CBSE

QUADRATIC EQUATIONS WS 1

Class 10 - Mathematics

Section A

1. Two numbers whose sum is 12 and the absolute value of whose difference is 4 are the roots of the equation _____. **[1]**

    a) $2x^2 - 24x + 43 = 0$

    b) $2x^2 - 6x + 7 = 0$

    c) $x^2 - 12x + 32 = 0$

    d) $x^2 - 12x + 30 = 0$

2. The product of two consecutive integers is 240. The quadratic representation of the above situation is **[1]**

    a) $x(x + 1) = 240$

    b) $x(x + 1)^2 = 240$

    c) $x + (x + 1) = 240$

    d) $x^2 + (x + 1) = 240$

3. The two numbers whose sum is 27 and their product is 182 are **[1]**

    a) 12 and 15

    b) 12 and 13

    c) 14 and 15

    d) 13 and 14

4. The quadratic equation whose roots are $7 + \sqrt{3}$ and $7 - \sqrt{3}$ is **[1]**

    a) $x^2 + 14x - 46 = 0$

    b) $x^2 - 14x + 46 = 0$

    c) $x^2 - 14x - 46 = 0$

    d) $x^2 + 14x + 46 = 0$

5. If the product of the roots of the equation $x^2 - 3x + k = 10$ is -2 then the value of k is **[1]**

    a) -8

    b) 12

    c) -2

    d) 8

6. A quadratic equation whose one root is 3 is **[1]**

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

    b) $x^2 - 6x - 6 = 0$

    c) $x^2 - 5x - 6 = 0$

    d) $x^2 + 6x - 5 = 0$

7. A quadratic equation whose one root is 2 and the sum of whose roots is zero, is **[1]**

    a) $4x^2 - 1 = 0$

    b) $x^2 - 2 = 0$

    c) $x^2 + 4 = 0$

    d) $x^2 - 4 = 0$

8. A quadratic equation whose roots are $(3 - \sqrt{2})$ and $(3 + \sqrt{2})$ is: **[1]**

    a) $x^2 - 7 = 0$

    b) $x^2 - 6x + 7 = 0$

    c) $9x^2 - 2 = 0$

    d) $x^2 + 6x + 7 = 0$

9. If x = 2 is a root of the quadratic equation $3x^2 - px - 2 = 0$, then the value of p is **[1]**

a) 0   b) 3

c) 5   d) 1

10. $5x^2 + 8x + 4 = 2x^2 + 4x + 6$ is a **[1]**

     a) quadratic equation   b) cubic equation

     c) constant   d) linear equation

11. **Assertion (A):** The equation $x^2 + 3x + 1 = (x - 2)^2$ is a quadratic equation. **[1]**

    Reason (R): Any equation of the form $ax^2 + bx + c = 0$ where $a \neq 0$, is called a quadratic equation.

     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.

12. If one root of the equation $3x^2 - 10x + k = 0$ is reciprocal of the other, find the value of k. **[1]**

13. Check whether it is a quadratic equation: **[1]**

    $(2x - 1)(x - 3) = (x + 4)(x - 2)$

14. State whether the $(2x + 3)(3x + 2) = 6(x - 1)(x - 2)$ is quadratic equation in x? **[1]**

15. State whether $x^2 + 6x - 4 = 0$ is a quadratic equation or not? **[1]**

16. Check whether it is quadratic equation: **[1]**

    $x(x + 3) + 6 = (x + 2)(x - 2)$

17. Write a quadratic polynomial, sum of whose zeros is $2\sqrt{3}$ and their product is 2. **[1]**

18. Does $(x - 1)^2 + 2(x + 1) = 0$ have a real root? Justify your answer. **[1]**

19. State whether the $x^2 - 3x - \sqrt{x} + 4 = 0$ is the quadratic equation in x? **[1]**

20. The product of two consecutive positive integers is 306. Form the quadratic equation to find the integers, if x denotes the smaller integer. **[1]**

21. Determine whether the given values are solutions of the given equation or not: **[1]**

    $x^2 + x + 1 = 0$, x = 0, x = 1

22. Is it quadratic equation ? **[1]**

    $2x^2 - 3\sqrt{2}x + 6 = 0$

23. Show that x = - 3 is a solution of $x^2 + 6x + 9 = 0$. **[1]**

24. Check whether $x^2 - 2x = (-2)(3 - x)$ is a quadratic equation. **[1]**

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Section B

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25. The length of a rectangular field is three times its breadth. If the area of the field be 147 sq metres, find the length of the field. (In meter) **[2]**

26. **Fill in the blanks:** **[2]**

    (a) $(x + 2)^3 = 2x(x^2 - 1)$ is a _____ equation. **[1]**

    (b)   The equation having maximum index of the variable 2 is called _____ equation. **[1]**

27. Represent the following situations in the form of Quadratic Equations: **[2]**

    i. The area of rectangular plot is 528 m^2. The length of the plot (in metres) is one more than twice its breadth. We need to find the length and breadth of the plot.

    ii. The product of two consecutive numbers is 306. We need to find the integers.

28. Check whether $(2x - 1)(x - 3) = (x + 5)(x - 1)$ is a quadratic equation. **[2]**

29. Check whether (x - 3) (2x + 1) = x(x + 5) is a quadratic equation. **[2]**

30. If α and β are roots of the quadratic equation x^2 - 7x + 10 = 0, find the quadratic equation whose roots are α^2 and β^2. **[2]**

31. The product of two consecutive positive integers is 306. Form the quadratic equation to find the integers. Represent the situation in the form of a quadratic equation. **[2]**

32. Solve for x: $\frac{1}{x} - \frac{1}{x-2}$ = 3; x $\neq$ 0, 2 **[2]**

33. Check whether the given equation is quadratic equation or not: x^3 - $4x^2$ - x + 1 = $(x - 2)^3$ **[2]**

34. The area of a rectangular plot is 528 m^2. The length of the plot (in metres) is one more than twice its breadth. We need to find the length and breadth of the plot. Represent the situation in the form of a quadratic equation. **[2]**

35. Check whether $(x + 2)^3$ = x^3 - 4 is a quadratic equation. **[2]**

36. Check whether x^2 + 3x + 1 = $(x - 2)^2$ is a quadratic equation. **[2]**

37. Check whether x(x + 1) + 8 = (x + 2) (x - 2) is a quadratic equation. **[2]**

38. Determine whether or not $x = \sqrt{2}, x = -2\sqrt{2}$ are solution of the equation $x^2 + \sqrt{2}x - 4 = 0,$? **[2]**

39. Check whether $(x - 2)^2$ + 1 = 2x - 3 is a quadratic equation. **[2]**

40. A cottage industry produces a certain number of toys in a day. The cost of production of each toy (in rupees) was found to be 55 minus the number of articles produced in a day. On a particular day, the total cost of production was Rs.750. We would like to find out the number of toys produced on that day. Represent situation mathematically (quadratic equation) **[2]**

41. The product of two consecutive positive integers is 240. Formulate the quadratic equation whose roots are these integers. **[2]**

42. Find the ratio of the sum and product of the roots of $7x^2$ - 12x + 18 = 0. **[2]**

43. Check whether (x - 2) (x + 1) = (x - 1) (x + 3) is a quadratic equation. **[2]**

44. The length of a rectangular field is three times its breadth. If the area of the field be 147 sq metres, find the length of the field. **[2]**

45. A two-digit number is four times the sum of its digits and twice the product of its digits. Find the number. **[2]**

46. If x = $\frac{2}{3}$ and x = - 3 are roots of the quadratic equation ax^2 + 7x + b = 0, find the values of a and b. **[2]**

47. A car covers a distance of 2592 km with a uniform speed. The number of hours taken for the journey is one half the number representing the speed in km/ hour. Find the time taken to cover the distances. **[2]**

48. Determine whether or not x = $\frac{-1}{2}$, x = $\frac{2}{3}$ are solution of the equation $6x^2$ - x - 2 = 0? **[2]**

49. Determine whether the given values are solutions of the given equation or not:

    x^2 - 3x + 2 = 0, x = 2, x = -1 **[2]**

50. A factory kept increasing its output by the same percentage every year. Find the percentage if it is known that the output is doubled in the last two years. **[2]**

51. Write a quadratic equation with roots -3 and 5. **[2]**

52. Check whether x(2x + 3) = x^2 + 1 is a quadratic equation. **[2]**

Section C

53. A two digit number is such that the product of the digits is 12. When 36 is added to the number the digits interchange their places. Formulate the quadratic equation whose roots are digits of the number. **[3]**

54. Rohan's mother is 26 years older than him. The product of their ages 3 years from now will be 360. We would like to find Rohan's present age. Represent the situation in the form of a quadratic equation. **[3]**

55. A 2-digit number is four times the sum of its digits and twice the product of its digits. Find the number. **[3]**

Section D

Question No. 56 to 59 are based on the given text. Read the text carefully and answer the questions: **[4]**

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.
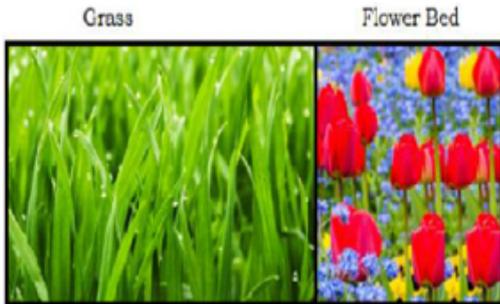
Grass   Flower Bed

56. If the length of the square is x m then find the total length of the field.

57. What will be the perimeter of the whole figure in terms of x?

58. Find the value of x if the area of total field is 1260 m^2.

59. Find area of grassland and the flowerbed separately.

Question No. 60 to 63 are based on the given text. Read the text carefully and answer the questions: **[4]**

The angry Arjun carried some arrows for fighting with Bheeshm. With the half of the arrows, he cut down the arrows thrown by Bheeshm on him and with six other arrows, he killed the charioteer of Bheeshm. With one arrow each, he knocked down respectively the chariot, flag and the bow of Bheeshma. Finally, with one more than four times the square root of arrows, he laid Bheeshm unconscious on an arrow bed.

60. If Arjun had x arrows then by how many arrows he cut down arrows thrown by Bheeshm?

61. If Arjun had x arrows then by how many arrows he laid Bheeshm unconscious on arrow bed?

62. Find the total number of arrows Arjun had.

63. From a quadratic equation by the no of arrows used by Arjuna?

Question No. 64 to 67 are based on the given text. Read the text carefully and answer the questions: **[4]**

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.

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

65. Find the number of articles produced and the cost of each article.

66. Find the cost of production of 15 articles.

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

<div align="center">**Section E**</div>

68. **State True or False:** **[5]**

    (a) $7x^3 + 7x = 36$ is a quadratic equation. **[1]**

    (b)   p(p - 6) = 0 is a quadratic equation. **[1]**

    (c)   A quadratic equation can have at most 2 real roots. **[1]**

    (d)   Every quadratic equation has at least two roots. **[1]**

    (e)   Every quadratic equation will have rational roots. **[1]**

69. Represent the situation in the form of the quadratic equation: **[5]**

A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/hr less, then it would have taken 3 hours more to cover the same distance. We need to find the speed of the train.

70. If the factory kept increasing its output by the same percentage every year. Find the percentage, if it is known that the output doubles in the last two years. **[5]**