

PRACTICE EXERCISE

- If $7a + 8b = 53$ and $9a + 5b = 47$, find the values of a and b .
(a) (4, 5) (b) (4, 3) (c) (3, 4) (d) (5, 4)
- If I add 7 times my age seven years from now and 3 times my age three years ago, I get 12 times my current age. How old will I be 3 years from now?
(a) 22 years (b) 23 years
(c) 24 years (d) 25 years
- A farmer has some chickens and feed for them. The feed lasts for exactly 30 days. He sold 10 of the chickens and purchased some feed such that the entire feed with him will last for 150 days. Now, he has thrice the initial feed. Find the initial number of chickens.
(a) 25 (b) 30
(c) 40 (d) Cannot be determined
- The cost of 4 chocolates, 6 biscuits and 12 lolly-pops is Rs.36. The cost of 15 biscuits, 9 lolly-pops and 3 chocolates is Rs.48. Find the cost of 1 biscuit.
(a) Rs.4 (b) Rs.3 (c) Rs.2 (d) Rs.1
- Tree I grows at $\frac{3}{7}$ of tree II. If both the trees together grow 3 ft for every 3 years, find the time required by tree II to grow 7 ft.
(a) 7 years (b) 10 years (c) 8 years (d) 12 years
- Find the quadratic equation whose roots are the reciprocals of the roots of the equation $x^2 - 7x + 12 = 0$.
(a) $x^2 - 12x + 7 = 0$ (b) $x^2 + 12x - 7 = 0$
(c) $12x^2 + 7x - 1 = 0$ (d) $12x^2 - 7x + 1 = 0$
- The equation $\sqrt{4x+9} - \sqrt{11x+1} - \sqrt{7x+4} = 0$ has
(a) no solution (b) 1 solution
(c) 2 solutions (d) more than 2 solutions
- The equation $(\cos p - 1)x^2 + (\cos p)x + \sin p = 0$ has real roots if p lies in the interval
(a) $(0, 2\pi)$ (b) $(-\pi, 0)$
(c) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ (d) $(0, \pi)$
- The set of values of p for which the roots of the equation $5x^2 + 4x + p(p-2) = 0$ are of opposite sign is
(a) $(-\infty, 0)$ (b) $(0, 2)$
(c) $(0, \infty)$ (d) None of these
- If α, β are the roots of the equation $(x-a)(x-b) = c$ with $c \neq 0$, find the roots of the equation $(x-\alpha)(x-\beta) + c = 0$.
(a) a, c (b) b, c
(c) a, b (d) $a + c, b + c$
- If p and q are the roots of $x^2 - 2x + A = 0$ and r and s are the roots of $x^2 - 18x + B = 0$ and $p < q < r < s$ are in A.P., find (A, B) .
(a) $(-3, 77)$ (b) $(77, -3)$
(c) $(-3, -77)$ (d) None of these
- The sum of a fraction and its reciprocal equals $\frac{85}{18}$. Find the fraction.
(a) $\frac{2}{6}$ (b) $\frac{2}{3}$ (c) $\frac{2}{9}$ (d) $\frac{4}{9}$
- If the sum of the roots of the equation $ax^2 + bx + c = 0$ is equal to the sum of the squares of their reciprocals, then
(a) ab^2, ca^2, bc^2 are in A.P.
(b) ab^2, bc^2, ca^2 are in A.P.
(c) ab^2, bc^2, ac^2 are in A.P.
(d) None of these
- Let $a, b, c \in \mathbb{R}$ and $a \neq 0$. If α is a root of $a^2x^2 + bx + c = 0$, β is a root of $a^2x^2 - bx - c = 0$ and $0 < \alpha < \beta$, then the equation $a^2x^2 + 2bx + 2c = 0$ has a root γ that always satisfies
(a) $\gamma - \frac{1}{2}(\alpha + \beta)$ (b) $\gamma = \alpha + \frac{\beta}{2}$
(c) $\gamma = \alpha + \beta$ (d) $\alpha < \gamma < \beta$
- If α, β are the roots of $ax^2 + bx + c = 0$, then the roots of the equation $ax^2 - bx(x-1) + c(x-1)^2 = 0$ are
(a) $\alpha - 1, \beta - 2$ (b) $\frac{\alpha}{\alpha+1}, \frac{\beta}{\beta+1}$
(c) $\frac{\alpha+1}{\alpha}, \frac{\beta+1}{\beta}$ (d) None of these
- If for the quadratic equation $x^2 - kx + 1 = 0$, one of the roots is A such that $\tan A = 2\sqrt{5} - 1$, then the other root is
(a) greater than 1 (b) greater than 2
(c) less than 1 (d) None of these

17. If p and q are the roots of the equation $x^2 + px + q = 0$, then
(a) $p = 1$ (b) $p = 1$ or 0
(c) $p = -2$ (d) $p = -2$ or 0
18. If a, b, c are positive real numbers which are in G.P., then the equation $ax^2 + 2bx + c = 0$ and $dx^2 + 2ex + f = 0$ have a common root if $\frac{a}{d}, \frac{b}{e}, \frac{c}{f}$ are in
(a) A.P. (b) G.P.
(c) H.P. (d) None of these
19. If a, b are the roots of $x^2 + px + 1 = 0$ and c, d are the roots of $x^2 + qx + 1 = 0$, the value of $(a - c)(b - c)(a + d)(b + d)$ is
(a) $p^2 - q^2$ (b) $q^2 - p^2$
(c) $q^2 + p^2$ (d) None of these
20. Find the value of 'a' for which one root of the quadratic equation $(a^2 - 5a + 3)x^2 + (3a - 1)x + 2 = 0$ is twice as large as the other.
(a) $-\frac{2}{3}$ (b) $\frac{1}{3}$ (c) $-\frac{1}{3}$ (d) $\frac{2}{3}$
25. If a, b, c are natural numbers and $\frac{x-a}{b+c} + \frac{x-b}{c+a} + \frac{x-c}{a+b} = 3$, find the value of x .
(a) abc (b) 1 (c) 0 (d) $a + b + c$
26. Solve: $\frac{x^2 - 7x + 12}{2x^2 + 4x + 5} > 0$
(a) $x < 3$ or $x > 4$ (b) $3 < x < 4$
(c) $4 < x < 24$ (d) $0 < x < 3$
27. Find the number of real values of x satisfying the equation $2\left(x^2 + \frac{1}{x^2}\right) - 9\left(x + \frac{1}{x}\right) + 14 = 0$
(a) 1 (b) 2 (c) 3 (d) 4
28. If $f(x) = 2x^3 + mx^2 - 13x + n$ and $2, 3$ are the roots of the equation $f(x) = 0$, then the values of m and n are
(a) $-5, -30$ (b) $-5, 30$
(c) $5, 30$ (d) None of these
29. There are some chocolates in a plate. Ajay took one third of them, Vijay took one third of the remaining and finally Karan took one third of the remaining. If at the end there were 8 chocolates, find the number of chocolates initially in the plate.
(a) 27 (b) 24 (c) 32 (d) 36
30. The equation $\frac{(x+2)(x-5)}{(x-3)(x+6)} = \frac{(x-2)}{(x+4)}$ has ___ root/s.
(a) No (b) One
(c) Two (d) Three

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ALGEBRA - II

21. If $5x + 9y + 17z = a$, $4x + 8y + 12z = b$ and $2x + 3y + 8z = c$ have atleast 1 solution for x, y, z and $a, b, c \neq 0$ then which of the following is true?
(a) $4a - 3b - 3c = 0$ (b) $3a - 4b - 3c = 0$
(c) $4a - 3b - 4c = 0$ (d) None of these
22. If the expression $ax^2 + bx + c$ is equal to 4 when $x = 0$, leaves a remainder 4 when divided by $x + 1$, and remainder 6 when divided by $x + 2$, the values of a, b, c are
(a) $1, 1, 4$ (b) $2, 2, 4$
(c) $3, 3, 4$ (d) $4, 4, 4$
23. If $3x + 2y + z = 17$ and $4y + 2x + 6z = 38$, then find the value of $x + y + z$.
(a) 6 (b) 7 (c) 8 (d) 9
24. If 2 quadratic equations $ax^2 + ax + 3 = 0$ and $x^2 + x + b = 0$ have a common root, $x = 1$ find out which of the following statements is correct.
(a) $a + b = -3.5$ (b) $ab = 3$
(c) $\frac{a}{b} = \frac{3}{4}$ (d) $a - b = -0.5$
31. Karen went to buy 100 items which include only pens, pencils and erasers. The cost of each pen and pencil are Rs.5 and Re.1 respectively. If the cost of 20 erasers is Re.1 and he spent Rs.100 to buy 100 items. Find the number of pencils he bought.
(a) 1 (b) 51
(c) 49 (d) Cannot be determined
32. Eight years hence I will be thrice as old as I was 4 years ago. After how many years will I be 24 years?
(a) 20 (b) 18 (c) 14 (d) 12
33. Ram takes 18 steps to go to a lake from his home. While coming back, he increased the steps length by 2 inches and took only 16 steps. What is the distance between his home and the lake?
(a) 24 feet (b) 8 feet (c) 16 feet (d) 36 feet
34. If $f(x) = x^2 + 2x - 5$ and $g(x) = 5x + 30$, find the roots of the quadratic equation $g[f(x)] = 0$.
(a) $-1, -1$ (b) $2, -1$
(c) $-1 + \sqrt{2}, -1 - \sqrt{2}$ (d) $1, 2$