

QUADRATIC EQUATIONS WS 3

Class 10 - Mathematics

1. If α, β are roots of the equation $2x^2 - 6x + a = 0$ and $2\alpha + 5\beta = 12$, find the value of a. [3]
2. The area of an isosceles triangle is 60 cm^2 and the length of each one of its equal sides is 13 cm. Find its base. [3]
3. The numerator of a fraction is 3 less than its denominator. If 2 is added to both the numerator and the denominator, then the sum of the new fraction and original fraction is $\frac{29}{20}$. Find the original fraction. [3]
4. Solve: $\frac{2}{x^2} - \frac{5}{x} + 2 = 0$ [3]
5. A two-digit number is seven times the sum of its digits and is also equal to 12 less than three times the Product of its digits. Find the number. [3]
6. The sum of the squares of two consecutive multiples of 7 is 1225. Find the multiples. [3]
7. The sum of a natural number and its positive square root is 132. Find the number. [3]
8. One root of the quadratic equation $2x^2 - 8x - k = 0$ is $\frac{5}{2}$. Find the value of k. Also, find the other root. [3]
9. Find the value of k for which the roots are real and equal of equation: [3]
 $(k + 1)x^2 + 2(k + 3)x + (k + 8) = 0$
10. The difference of two natural numbers is 5 and the difference of their reciprocals is $\frac{5}{14}$. Find the numbers. [3]
11. Solve the quadratic equation by factorization: [3]
 $\frac{1}{x-2} + \frac{2}{x-1} = \frac{6}{x}$
12. Solve the quadratic equation by factorization: [3]
 $\frac{3}{x+1} + \frac{4}{x-1} = \frac{29}{4x-1}; x \neq 1, -1, \frac{1}{4}$
13. Solve the given equation for x: [3]
 $\frac{x-2}{x-3} + \frac{x-4}{x-5} = 3\frac{1}{3}, x \neq 3, 5.$
14. Solve: $\frac{x}{x-1} + \frac{x-1}{x} = 4\frac{1}{4}, x \neq 2, 0$ [3]
15. Solve the equation $\frac{4}{x} - 3 = \frac{5}{2x+3}; x \neq 0, -\frac{3}{2}$, for x. [3]
16. Solve: $2\left(\frac{2x-1}{x+3}\right) - 3\left(\frac{x+3}{2x-1}\right) = 5, x \neq -3, \frac{1}{2}$ [3]
17. Find two consecutive odd positive integers, sum of whose squares is 970. [3]
18. The sum of two numbers is 48 and their product is 432. Find the numbers. [3]
19. The length of the rectangle exceeds its breadth by 8 cm and the area of the rectangle is 240 cm^2 . Find the dimensions of the rectangle. [3]
20. Find the value of k for which the given equation has equal roots. Also, find the roots [3]
 $9x^2 - 24x + k = 0$
21. Solve: $\frac{2}{(x+1)} + \frac{3}{2(x-2)} = \frac{23}{5x}, x \neq 0, -1, 2.$ [3]
22. The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides. [3]
23. The perimeter of a right triangle is 60 cm. Its hypotenues is 25 cm. Find the area of the triangle. [3]
24. Determine whether the given values are solutions of the given equation or not: [3]
 $2x^2 - x + 9 = x^2 + 4x + 3, x = 2, x = 3$
25. Solve: $\sqrt{3}x^2 + 10x - 8\sqrt{3} = 0$ [3]

26. Find the values of k for which the quadratic equation $(3k + 1)x^2 + 2(k + 1)x + 1 = 0$ has real and equal roots [3]
27. The numerator of a fraction is one less than its denominator. If three is added to each of the numerator and denominator, the fraction is increased by $\frac{3}{28}$. Find the fraction. [3]
28. A rectangular field is 16 m long and 10 m wide. There is a path of uniform width all around it, having an area of 120 m^2 . Find the width of the path. [3]
29. Solve: $\frac{3x-4}{7} + \frac{7}{3x-4} = \frac{5}{2}, x \neq \frac{4}{3}$ [3]
30. Solve: $3^{(x+2)} + 3^{-x} = 10$ [3]
31. Find the value of k for which the quadratic equation $(k + 1)x^2 - 6(k + 1)x + 3(k + 9) = 0, k \neq -1$ has equal roots. [3]
32. Solve the quadratic equation by factorization: [3]
 $\frac{x-1}{2x+1} + \frac{2x+1}{x-1} = \frac{5}{2}, x \neq -\frac{1}{2}, 1$
33. The area of a right-angled triangle is 600 cm^2 . If the base of the triangle exceeds the altitude by 10 cm, find the base and altitude of the triangle. [3]
34. If a, b, c are real numbers such that $ac \neq 0$, then show that at least one of the equations $ax^2 + bx + c = 0$ and $-ax^2 + bx + c = 0$ has real roots. [3]
35. The product of two successive integral multiples of 5 is 300. Determine the multiples. [3]
36. The sum of two natural numbers is 8 and their product is 15. Find the numbers. [3]
37. Solve the quadratic equation by factorization: [3]
 $25x(x + 1) = -4$
38. Solve the quadratic equation by factorization method: [3]
 $\frac{x+3}{x-2} - \frac{1-x}{x} = \frac{17}{4}$
39. The hypotenuse of a grassy land in the shape of a right triangle is 1 metre more than twice the shortest side. If the third side is 7 metres more than the shortest side, find the sides of the grassy land. [3]
40. Solve the quadratic equation by factorization: [3]
 $\frac{x+1}{x-1} + \frac{x-2}{x+2} = 4 - \frac{2x+3}{x-2}$
41. Solve the quadratic equation by factorization: [3]
 $(x - 5)(x - 6) = \frac{25}{(24)^2}$
42. The sum of the squares of two consecutive positive even numbers is 452. Find the numbers. [3]
43. Solve: [3]
 $x = \frac{1}{2 - \frac{1}{2 - \frac{1}{2-x}}}, x \neq 2$
44. Find the roots of the quadratic equation $2x^2 - 5x + 3 = 0$ by factorisation. [3]
45. Solve: $x^2 + 5x - (a^2 + a - 6) = 0$ [3]
46. The sum of the squares of two consecutive odd positive integers is 394. Find them. [3]
47. Determine, if 3 is a root of the equation given below: [3]
 $\sqrt{x^2 - 4x + 3} + \sqrt{x^2 - 9} = \sqrt{4x^2 - 14x + 16}$
48. The area of a right angled triangle is 165 m^2 . Determine its base and altitude if the latter exceeds the former by 7m. [3]
49. Solve the quadratic equation by factorization: [3]
 $\frac{1}{x-3} + \frac{2}{x-2} = \frac{8}{x}, x \neq 0, 2, 3$
50. Solve: $\frac{x}{x-1} + \frac{x-1}{x} = 4\frac{1}{4}, x \neq 0, 1$ [3]
51. Solve $(x - 3)(x - 4) = \frac{34}{(33)^2}$ [3]

52. Solve: $\frac{1}{2x-3} + \frac{1}{x-5} = 1\frac{1}{9}, x \neq \frac{3}{2}, 5$ [3]
53. The side of a square exceeds the side of the another square by 4 cm and the sum of the areas of the two squares is 400 sq. cm. Find the dimensions of the squares. [3]
54. The difference of squares of two numbers is 88. If the larger number is 5 less than twice the smaller number, then find the two numbers. [3]
55. The sum of two natural numbers is 28 and their product is 192. Find the numbers. [3]
56. Solve: $\frac{1}{(x+3)} + \frac{1}{(2x-1)} = \frac{11}{(7x+9)}, x \neq -3, \frac{1}{2}, \frac{-9}{7}$ [3]
57. Find roots of given quadratic equation: $p^2x^2 + (p^2 - q^2)x - q^2 = 0, p \neq 0$ [3]
58. If $x = 3$ is one root of the quadratic equation $2x^2 + px + 30 = 0$, find the value of p and the other root of the quadratic equation. [3]
59. The length of a hall is 5 m more than its breadth. If the area of the floor of the hall is 84 m^2 , what is the length and breadth of the hall? [3]
60. The numerator of a fraction is 3 less than its denominator. If 1 is added to the denominator, the fraction is decreased by $\frac{1}{15}$. Find the fraction. [3]
61. Find the roots of the quadratic equation $3x^2 - 2\sqrt{6}x + 2 = 0$. [3]
62. Solve: $\frac{1}{(a+b+x)} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x} [x \neq 0, x \neq -(a+b)]$ [3]
63. Solve the quadratic equation by factorization method $\frac{4}{x} - 3 = \frac{5}{2x+3} x \neq 0, \frac{-3}{2}$ [3]
64. Solve the quadratic equation by factorization: $\frac{x+1}{x-1} - \frac{x-1}{x+1} = \frac{5}{6}, x \neq 1, -1$ [3]
65. Solve the quadratic equation by factorization: $\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$ [3]
66. Solve: $\frac{x+3}{x-2} - \frac{1-x}{x} = 4\frac{1}{4}, x \neq 2, 0$ [3]
67. Sum of the areas of two squares is 157 m^2 . If the sum of their perimeters is 68 m, find the sides of the two squares. [3]
68. Solve the quadratic equation by factorization: $\frac{2x}{x-4} + \frac{2x-5}{x-3} = \frac{25}{3}, x \neq 3, 4$ [3]
69. The hypotenuse of a right triangle is 25 cm. The difference between the lengths of the other two sides of the triangle is 5 cm. Find the lengths of these sides. [3]
70. A two-digit number is such that the product of its digits is 15. If 18 is added to the number, the digits interchange their places. Find the number. [3]
71. The sum of the squares of two consecutive positive odd numbers is 514. Find the numbers. [3]
72. The perimeter of a right-angled triangle is 70 units and its hypotenuse is 29 units. Find the lengths of the other sides. [3]
73. Solve: $x^2 - 2ax - (4b^2 - a^2) = 0$ [3]
74. The hypotenuse of a right triangle is $3\sqrt{5}$ cm. If the smaller side is tripled and the larger side is doubled, the new hypotenuse will be 15 cm. Find the length of each side.? [3]
75. If the roots of the equation $(b - c)x^2 + (c - a)x + (a - b) = 0$ are equal, then prove that $2b = a + c$. [3]