

MATHEMATICS

- $4x^3 - 8x^2 + 8x + 1$  when divided by  $g(x)$  gives  $(2x-1)$  as quotient and  $(x+3)$  as remainder. Find  $g(x)$ .
- Find all the zeroes of the polynomial  $f(x) = 2x^4 - 3x^3 - 5x^2 + 9x - 3$ , it being given that two of its zeroes are  $\sqrt{3}$  and  $-\sqrt{3}$ .
- Divide  $12-17x-5x^2$  by  $3 - 5x$  and verify the division algorithm.
- It being given that 1 is one of the zeroes of the polynomial  $7x - x^3 - 6$ . Find its other zeroes.
- If the polynomial  $x^4 - 6x^3 + 16x^2 - 25x + 10$  is divided by another polynomial  $x^2 - 2x + k$ , the remainder comes out to be  $x + a$ . Find the values of  $k$  and  $a$ .
- If the zeroes of the polynomial  $x^3 - 3x^2 + x + 1$  are  $a-b$ ,  $a$  and  $a=b$ , find the values of  $a$  and  $b$ .
- If one zero of the polynomial  $(a^2 + 9)x^2 + 13x + 6a$  is reciprocal of the other, find the value of  $a$ .
- If the product of the zeroes of the polynomial  $ax^2 - 6x - 6$  is 4, find the value of  $a$ .
- If  $\alpha, \beta$  are the zeroes of the polynomial  $2x^2 - 5x + 3$  then form a polynomial whose zeroes are  $\frac{1}{\alpha}$  and  $\frac{1}{\beta}$ .
- Solve the following pair of equations for  $x$  and  $y$ , also find the value of 'm' such that  $y = mx + 2$ .  
 $x + \frac{3}{y} = 5, 2x - \frac{6}{y} = 6$ .
- Solve for  $x$  and  $y$ :  $23x + 37y = 143$  and  $37x + 23y = 157$
- Solve the following pair of linear equations graphically :  
 $2x + 3y = 12$  and  $x - y = 1$   
Find the area of the region bounded by the two lines representing the above equations and  $y$ -axis.
- If 2 is subtracted from the numerator and 1 is added to the denominator, a fraction becomes  $\frac{1}{2}$  but when 4 is added to the numerator and 3 is subtracted from the denominator, it becomes  $\frac{3}{2}$ . Find the fraction.
- A and B are two points 150 km apart on a highway. Two cars start from A and B at the same time. If they move in the same direction they meet in 15 hours. But if they move in the opposite direction, they meet in 1 hour. Find their speeds.
- The sum of a two digit number and the number obtained by reversing the order of digits is 165. When 9 is subtracted from the number the digits interchanged their places. Find the number.
- Solve for  $x$  and  $y$  by cross multiplication method:  $\frac{x}{2a} - \frac{y}{2b} = a + b, \frac{x}{a} + \frac{y}{b} = a - b$ .
- Find the value of  $a$  and  $b$  such that  $(x + 1)$  and  $(x+2)$  are the factors of the polynomials  $x^3 + ax^2 - bx + 10$
- Divide 29 into two parts so that the sum of squares of the parts is 425.
- Solve for  $x$ :  $9x^2 - 6ax + (a^2 - b^2) = 0$
- Solve for  $x$ :  $\frac{x-1}{x-2} + \frac{x-3}{x-4} = \frac{10}{3}, x \neq 2, x \neq 4$
- Solve for  $x$ :  $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}, x \neq -4, x \neq 7$
- Solve for  $x$ :  $\frac{1}{x+3} + \frac{1}{2x-1} = \frac{11}{7x+9}, x \neq -3, \frac{1}{2}, -\frac{9}{7}$
- If the equation  $(1 + m^2)x^2 + 2mcx + c^2 - a^2 = 0$  has equal roots, show that  $c^2 = a^2(1 + m^2)$
- If one root of the equation  $x^2 + 7x + k = 0$  is  $-2$ , then find the value of  $k$  and the other root.

25. For what value of 'k' the equation  $2x^2 + kx + 3 = 0$  has equal roots?
26. If (-5) is a root of the equation  $2x^2 + px - 15 = 0$  and the equation  $p(x^2 + x) + k = 0$  has equal roots, find the values of 'p' and 'k'.
27. If the roots of the equation  $(a - b)x^2 + (b - c)x + (c - a) = 0$  are equal, prove that  $2a = b + c$ .
28. If 12<sup>th</sup> term of AP is 213 and the sum of its first four terms is 24, then what is the sum of its first 10 terms.
29. Determine 'a' so that  $2a+1$ ,  $a^2+a+1$  and  $3a^2-3a+3$  are consecutive terms of an A.P.
30. Determine  $x$  so that  $\frac{3}{5}$ ,  $x$  and  $\frac{5}{3}x$  are in A.P.
31. How many 3-digit numbers are divisible by 7?
32. The sum of 3 numbers in A.P. is -6, and their product is 64. Find the numbers.
33. Sum of first  $n$  terms of an AP is  $5n^2 - 3n$ . Find the AP and also find its 16<sup>th</sup> term.
34. If  $\frac{1}{x+2}$ ,  $\frac{1}{x+3}$ ,  $\frac{1}{x+5}$  are in AP find  $x$ .
35. Find the middle term of the AP 1, 8, 15....505.
36. Find the number of terms in the sequence  $20, 19\frac{1}{3}, 18\frac{2}{3}, \dots$  of which sum is 300. Explain the double answer.
37. If the sum of first 7 terms of AP is 119 and that of first 17 terms is 714., then find the sum of first  $n$  terms.
38. Nidhi saves Rs. 2 on first day of the month, Rs. 4 on the second day, Rs. 6 on the third day, and so on. What will be her savings in the month of February, 2012?
39. The sum of the first term and the fifth term of an ascending AP is 26 and the product of the second term by the fourth term is 160. Find the sum of first 7 terms of the AP.
40. In an orchard there are 17 guava trees in the first row, 15 in the second row, 13 in the third, and so on. There are 3 guava trees in the last row. How many rows are there in the orchard?