Sri Raghavendra Tuition Center

Algebra

10th Standard

Maths

Date : 02-11-24

Reg.No. : | | | | | | |

Exam Time : 01:30 Hrs

Total Marks : 50

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I. Multiple Choice Question. 10 x 1 = 10

1) The solution of the system $x + y - 3z = -6, -7y + 7z = 7, 3z = 9$ is

(a) $x = 1, y = 2, z = 3$ (b) $x = -1, y = 2, z = 3$ (c) $x = -1, y = -2, z = 3$ (d) $x = 1, y = -2, z = 3$

2) If $(x - 6)$ is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ then the value of k is

(a) 3 (b) 5 (c) 6 (d) 8

3) The solution of $(2x - 1)^2 = 9$ is equal to

(a) -1 (b) 2 (c) -1, 2 (d) None of these

4) If the roots of the equation $q^2x^2 + p^2x + r^2 = 0$ are the squares of the roots of the equation $qx^2 + px + r = 0$, then q, p, r are in _____.

(a) A.P (b) G.P (c) Both A.P and G.P (d) none of these

5) If A is a 2 x 3 matrix and B is a 3 x 4 matrix, how many columns does AB have

(a) 3 (b) 4 (c) 2 (d) 5

6) If number of columns and rows are not equal in a matrix then it is said to be a

(a) diagonal matrix (b) rectangular matrix (c) square matrix (d) identity matrix

7) What should be the value of m in the pair of equations $4x + my + 9 = 0$ and $3x + 4y + 18 = 0$ to have unique solutions?

(a) $m \neq 16$ (b) $m \neq 15$ (c) $m \neq \frac{16}{3}$ (d) $m \neq \frac{15}{3}$

8) $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ is

(a) $\frac{9y}{7}$ (b) $\frac{9y^2}{(21y-21)}$ (c) $\frac{21y^2-42y+21}{3y^2}$ (d) $\frac{7(y^2-2y+1)}{y^2}$

9) $\frac{x}{x^2-25} - \frac{8}{x^2+6x+5}$ gives

(a) $\frac{x^2-7x+40}{(x-5)(x+5)}$ (b) $\frac{x^2+7x+40}{(x-5)(x+5)(x+1)}$ (c) $\frac{x^2-7x+40}{(x^2-25)(x+1)}$ (d) $\frac{x^2+10}{(x^2-25)(x+1)}$

10) The product of the sum and product of roots of equation $(a^2-b^2)x^2-(a+b)^2x+(a^3-b^3) = 0$ is _____

(a) $\frac{a^2+ab+b^2}{(a-b)}$ (b) $\frac{a-b}{a+b}$ (c) $\frac{a-b}{a+b}$ (d) $\frac{a-b}{a^2+ab+b^2}$

II. ANSWER ANY 10 QUESTION. 14 x 2 = 28

11) Find the LCM and GCD for the following and verify that f(x) x g(x) = LCM x GCD

$21x^2y$, $35\ xy^2$

12) Write down the quadratic equation in general form for which sum and product of the roots are given below.

9, 14

13) If one root of the equation $2y^2 - ay + 64 = 0$ is twice the other then find the values of a.

14) Find the LCM of the following

$x^3 - 27$, $(x - 3)^2$, $x^2 - 9$.

15) The roots of the equation $x^2 + 6x - 4 = 0$ are α, β. Find the quadratic equation whose roots are $\frac{2}{\alpha}$ and $\frac{2}{\beta}$

16) Reduce the rational expressions to its lowest form

$\frac{x^2-16}{x^2+8x+16}$

17) Reduce each of the following rational expressions to its lowest form.

$\frac{p^2-3p-40}{2p^3-24p^2+64p}$

18) Find the square root of the following expressions

$\frac{144a^8b^{12}c^{16}}{81f^{12}g^4h^{14}}$

19) Find the sum and product of the roots for each of the following quadratic equations:

$2x^2 + 5x + 7 = 0$

20) The roots of the equation $x^2 + 6x - 4 = 0$ are α, β. Find the quadratic equation whose roots are

$\alpha^2\beta$ and $\beta^2\alpha$

21) Find

$\frac{x^2-16}{x+1} \div \frac{x-4}{x+4}$

22) Find the square root of the following expressions

$256(x - a)^8 (x - b)^4 (x - c)^{16} (x - d)^{20}$

23) Reduce each of the following rational expressions to its lowest form.

$\frac{9x^2+81x}{x^3+8x^2-9x}$

24) Solve the following quadratic equations by factorization method $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

25) Simplify : $\frac{2x^2+26x+84}{2x^2+12x-14}$

III. ANSWER ALL QUESTION. 8 x 5 = 40

26) Simplify

$\frac{(2x+1)(x-2)}{x-4} - \frac{(2x^2-5x+2)}{x-4}$

27) Solve the following quadratic equations by formula method

$36y^2 - 12ay + (a^2 - b^2) = 0$

28) A ladder 17 feet long is leaning against a wall. If the ladder, vertical wall and the floor from the bottom of the wall to the ladder form a right triangle, find the height of the wall where the top of the ladder meets if the distance between bottom of the wall to bottom of the ladder is 7 feet less than the height of the wall?

29) Given that $\alpha, \beta,$ are the roots of the equation $2x^2 + 3x + 7 = 0,$ then find

$(i)\alpha^2 + \beta^2,$

$(ii)\frac{1}{\alpha} + \frac{1}{\beta},$

$(iii)\alpha^3 + \beta^3$

30) Find the GCD of each pair of the following polynomials

$12(x^4 - x^3)$, $8(x^4 - 3x^3 + 2x^2)$ whose LCM is $24x^3 (x - 1) (x - 2)$

31) One hundred and fifty students are admitted to a school. They are distributed over three sections A, B and C. If 6 students are shifted from section A to section C, the sections will have equal number of students. If 4 times of students of section C exceeds the number of students of section A by the number of students in section B, find the number of students in the three sections.

32) In a three-digit number, when the tens and the hundreds digit are interchanged the new number is 54 more than three times the original number. If 198 is added to the number, the digits are reversed. The tens digit exceeds the hundreds digit by twice as that of the tens digit exceeds the unit digit. Find the original number.

33) Find the square root of the following polynomials by division method

$121x^4 - 198x^3 - 183x^2 + 216x + 144$