Maxprap. Chapter wise Series Class 10th – Mathematics

Class : 10th **Topic : Quadratic Equation**

Max. Marks : 50 **Duration : 2 Hrs**

Sections: A (MCQs), B (Short Answer-I), C (Short Answer-II), D (Long Answer), E (Case-Based).

General Instructions:

(i). All questions are compulsory.

(ii). This question paper contains 23 questions divided into five Sections A, B, C, D and E.

(iii). Section A comprises of 10 MCQs of 1 mark each. Section B comprises of 5 questions of 2 marks each. Section C comprises of 4 questions of 3 marks each. Section D comprises of 2 question of 5 marks each and Section E comprises of 2 Case Study Based Questions of 4 marks each.

(iv). There is no overall choice.

(v). Use of Calculators is not permitted.

Section A

1. Which of the following quadratic equations has - 1as a root?

a) $x^2 - 5x + 6 = 0$ b) $x^2 + 3x + 4 = 0$

c) $-x^2 - 4x + 5 = 0$ d) $x^2 - 4x - 5 = 0$

2. If the roots of the equation $(a - b)x^2 + (b - c)x + (c - a) = 0$ are equal. Then _____.

a) $2c = a + b$ b) $\frac{1}{b} = \frac{1}{a} + \frac{1}{c}$ c) $2b = a + c$ d) $2a = b + c$

3. The roots of the equation $2x^2 - 6x + 3 = 0$ are

a) real, unequal and rational b) real and equal

c) imaginary d) real, unequal and irrational

4. The roots of a quadratic equation $x^2 - 4px + 4p^2 - q^2 = 0$ are

a) $2p + q, 2p - q$ b) $2p - q, 2p - q$

c) $2p + q, 2p + q$ d) $p + 2q, p - 2q$

5. Which of the following equations has two distinct real roots?

a) $5x^2 - 3x + 1 = 0$ b) $x^2 + x + 5 = 0$

c) $x^2 + x - 5 = 0$ d) $4x^2 - 3x + 1 = 0$

6. If the quadratic equation $ax^2 + bx + c = 0$ has two real and equal roots, then **c** is equal to

a) $\frac{b}{2a}$ b) $\frac{b^2}{4a}$ c) $\frac{-b^2}{4a}$ d) $\frac{-b}{2a}$

7. The ratio of the sum and product of the roots of the quadratic equation $5x^2 - 6x + 21 = 0$ is:

a) 5 : 21 b) 21 : 5 c) 7 : 2 d) 2 : 7

8. A quadratic equation $ax^2 + bx + c = 0$ has real and equal roots, if

a) $b^2 - 4ac > 0$ b) $b^2 - 4ac = 0$ c) $b^2 - 4ac < 0$ d) $b^2 - 4ac \neq 0$

Assertion(A)/Reason(R) Based (9-10): In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

9. Assertion (A): The equation $9x^2 + 3kx + 4 = 0$ has equal roots for $k = \pm 4$

Reason (R): If discriminant D of a quadratic equation is equal to zero then the roots of the equation are real and equal.

10. Assertion (A): If one root of the quadratic equation $4x^2 - 10x + (k - 4) = 0$ is reciprocal of the other, then value of k is 8.

Reason (R): Roots of the quadratic equation $x^2 - x + 1 = 0$ are real.

SECTION – B

Questions 11 to 15 carry 2 marks each

11. Solve the equation: $3x^2 - 8x - 1 = 0$ for x.

12. Find the roots of the quadratic equation $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$ by factorization.

13. Solve for x: $\frac{1}{x+4} - \frac{1}{x+7} = \frac{11}{30}$, $x \neq -4, 7$

14. Solve the quadratic equation by factorization: $\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$.

15. Solve for x : $\frac{x+1}{x-1} + \frac{x-2}{x+2} = 4 - \frac{2x+3}{x-2}; x \neq 1, -2, 2$

SECTION – C

Questions 16 to 19 carry 3 marks each

16. Solve: $\frac{1}{(a+b+x)} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x} [x \neq 0, x \neq -(a+b)]$

17. A passenger train takes one hour less for a journey of 150 km if its speed is increased by 5 km/hr from its usual speed. Find the usual speed of the train.

18. If the list price of a toy is reduced by₹ 2, a person can buy 2 toys more for ₹ 360. Find the original price of the toy.

19. Solve: $x^2 + 5x - (a^2 + a - 6) = 0$

SECTION – D

Questions 20 to 21 carry 5 marks each

20. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream, than to return to the same point. Find the speed of the stream and total time of the journey.

21. Two pipes together can fill a tank in $\frac{15}{8}$ hours. The pipe with larger diameter takes 2 hours less than the pipe with smaller diameter to fill the tank separately. Find the time in which each pipe can fill the tank separately.

SECTION – E (Case Study Based Questions)

Questions 22 & 23 carry 4 marks each

22. Read the following text carefully and answer the questions that follow:

The tradition of pottery making in India is very old. In fact, it is older than Indus Valley Civilization. The shaping and baking of clay articles has continued through the ages. The picture of a potter is shown below:

A potter makes a certain number of pottery articles in a day. It was observed on a particular day the cost of production of each article(in ₹) was one more than twice the number of articles produced on that day. The total cost of production on that day was ₹ 210.

a) Taking number of articles produced on that day as x, form a quadratic equation in x. (1)

b) Find the number of articles produced and the cost of each article. (1)

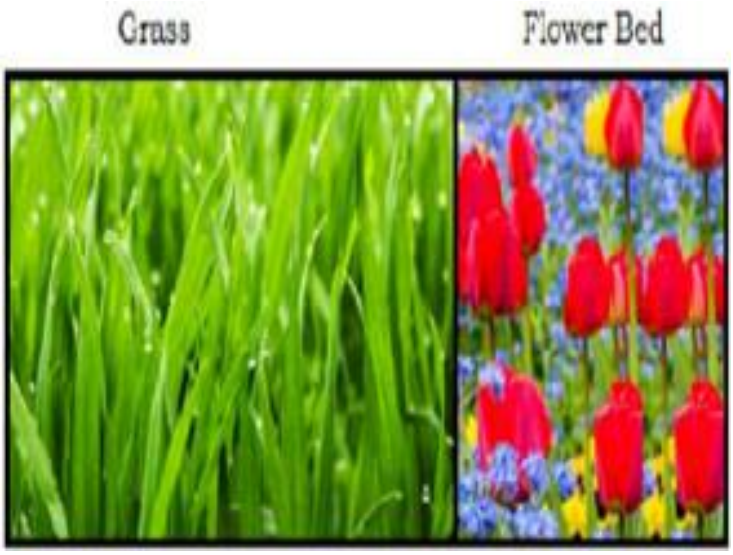
c) Find the cost of production of 15 articles. (2)

OR

Find the number of articles made by Potter in a day if the total cost of production is₹ 1575. (2)

23. Read the following text carefully and answer the questions that follow:

Shreya has a field with a flowerbed and grassland. The grassland is in the shape of rectangle while flowerbed is in the shape of square. The length of the grassland is found to be 3 m more than twice the length of the flowerbed. Total area of the whole land is 1260 m^2.



a) If the length of the square is x m then find the total length of the field. (1)
b) What will be the perimeter of the whole figure in terms of x? (1)
c) Find the value of x if the area of total field is 1260 m^2 . (2)

OR

Find area of grassland and the flowerbed separately. (2)

Quadratic Equation Paper Details – Analysis		
Objective Questions		
MCQ	1 marks x 8 question = 8	
Assertion Reason	1 marks x 2 question = 2	
Subjective		
Short type I	2 marks x 5 question = 10	
Short type II	3 marks x 4 question = 12	
Long Type	5 marks x 2 question = 10	
Case Studies Based		
Case 1	4 marks	
Case 2	4 marks	

Total = 50 marks Your Score =