

## QUADRATIC EQUATIONS

1. Find the roots of the quadratic equation  $2x^2 - \sqrt{5}x - 2 = 0$  using the quadratic formula.
2. Find the roots of the quadratic equation  $6x^2 - \sqrt{2}x - 2 = 0$  by the factorisation of the corresponding quadratic polynomial.
3. Solve the following equation for  $x$ :  
 $9x^2 - 9(a + b)x + (2a^2 + 5ab + 2b^2) = 0$

4. Solve :  $2\left(\frac{2x-1}{x+3}\right) - 3\left(\frac{x+3}{2x-1}\right) = 5, x \neq -3, \frac{1}{2}$

5. Solve :  $\frac{4}{x} - 3 = \frac{5}{2x+3}, x \neq 0, \frac{-3}{2}$

6. If the roots of the equation  $(a - b)x^2 + (b - c)x + (c - a) = 0$  are equal, prove that  $b + c = 2a$ .
7. Solve for  $x$ :

$$\frac{1}{x-2} + \frac{1}{x-4} = \frac{4}{3}, x \neq 2, 4$$

8. Solve :  $36x^2 - 12ax + (a^2 - b^2) = 0$
9. Solve:  $x^2 - 2ax + (a^2 - b^2) = 0$  by using the quadratic formula.
10. Two numbers differ by 3 and their product is 504. Find the numbers.
11. Find the roots of the quadratic equation by using the formula

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

12. Find the roots of the following quadratic equation by the factorisation method:  $3x^2 + 5\sqrt{5}x - 10 = 0$

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

14. Solve:  $\frac{x-1}{x-2} + \frac{x-3}{x-4} = 3\frac{1}{3}, (x \neq 2, 4)$

15. Solve:  $\left(\frac{4x-3}{2x+1}\right) + \left(\frac{2x+1}{4x-3}\right) = 3 (x \neq \frac{-1}{2}, \frac{3}{4})$

16. Solve:  $12abx^2 - (9a^2 - 8b^2)x - 6ab = 0$

17. Find the value of  $k$  for which the roots of the equation  $(k + 4)x^2 + (k + 1)x + 1 = 0$  are real and equal.
18. Solve:  $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$ .
19. Solve by using the quadratic formula:  
 $p^2x^2 + (p^2 - q^2)x - q^2 = 0$
20. The sum of a number and its reciprocal is  $\frac{10}{3}$ . Find the number.
21. Find the roots of the following quadratic equations using the quadratic formula:
- (a)  $-3x^2 + 5x + 12 = 0$                       (e)  $x^2 - 3\sqrt{5}x + 10 = 0$
- (b)  $\frac{1}{2}x^2 - \sqrt{11}x + 1 = 0$                       (f)  $6a^2x^2 - 7abx - 3b^2 = 0, a \neq 0$
- (c)  $abx^2 + (b^2 - ac)x - bc = 0$                       (g)  $\frac{x-1}{x-2} + \frac{x-3}{x-4} = 3\frac{1}{3}, x \neq 2, 4$
22. Find two consecutive positive integers, sum of whose square is 925.
23. The sum of two natural numbers is 20 and the sum of their reciprocals is  $\frac{5}{24}$ . Find the number.
24. The difference of squares of two numbers is 88. If the largest number is 5 less than twice the smallest number, then find the two numbers.
25. The sum of reciprocals of child's age (in years) 3 years ago and 5 years from now is  $\frac{1}{3}$ . Find his present age.
26. The difference of two numbers is 4. If the difference of their reciprocals is  $\frac{4}{21}$ , find the number.
27. 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 their present ages.
28. The area of a right angled triangle is 165 sq m. Determine its base and altitude if the later exceeds the former by 7m.
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