

QUADRATIC EQUATIONS WS 5

Class 10 - Mathematics

Section A

1. Find the value of k for which $x = 2$ is a root of equation $3x^2 - 2kx + 5 = 0$. [2]
2. Find the value of k for which the roots are real and equal of equation: [2]
 $3x^2 - 5x + 2k = 0$
3. Show that the roots of the equation $x^2 + px - q^2 = 0$ are real for all real values of p and q . [2]
4. Find the value of k so that the quadratic equation $3x^2 - 5x - 2k = 0$ has real and equal roots. [2]
5. Write the condition to be satisfied for which equations $ax^2 + 2bx + c = 0$ and $bx^2 - 2\sqrt{ac}x + b = 0$ have equal roots. [2]
6. Find the value of k for the quadratic equation $2x^2 + kx + 3 = 0$, so that they have two real equal roots. [2]
7. Find k so that the quadratic equation $(k + 1)x^2 + 2(k + 1)x + 1 = 0$ has equal roots. [2]
8. Find whether the equation has real roots. If real roots exist, find them: $5x^2 - 2x - 10 = 0$ [2]
9. Find the nature of the roots of the quadratic equation: $4x^2 - 5x - 1 = 0$ [2]
10. Find the value of k for which the roots of $9x^2 + 8kx + 16 = 0$ are real and equal. [2]
11. Find the nature of the roots of the quadratic equation $2x^2 - 3x + 5 = 0$. If the real roots exist, find it. [2]
12. A pole has to be erected at a point on the boundary of a circular park of diameter 13 metres in such a way that the difference of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 metres. Is it possible to do so? If yes, at what distances from the two gates should the pole be erected? [2]
13. If one root of the quadratic equation $x^2 + 12x - k = 0$ is thrice the other root, then find the value of k . [2]
14. Find the value(s) of k for which the quadratic equation $x^2 + 5kx + 16 = 0$ has real and equal roots. [2]
15. For what value of k , the roots of the quadratic equation $kx(x - 2\sqrt{5}) + 10 = 0$ real and equal? [2]
16. Is it possible to design a rectangular mango grove whose length is twice its breadth and the area is 800 m^2 ? If so, find its length and breadth. [2]
17. Find the values of k so that the quadratic equation $x^2 - 4kx + k = 0$ has equal roots. [2]
18. Find the values of k for which the following equation has equal roots: [2]
 $(k - 12)x^2 + 2(k - 12)x + 2 = 0$
19. Find the values of k for which the given equation has real roots: [2]
 $5x^2 - kx + 1 = 0$
20. If 2 is a root of the equation $x^2 + kx + 12 = 0$ and the equation $x^2 + kx + q = 0$ has equal roots, find the value of q . [2]
21. Determine the nature of the roots of quadratic equation: $5x(x - 2) + 6 = 0$. [2]
22. Find the equations have real roots. If real roots exist, find them : $-2x^2 + 3x + 2 = 0$ [2]
23. Find the value of k for which the given quadratic equation has real and distinct roots: $9x^2 + 3kx + 4 = 0$ [2]

24. Find the values of k for which the given equation has real and equal roots: [2]
 $(k + 1)x^2 - 2(k - 1)x + 1 = 0$
25. Write a quadratic equation whose roots are -7 and 9 . [2]
26. For what value of p , does the quadratic equation $px^2 + 2x + p = 0$ have real and equal roots? [2]
27. Find the nature of the roots of the quadratic equation $3x^2 - 4\sqrt{3}x + 4 = 0$. If the real roots exist, find it. [2]
28. Find the nature of the roots of the quadratic equation $x^2 - 5x + 9 = 0$. [2]
29. Find the nature of the roots of the quadratic equation: [2]
 $13\sqrt{3}x^2 + 10x + \sqrt{3} = 0$
30. For what values of p are the roots of the equation $4x^2 + px + 3 = 0$ real and equal? [2]
31. Determine the positive value of ' k ' for which the equation $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will both [2]
have real and equal roots.
32. Find the value of k for the quadratic equation $kx(x - 2) + 6 = 0$, so that they have two equal roots. [2]
33. Find the non zero values of k for which the roots of the quadratic equation $9x^2 - 3kx + k = 0$ are real and equal. [2]
34. If the quadratic equation $(1 + a^2)x^2 + 2abx + (b^2 - c^2) = 0$ has equal roots, then prove that: $b^2 = c^2 (1 + a^2)$. [2]
35. Find the value of ' p ' so that the quadratic equation $x^2 + px + 1 = 0$ has real roots. [2]
36. Determine the nature of the roots of quadratic equation: $12x^2 - 4\sqrt{15}x + 5 = 0$. [2]
37. Find the roots of the equation, if they exist, by applying the quadratic formula: $25x^2 + 30x + 7 = 0$ [2]
38. Find the value of k for which the given quadratic equation has real and distinct roots : $kx^2 + 2x + 1 = 0$ [2]
39. Find the values of k for which the equation $x^2 - 4x + k = 0$ has distinct real roots. [2]
40. Find the value of k for which the roots are real and equal of equation: [2]
 $kx^2 - 2\sqrt{5}x + 4 = 0$
41. Find the values of k for which the equation has real and equal roots: $x^2 + k(2x + k - 1) + 2 = 0$. [2]
42. If the equation $mx^2 + 2x + m = 0$ has two equal roots, then find the values of m . [2]
43. Find the value of k for which the given quadratic equation has real and distinct roots : $4x^2 - 3kx + 9 = 0$ [2]
44. Find the value of k for which the quadratic equation $9x^2 + 8kx + 16 = 0$ has real and equal roots. [2]
45. Determine the nature of the roots of quadratic equation : $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0$ [2]
46. If -4 is a root of the quadratic equation $x^2 + px - 4$ and the quadratic equation $x^2 + px + k = 0$ has equal root, find [2]
the value of k .
47. Find the values of k for which the following equation have real roots: $4x^2 + kx + 3 = 0$ [2]
48. Find the least positive value of k for which the equation $x^2 + kx + 4 = 0$ has real roots. [2]
49. Find the value of m for which the quadratic equation $(m - 1)x^2 + 2(m - 1)x + 1 = 0$ has two real and equal [2]
roots.
50. State whether the quadratic equation has two distinct real roots. Justify your answer. [2]
 $2x^2 + x - 1 = 0$.
51. Find the nature of the roots of the quadratic equation $2x^2 - 6x + 3 = 0$. If the real roots exist, find it. [2]
52. For what values of k are the roots of the quadratic equation $3x^2 - 2kx + 27 = 0$ real and equal? [2]
53. If the equation $kx^2 - 2kx + 6 = 0$ has equal roots, then find the value of k . [2]

Section B

54. Prove that both the roots of the equation $(x - a)(x - b) + (x - b)(x - c) + (x - c)(x - a) = 0$ are real but they are [3]

equal only when $a = b = c$.

55. If p, q, r and s are real numbers such that $pr = 2(q + s)$, then show that at least one of the equations $x^2 + px + q = 0$ and $x^2 + rx + s = 0$ has real roots. [3]
56. Find the values of k for which the given equation has real and equal roots: [3]
 $x^2 + k(4x + k - 1) + 2 = 0$
57. Is it possible to design a rectangular park of perimeter 80 m and area 400 m²? If so, find its length and breadth. [3]
58. If the roots of the equation $x^2 + 2cx + ab = 0$ are real unequal, then prove that the equation $x^2 - 2(a + b)x + a^2 + b^2 + 2c^2 = 0$ has no real roots. [3]
59. Is the following situation possible? If so, determine their present ages. The sum of the ages of two friends is 20 years. Four years ago, the product of their ages in years was 48. [3]
60. Using quadratic formula, solve the following equation for x : $abx^2 + (b^2 - ac)x - bc = 0$ [3]
61. Find the value of p for which the quadratic equation $p(x - 4)(x - 2) + (x - 1)^2 = 0$ has real and equal roots. [3]
62. Find the value of k for which the roots are real and equal of equation: [3]
 $kx^2 + kx + 1 = -4x^2 - x$
63. Find the values of k for which the given equation has real and equal roots: [3]
 $x^2 - 2x(1 + 3k) + 7(3 + 2k) = 0$
64. If -2 is a root of the equation $3x^2 + 7x + p = 0$, find the value of k so that the roots of the equation $x^2 + k(4x + k - 1) + p = 0$ are equal. [3]
65. Determine whether the given quadratic equation have real roots and if so, find the roots [3]
 $16x^2 = 24x + 1$

Section C

66. Find the value of m for which the quadratic equation $(m + 1)y^2 - 6(m + 1)y + 3(m + 9) = 0$, $m \neq -1$ has equal roots. Hence find the roots of the equation. [5]
67. If the roots of the quadratic equation $(x - a)(x - b) + (x - b)(x - c) + (x - c)(x - a) = 0$ are equal. Then show that $a = b = c$ [5]
68. Find all the values of k for which the quadratic equation $2x^2 + kx + 8 = 0$ has equal roots. Also, find the roots. [5]
69. If $x = -4$ is a root of the equation $x^2 + 2x + 4p = 0$, find the values of k for which the equation $x^2 + px(1 + 3k) + 7(3 + 2k) = 0$ has equal roots. [5]
70. If the equation $(1 + m^2)x^2 + 2mcx + (c^2 - a^2) = 0$ has equal roots, prove that $c^2 = a^2(1 + m^2)$ [5]
71. 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, then find the values of p and k . [5]
72. If the roots of the quadratic equation $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$ in x are equal then show that either $a = 0$ or $a^3 + b^3 + c^3 = 3abc$ [5]
73. If roots of the quadratic equation $x^2 + 2px + mn = 0$ are real and equal, show that the roots of the quadratic equation $x^2 - 2(m + n)x + (m^2 + n^2 + 2p^2) = 0$ are also equal. [5]
74. Find the values of k for which the equation $(3k + 1)x^2 + 2(k + 1)x + 1$, has equal roots. Also find the roots. [5]
75. If $x = -2$ is a root of the equation $3x^2 + 7x + p = 0$, find the value of k so that the roots of the equation $x^2 + k(4x + k - 1) + p = 0$ are equal. [5]