

PRACTICE QUESTION PAPER (2026–27)
CHAPTER 4: QUADRATIC EQUATIONS

Class: X
Subject: Mathematics (Standard/Basic)

Maximum Marks: 40
Time Allowed: 1.5 Hours

GENERAL INSTRUCTIONS

1. This question paper contains **19 questions** divided into **Five Sections:** A, B, C, D, and E.
2. **Section A** comprises 10 Multiple Choice Questions (Q1 to Q10) carrying **1 mark** each (including 2 Assertion-Reason questions).
3. **Section B** comprises 3 Very Short Answer Type Questions (Q11 to Q13) carrying **2 marks** each.
4. **Section C** comprises 3 Short Answer Type Questions (Q14 to Q16) carrying **3 marks** each.
5. **Section D** comprises 2 Long Answer Type Questions (Q17 and Q18) carrying **5 marks** each.
6. **Section E** comprises 1 Case-Based Integrated Question (Q19) carrying **5 marks**.
7. All questions are compulsory. Use of calculators is strictly prohibited.

SECTION A (10 Marks)

Questions 1 to 10 carry 1 mark each.

1. The discriminant of the quadratic equation $3x^2 - 5x + 2 = 0$ is:
 (A) 1 (B) -1 (C) 49 (D) 25
2. If the quadratic equation $2x^2 - kx + 8 = 0$ has real and equal roots, then the value of k is:
 (A) ± 4 (B) ± 8 (C) ± 16 (D) ± 2
3. If $x = 2$ is one of the roots of the quadratic equation $kx^2 + 2x - 12 = 0$, then the value of k is:
 (A) 2 (B) 3 (C) -2 (D) -3
4. Which of the following is a quadratic equation?
 (A) $x^2 + 2x + 1 = (4 - x)^2 + 3$
 (B) $-2x^2 = (5 - x)(2x - \frac{2}{5})$
 (C) $(x + 1)^3 = x^3 + 4x + 1$
 (D) $x^3 - x^2 = (x - 1)^3$
5. If the quadratic equation $ax^2 + bx + c = 0$ ($a \neq 0$) has real and distinct roots, then:
 (A) $b^2 - 4ac < 0$ (B) $b^2 - 4ac = 0$ (C) $b^2 - 4ac > 0$ (D) $b^2 - 4ac \leq 0$
6. The product of two consecutive positive integers is 306. The quadratic equation representing this situation is:
 (A) $x^2 + x - 306 = 0$ (B) $x^2 - x - 306 = 0$ (C) $x^2 + 2x - 306 = 0$ (D) $x^2 - 2x + 306 = 0$
7. The roots of the quadratic equation $\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$ are:
 (A) $-\sqrt{3}, -\frac{7}{\sqrt{3}}$ (B) $\sqrt{3}, \frac{7}{\sqrt{3}}$ (C) $-\sqrt{3}, \frac{7}{\sqrt{3}}$ (D) $\sqrt{3}, -\frac{7}{\sqrt{3}}$
8. The discriminant of the equation $2x^2 - 4x + 3 = 0$ is -8 . The nature of its roots is:

- (A) Two distinct real roots
- (B) Two equal real roots
- (C) No real roots
- (D) More than two real roots

Direction for Q9 and Q10: In question numbers 9 and 10, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option:

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of Assertion (A).
- (C) Assertion (A) is true, but Reason (R) is false.
- (D) Assertion (A) is false, but Reason (R) is true.

9. Assertion (A): The quadratic equation $x^2 + 4x + 5 = 0$ has no real roots.

Reason (R): For a quadratic equation $ax^2 + bx + c = 0$, if discriminant $D = b^2 - 4ac < 0$, then it has no real roots.

10. Assertion (A): If one root of the quadratic equation $x^2 - 5x + 6 = 0$ is 2, then the other root is 3.

Reason (R): The sum of roots of the quadratic equation $ax^2 + bx + c = 0$ is equal to $-\frac{b}{a}$.

SECTION B (6 Marks)

Questions 11 to 13 carry 2 marks each.

- 11.** Find the discriminant of the quadratic equation $2x^2 - 5x + 3 = 0$ and hence write the nature of its roots.
- 12.** Solve the quadratic equation by factorisation: $6x^2 - x - 2 = 0$.
- 13.** Find the value(s) of p for which the quadratic equation $px(x - 2) + 6 = 0$ has two equal real roots.

SECTION C (9 Marks)

Questions 14 to 16 carry 3 marks each.

14. Solve for x :

$$\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}, \quad x \neq -4, 7$$

15. The sum of two numbers is 15, and the sum of their reciprocals is $\frac{3}{10}$. Find the numbers.

16. If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots, find the value of k .

SECTION D (10 Marks)

Questions 17 and 18 carry 5 marks each.

17. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.
18. Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

SECTION E (5 Marks)

Case-Based Integrated Question. Question 19 is compulsory and carries 5 marks.

19. Case Study: Design of a Football Turf

A local sports council plans to construct a rectangular football field inside a community sports complex. To ensure standard play conditions, the layout designer specifies that the length of the rectangular field must be 3 metres more than twice its breadth. The total area allocated for the field is 299 square metres.

Field Dimensions Specification

$$\begin{aligned} \text{Let breadth} &= x \text{ m} & \implies & \text{Length} = (2x + 3) \text{ m} \\ \text{Total Area} &= 299 \text{ m}^2 \end{aligned}$$

Based on the above information, answer the following questions:

- (i) Formulate the quadratic equation in terms of x representing the given physical situation. [1 Mark]
- (ii) Find the discriminant (D) of the formed quadratic equation and state whether the dimensions are physically realisable. [1 Mark]
- (iii) Solve the quadratic equation to determine the actual length and breadth of the football field. [2 Marks]
- (iv) If the cost of laying artificial turf is Rs. 150 per m^2 , calculate the total expenditure required for turfing the field. [1 Mark]

*** END OF QUESTION PAPER ***