



## MATHS

### BOOKS - CENGAGE

# Quadratic Equations, Inequalities, Modulus and Logarithms

#### Question Bank

1. Let  $a, b, c, d$  be positive integers such that  $(\log)_a b = \frac{3}{2}$  and  $(\log)_c d = \frac{5}{4}$ . If  $(a - c) = 9$ ,

then find the value of  $(b - d)$ .



[Watch Video Solution](#)

2. Find the largest natural number  $a$  for which the maximum value of  $f(x) = a - 1 + 2x - x^2$  is smaller than the minimum value of  $g(x) = x^2 - 2ax = 10 - 2a$ .



[Watch Video Solution](#)

3. If a positive real number  $x$  satisfy the condition  $x^5 - x^3 + x = 1$  then the minimum value of  $x^6$  is equal to



[Watch Video Solution](#)

4. If the quadratic equations  $3x^2 + ax + 1 = 0$  and  $2x^2 + bx + 1 = 0$  have a common root, then the value of the expression  $5ab - 2a^2 - 3b^2$  is



[Watch Video Solution](#)

5. The value of the expression

$$x^4 - 8x^3 + 18x^2 - 8x + 2 \text{ when } x = \frac{\cot(\pi)}{12} \text{ is}$$



[Watch Video Solution](#)

6. If  $\lambda_1$  and  $\lambda_2$  be two values of  $\lambda$  for which the expression  $x^2 + (2 - \lambda)x + \lambda - \frac{3}{4}$  becomes a perfect square, then calculate the value of  $(\lambda_1^2 + \lambda_2^2)$ .



[Watch Video Solution](#)

7. If  $k$  be an integer and  $p$  is a prime such that the quadratic equation  $x^2 + kx + p = 0$  has two distinct positive integer solutions find the value of  $-(k + p)$ .



[Watch Video Solution](#)

8. If the equation  $x^3 + kx^2 + 3 = 0$  and  $x^2 + kx + 3 = 0$  have a common root, then the value  $k$ .



[Watch Video Solution](#)

9. If  $ax^2 + bx + c = 0$  and  $bx^2 + cx + a = 0$ ,  $a, b, c \neq 0$  have a common root, then value of  $\left(\frac{a^3 + b^3 + c^3}{abc}\right)^2$  is



Watch Video Solution

10. Let  $r_1, r_2$  and  $r_3$  be the solutions of the equation  $x^3 - 2x^2 + 4x + 5074 = 0$ , then the value of  $(r_1 + 2)(r_2 + 2)(r_3 + 2)$



Watch Video Solution

11. If  $f(x) = \frac{(x + 3)^{201}(x - 1)^{102}(x - 5)^{305}}{x^5(3x + 4)^{503}}$ ,

then sum of integral values of  $x$  for which  $f(x) \leq 0$ .



[Watch Video Solution](#)

12. The equation  $\alpha x^3 - 2(\alpha + 1)x^2 + 4\alpha x = 0$  has real roots and  $\alpha$  is any positive integer, then the sum of the roots of the equation is



[Watch Video Solution](#)

13. Number of integral values of  $b$  for which inequality  $(a^2 + 1)x^2 + 4(a + b)x + 2 < 0$  is true for atleast one  $x \forall a \in R$ ,



Watch Video Solution

14. Let  $f(x) = ax^2 + bx + c$ ,  $a \neq 0$ ,  $a, b, c \in I$ .  
Suppose that  $f(1) = 0$ ,  $50 < f(7) < 60$  and  $70 < f(8) < 80$ .

The least value of  $f(x)$  is



Watch Video Solution



15. If  $\alpha, \beta$  be the roots of  $x^2 + x + 2 = 0$  and  $\gamma, \delta$  be the roots of  $x^2 + 3x + 4 = 0$ , then  $(\alpha + \gamma)(\alpha + \delta)(\beta + \gamma)(\beta + \delta)$  is equal to



[Watch Video Solution](#)

16. The number of integral value(s) of  $a$  so that the graph of  $y = 16x^2 + 8(a + 5)x - 7a - 5$  is always above the  $x$ -axis is



[Watch Video Solution](#)

**17.** Number of integral values of  $a$  such that the quadratic equation  $x^2 + ax + a + 1 = 0$  has integral roots is



**Watch Video Solution**

**18.** If  $P(x) = x^2 + ax + 1$ . If  $P(x)$  is a negative integer for only one real  $x$ , then number of values of  $a$  is



**Watch Video Solution**

19.

If

$$A = \frac{(\log_2 3)^3 - (\log_2 6)^3 - (\log_2 12)^3 + (\log_2 24)^3}{6}$$

then the value of  $(2^A)$  is equal to



[Watch Video Solution](#)

20. If  $a, b$  and  $c$  be the roots of  $3x^3 + 8x + 7 = 0$ , then the value of  $(a + b)^3 + (b + c)^3 + (c + a)^3$  is equal to



[Watch Video Solution](#)

21. If  $\alpha, \beta, \gamma$  are roots of equation  $x^3 - 2x^2 - 1 = 0$  and  $T_n = \alpha^n + \beta^n + \gamma^n$ , then value of  $\frac{T_{11} - T_8}{T_{10}}$  is

 [Watch Video Solution](#)

22. The minimum value of the expression  $x^2 - kx + \alpha$  is 6 which is obtained at  $x = 3$ . Find the value of  $\frac{\alpha}{3}$ .

 [Watch Video Solution](#)

23. If  $\alpha, \beta$  are the roots of the equation  $x^2 - 3x - 15 = 0$ , and  $f(n) = \alpha^n + \beta^n$ , then  $\frac{f(8) - 3f(7) + f(6)}{2f(6)}$  is equal to



Watch Video Solution

24. If  $a, b, c, d$  in  $\mathbb{R} - \{0\}$ , such that  $a, b$  are the roots of equation  $x^2 + cx + d = 0$  and  $c, d$  are the roots of equation  $x^2 + ax + b = 0$ , then  $|a| + |b| + |c| + |d|$  is equal to



Watch Video Solution

25. If  $x + y + z = 5$  and  $xy + yz + zx = 3$ , then the greatest value of  $(x)$  is



Watch Video Solution

26. Number of values of  $x$  satisfying the pair of quadratic equations  $x^2 - px + 20 = 0$  and  $x^2 - 20x + p = 0$  for some  $p \in R$ , is



Watch Video Solution

27. If  $(y^2 - 5y)(x^2 + 2x + 4) < 2$ , for all  $x \in R$

, then number of integers in the range of  $y$  is



Watch Video Solution

28. Number of integral value(s) of '  $x$  ' satisfying the equation

$$|2x + 1| + |5 - 2x| = 6, \text{ is}$$



Watch Video Solution