the roots of an equation using the quadratic formula.
- ✓ Solve quadratic equations using the factorisation method.
- ✓ Find the value of k for which the roots are real and equal ($D = 0$).
- ✓ Form a quadratic equation from word problems and practical situations.

Key Pro Tips

- ★ Identify a, b, c correctly along with their negative signs.
- ★ Always check the sign of $b^2 - 4ac$ before applying the square root.
- ★ Use factorisation for quick calculations when numbers are easily split.
- ★ Use the quadratic formula when splitting the middle term is difficult or involves square roots.
- ★ Verify roots by substituting them back into the original equation.

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Discriminant (D)

$$(D) = b^2 - 4ac$$

Quadratic Formula

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

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

★ **KEY TAKEAWAY:** Identify $a, b, c \rightarrow$ Check the discriminant (D) $\rightarrow$ Use the right method $\rightarrow$ Verify the roots!

