

**QUADRATIC 01 BY HITESH SIR**

**Class 10 - Mathematics**

**Question No. 1 to 5 are based on the given text. Read the text carefully and answer the questions:**

If  $p(x)$  is a quadratic polynomial i.e.,  $p(x) = ax^2 + bx + c$ ,  $a \neq 0$ , then  $p(x) = 0$  is called a quadratic equation.

1. Which of the following is correct about the quadratic equation  $ax^2 + bx + c = 0$ ?

- a)  $a, b$  and  $c$  are real numbers,  $a \neq 0$
- b)  $a, b$  and  $c$  are real numbers,  $c \neq 0$
- c)  $a, b$  and  $c$  are integers,  $a, b$  and  $c \neq 0$
- d)  $a, b$  and  $c$  are rational numbers,  $a \neq 0$

2. The degree of a quadratic equation is:

- a) 3
- b) other than 1
- c) 2
- d) 1

3. Which of the following is a quadratic equation?

- i.  $x(x + 3) + 7 = 5x - 11$
- ii.  $(x - 1)^2 - 9 = (x - 4)(x + 3)$
- iii.  $x^2(2x + 1) - 4 = 5x^2 - 10$
- iv.  $x(x - 1)(x + 7) = x(6x - 9)$

- a) Option (i)
- b) Option (iii)
- c) Option (iv)
- d) Option (ii)

4. Which of the following is incorrect about the quadratic equation  $ax^2 + bx + c = 0$ ?

- i. If  $a\alpha^2 + b\alpha + c = 0$ , then  $x = -\alpha$  is the solution of the given quadratic equation.
- ii. The additive inverse of zeroes of the polynomial  $ax^2 + bx + c$  is the roots of the given equation.
- iii. If  $\alpha$  is a root of the given quadratic equation, then its other root is  $-\alpha$ .
- iv. All of these

- a) Option (ii)
- b) Option (iii)
- c) Option (iv)
- d) Option (i)

5. Which of the following is not a method of finding solutions of the given quadratic equation?

- a) None of these
- b) Formula method
- c) Factorisation method
- d) Completing the square method

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

- a) real, unequal and irrational
- b) real and equal

c) real, unequal and rational

d) imaginary

7. If  $x = 1$  is a common root of  $ax^2 + ax + 2 = 0$  and  $x^2 + x + b = 0$  then,  $ab$

a) 2

b) 1

c) 3

d) 4

8. The value of  $\sqrt{6 + \sqrt{6 + \sqrt{6 + \dots}}}$  is

a) 4

b) 3.5

c) 3

d) -2

9. For what values of  $k$ , the equation  $kx^2 - 6x - 2 = 0$  has real roots?

a)  $k \geq \frac{-9}{2}$

b) None of these

c)  $k \leq -2$

d)  $k \leq \frac{-9}{2}$

10. 500 bananas were divided equally among a certain number of students. If there were 25 more students, each would have received one banana less. Then the number of students is

a) 500

b) 125

c) 250

d) 100

11. The roots of a quadratic equation are 5 and -2. Then, the equation is

a)  $x^2 - 3x + 10 = 0$

b)  $x^2 - 3x - 10 = 0$

c)  $x^2 + 3x + 10 = 0$

d)  $x^2 + 3x - 10 = 0$

12. Let  $b = a + c$ . Then the equation  $ax^2 + bx + c = 0$  has equal roots if

a)  $a = -c$

b)  $a = c$

c)  $a = -2c$

d)  $a = 2c$

13. The positive value of  $k$  for which the equation  $x^2 + kx + 64 = 0$  and  $x^2 - 8x + k = 0$  will both have real roots, is

a) 12

b) 4

c) 8

d) 16

14. If the roots of  $5x^2 - kx + 1 = 0$  are real and distinct then

a)  $k < -2\sqrt{5}$  only

b)  $k > 2\sqrt{5}$  only

c)  $-2\sqrt{5} < k < 2\sqrt{5}$

d) either  $k > 2\sqrt{5}$  or  $k < -2\sqrt{5}$

15. Which of the following equations has 2 as a root?

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

b)  $3x^2 - 6x - 2 = 0$

c)  $x^2 + 3x - 12 = 0$

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

16. Solve:  $15x^2 - 28 = x$

17. Find the least positive value of  $k$  for which  $x^2 + kx + 16 = 0$  has real roots.

18. State whether the quadratic equation  $(x + 4)^2 - 8x = 0$  has two distinct real roots. Justify your answer.

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

20. Find the roots of the quadratic equation.

$$3x^2 - 4\sqrt{3}x + 4 = 0$$

21. Solve the quadratic equation by factorization:

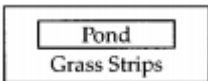
$$x^2 - x - a(a + 1) = 0$$

22. A chessboard contains 64 equal squares and the area of each square is  $6.25 \text{ cm}^2$ . A border round the board is 2 cm wide. Find the length of the side of the chessboard.

23. Find the roots of the quadratic equation  $15x^2 - 10\sqrt{6}x + 10 = 0$ .

24. A two-digit number is such that the product of the digits is 16. When 54 is subtracted from the number, the digits are interchanged. Find the number.

25. In a rectangular part of dimensions,  $50 \text{ m} \times 40 \text{ m}$  a rectangular pond is constructed so that the area of grass strip of uniform breadth surrounding the pond would be  $1184 \text{ m}^2$ . Find the length and breadth of the pond.



26. Solve the equation  $x^2 - \frac{11}{4}x + \frac{15}{8} = 0$  by factorisation method.

27. The height of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, form the quadratic equation to find the base of the triangle.

28. Solve the quadratic equation by factorization:

$$2x^2 + ax - a^2 = 0$$

29. Solve the quadratic equation by factorization:

$$4x^2 + 4bx - (a^2 - b^2) = 0$$

30. One fourth of a herd of camels was seen in forest. Twice of square root of the herd had gone to mountains and remaining 15 camels were seen on the bank of a river, find the total number of camels.

31. Solve the quadratic equation by factorization:

$$x^2 + \left(a + \frac{1}{a}\right)x + 1 = 0$$

32. Solve the quadratic equation by factorization:

$$\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$$

33. A person on tour has ₹ 4200 for his expenses. If he extends his tour for 3 days, he has to cut down his daily expenses by ₹ 70. Find the original duration of the tour.

34. Solve:  $\sqrt{3}x^2 + 10x - 8\sqrt{3} = 0$

35. Seven years ago Varun's age was five times the square of Swati's age. Three years hence Swati's age will be two fifth of Varun's age. Find present ages of Varun and Swati.

36. The sum of a natural number and its positive square root is 132. Find the number.

37. Had Aarush scored 8 more marks in a Mathematics test, out of 35 marks, 7 times these marks would have been 4 less than square of his actual marks. How many marks did he get in the test?

38. The difference of two numbers is 5 and the difference of their reciprocals is  $\frac{1}{10}$ . Find the numbers.

39. Two pipes running together can fill a tank in  $11\frac{1}{9}$  minutes. If one pipe takes 5 minutes more than the other to fill the tank, find the time in which each pipe would fill the tank separately.

40. A piece of cloth costs 200 Rupees . If the piece was 5 m longer and each metre of cloth costs 2 Rupees less, the cost of the piece would have remain unchanged. How long is the piece and what is the original rate per metre?

41. A journey of 192 km from a town A to town B takes 2 hours more by an ordinary passenger train than a super fast train. If the speed of the faster train is 16 km/h more, find the speed of the faster and the passenger train.

42. If the equation  $(1 + m^2)x^2 + 2mcx + (c^2 - a^2) = 0$  has equal roots, prove that  $c^2 = a^2(1 + m^2)$

43. A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If, the total cost of production on that day was ₹ 90, find the number of articles produced and the cost of each article.
44. A dealer sells a toy for ₹ 24 and gains as much per cent as the cost price of the toy. Then find the cost price of the toy.
45. At  $t$  minutes past 2 p.m, the time needed by the minute hand of a clock to show 3 p.m. was found to be 3 minutes less than  $\frac{t^2}{4}$  minutes. Find  $t$ .

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