Applied Academy

H-76 Sec 22

REAL NO AND POLYNOMAL

Class 10 - Mathematics

1. If two positive integers ‘a’ and ‘b’ are written as $a = pq^2$ and $b = p^3q^2$, where ‘p’ and ‘q’ are prime numbers, then LCM(a, b) = **[1]**

   a) pq b) p^3q^2
   c) p^2q^3 d) p^2q^2

2. If the HCF (2520, 6600) = 40 and LCM (2520, 6600) = 252 $\times$ k, then the value of k is **[1]**

   a) 1650 b) 165
   c) 1600 d) 1625

3. The HCF of two numbers is 27 and their LCM is 162. If one of the numbers is 54, what is the other number is: **[1]**

   a) 9 b) 81
   c) 45 d) 36

4. (2+ $\sqrt{5}$) is **[1]**

   a) an irrational number b) not real number
   c) a rational number d) an integer

5. $\sqrt{2}$ is **[1]**

   a) a non-terminating repeating decimal b) a rational number
   c) a terminating decimal d) an irrational number

6. Which of the following is a pair of co-primes? **[1]**

   a) (14, 35) b) (18, 25)
   c) (32, 62) d) (36, 96)

7. Prime factorisation of 882 is: **[1]**

   a) $2^2 \times 3^3 \times 7$ b) $2 \times 3^2 \times 7^2$
   c) $2^3 \times 3 \times 7^2$ d) $2^2 \times 3^2 \times 7$

8. If two positive integers p and q can be expressed as p = 18 a^2b^4 and q = 20 a^3b^2, where a and b are prime numbers, then LCM (p, q) is: **[1]**

   a) 180 a^2b^2 b) 180 a^3b^4
   c) 2 a^2b^2 d) 12 a^2b^2

9. If the HCF of 65 and 117 is expressible in the form 65m – 117, then the value of ‘m’ is **[1]**

   a) 3 b) 1

c) 2 d) 4

10. Given that H.C.F. (306, 954, 1314) = 18, find L.C.M. (306, 954, 1314). **[1]**

a) 1183234 b) 1123328

c) 1183914 d) 1123238

11. Two equilateral triangles have the sides of lengths 34 cm and 85 cm respectively. Find the greatest length of tape that can measure the sides of both of them exactly. **[1]**

12. Classify $\sqrt[3]{3}$ as rational or irrational. **[1]**

13. Find the greatest possible length which can be used to measure exactly the lengths 7 m, 3 m 85 cm and 12 m 95 cm. **[1]**

14. The LCM of two numbers is 9 times their HCF. The sum of LCM and HCF is 500. Find the HCF of the two numbers. **[1]**

15. Show that 23.123456789 is rational. What can you say about the prime factors of their denominators? **[1]**

16. Explain why 7 × 11 × 13 + 13 is a composite number. **[2]**

17. Three bells ring at intervals of 6, 12 and 18 minutes. If all the three bells rang at 6 a.m., when will they ring together again? **[2]**

18. Prove that $\sqrt{2}$ is an irrational number. **[2]**

19. Prove that $\frac{3}{2\sqrt{5}}$ is irrational. **[2]**

20. Find the HCF and LCM of 6, 72 and 120 using fundamental theorem of arithmetic. **[2]**

21. Show that $3\sqrt{2}$ is an irrational number. **[3]**

22. In a seminar, the number of participants in Hindi, English and Mathematics are 60, 84 and 108, respectively. Find the minimum number of rooms required if in each room the same number of participants are to be seated and all of them being in the same subject. **[3]**

23. Prove that $(3+\sqrt{2})$ is irrational. **[3]**

24. Show that $5-\sqrt{3}$ is irrational. **[3]**

25. Find the largest number that will divide 398, 436 and 542 leaving remainders 7,11 and 15 respectively. **[3]**

26. Prove that 7 - $2\sqrt{3}$ is an irrational number. **[5]**

27. Prove that for any prime positive integer $\sqrt{p}+\sqrt{q}$ is an irrational number. **[5]**

28. **Assertion (A):** For any two positive integers a and b, HCF (a, b) $\times$ LCM (a, b) = a $\times$ b **[1]**
Reason (R): The HCF of the two numbers is 8 and their product is 280. Then their LCM is 40.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

29. **Assertion (A):** The HCF of two numbers is 5 and their product is 150, then their LCM is 30. **[1]**
Reason (R): For any two positive integers a and b, HCF (a, b) + LCM (a, b) = a $\times$ b.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

30. If -2 and 3 are the zeros of the quadratic polynomial $x^2 + (a + 1)x + b$ then **[1]**

a) a = 2, b = 6 b) a = 2, b = -6

c) a = -2, b = -6 d) a = -2, b = 6

31. The number of polynomials having zeros 1 and -2 is **[1]**

a) more than 3 b) 1

c) 3 d) 2

32. If α, β are the zeroes of the polynomial $6x^2$ - 5x - 4, then $\frac{1}{\alpha} + \frac{1}{\beta}$ is equal to: **[1]**

a) $\frac{5}{4}$ b) $-\frac{5}{4}$

c) $\frac{4}{5}$ d) $\frac{5}{24}$

33. If the sum and the product of zeroes of a quadratic polynomial are $2\sqrt{3}$ and 3 respectively, then a quadratic polynomial is: **[1]**

a) $(x-\sqrt{3})^2$ b) $x^2+2\sqrt{3}x+3$

c) $x^2+2\sqrt{3}x-3$ d) $x^2-2\sqrt{3}x-3$

34. If f(x) = ax^2 +bx + c has no real zeros and a + b + c < 0, then **[1]**

a) c > 0 b) c < 0

c) C ≥ 0 d) c = 0

35. If the two zeroes of a quadratic polynomial are $\pm\sqrt{5}$, then the quadratic polynomial is: **[1]**

a) $4\left(x^2-5\right)$ b) $(x+\sqrt{5})^2$

c) $x^2-\sqrt{5}$ d) x^2 + 5

36. If α and β are zeros of x^2 + 5x + 8, then the value of $(\alpha+\beta)$ is **[1]**

a) -8 b) 8

c) 5 d) -5

37. If the sum of the zeroes of the quadratic polynomial kx^2 + 2x + 3k is equal to their product, then k equals. **[1]**

a) $\frac{1}{3}$ b) $\frac{2}{3}$

c) $-\frac{2}{3}$ d) $-\frac{1}{3}$

38. If sum of all zeros of the polynomial $5x^2$ - (3 + k)x + 7 is zero, then zeroes of the polynomial $2x^2$ - 2(k+ 11)x + 30 are **[1]**

a) 2, 5 b) 3, 5

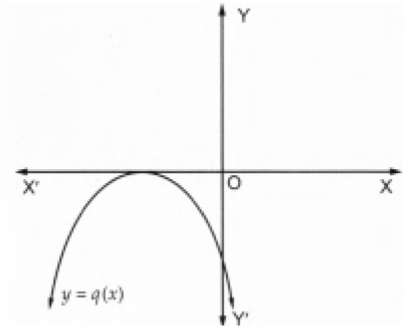
c) 7, 9 d) 3, 6

39. If p, q are the zeroes of the polynomial f(x) = x^2 + k(x - 1) - c, then (p - 1)(q - 1) is equal to ________. **[1]**

a) c b) c - 1

c) 1 - c d) 1 + c

40. Identify that graph given below corresponds to a linear polynomial or a quadratic polynomial? **[1]**



41. Find the zeros of the polynomial $x^2 - 3x - m(m + 3)$ **[1]**

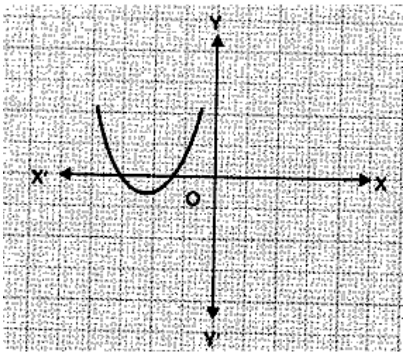
42. Find a quadratic polynomial whose zeroes are -9 and 6. **[1]**

43. Form a quadratic polynomial, one of whose zero, is $2 + \sqrt{5}$ and the sum of zeroes is 4. **[1]**

44. If α and β are zeroes of the polynomial $p(x) = 3x^2 - 8x - 3$, then find the value of $(\alpha + \beta)^2 - 2\alpha\beta$. **[1]**

45. Find the value of **k** such that the polynomial $p(x) = 3x^2 + 2kx + x - k - 5$ has the sum of zeroes equal to half of their product. **[1]**

46. For a polynomial p(x), the graph of y = p(x) is given below. Find the number of zeroes of p(x). **[1]**



47. Write the polynomial, the product and sum of whose zeroes are $-\frac{9}{2}$ and $-\frac{3}{2}$ respectively. **[1]**

48. Find the zeroes of the quadratic polynomial $p(x) = 25x^2 + 5x$ and verify the relationship between the zeroes and their coefficients. **[2]**

49. If α and β are the zeroes of the polynomial $f(x) = x^2 - 4x - 5$, then find the value of $\alpha^2 + \beta^2$ **[2]**

50. Find the quadratic polynomial, the sum of whose zeros is $\left(\frac{5}{2}\right)$ and their product is 1. Hence, find the zeros of the polynomial. **[2]**

51. If α and β are the zeros of the polynomial $f(x) = x^2 - 5x + k$ such that $\alpha - \beta = 1$, find the value of k. **[2]**

52. α, β are zeroes of the quadratic polynomial $x^2 - (k + 6)x + 2(2k - 1)$. Find the value of k if $\alpha + \beta = \frac{1}{2}\alpha\beta$. **[2]**

53. Find the zeroes of the polynomial $p(x) = 3x^2 + 5x - 28$ and verify the relationship between its coefficients and zeroes. **[2]**

54. m, n are zeroes of $ax^2 - 5x + c$. Find the values of a and c if m + n = mn = 10. **[2]**

55. If α and β are the zeroes of the polynomial $f(x) = x^2 - 6x + k$, find the value of k such that $\alpha^2 + \beta^2 = 40$ **[2]**

56. Find the zeroes of the quadratic polynomial $9t^2 - 6t + 1$ and verify the relationship between the zeroes and the coefficients. **[2]**

57. If the graph of quadratic polynomial $ax^2 + bx + c$ cuts negative direction of y-axis, then what is the sign of c? **[2]**

58. If α, β are zeroes of the quadratic polynomial $x^2 + 3x + 2$, find a quadratic polynomial whose zeroes are $\alpha + 1$, $\beta + 1$. **[3]**

59. If one zero of the polynomial $2x^2 + 3x + \lambda$ is $\frac{1}{2}$, find the value of λ and other zero. **[3]**

60. If α, β are the zeros of the polynomial $2x^2 - 4x + 5$. find the value of (i) $\alpha^2 + \beta^2$ (ii) $(\alpha - \beta)^2$. **[3]**

61. If α, β are zeroes of the quadratic polynomial $x^2 + 9x + 20$, form a quadratic polynomial whose zeroes are $(\alpha + 1)$ and $(\beta + 1)$. **[3]**

62. Write the family of quadratic polynomials having $-\frac{1}{4}$ and 1 as its zeros. **[3]**

63. Find a quadratic polynomial whose sum and product of the zeroes are $\frac{-3}{2\sqrt{5}}, -\frac{1}{2}$ respectively. Also find the zeroes of the polynomial by factorisation. **[3]**

64. Find the zeroes of the polynomial $v^2 + 4\sqrt{3}v - 15$ by factorisation method and verify the relationship between the zeroes and coefficient of the polynomials. **[3]**

65. Find a quadratic polynomial whose sum and product of the zeroes are $-2\sqrt{3}, -9$ respectively. Also find the zeroes of the polynomial by factorisation. **[3]**

66. Find the zeroes of the quadratic polynomial $6x^2 - 3 - 7x$ and verify the relationship between the zeroes and the coefficients of the polynomial. **[3]**

67. Find the quadratic polynomial, sum and product of whose zeroes are -1 and -20 respectively. Also find the zeroes of the polynomial so obtained. **[3]**

68. If α and β are the zeros of the quadratic polynomial $f(x) = ax^2 + bx + c$, then evaluate: **[5]**
$a\left(\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}\right) + b\left(\frac{\alpha}{\beta} + \frac{\beta}{\alpha}\right)$

69. Find the zeros of $f(s) = 2s^2 - (1 + 2\sqrt{2})s + \sqrt{2}$ and verify the relationship between the zeros and its coefficients. **[5]**

70. If α and β are the zeroes of the polynomial $x^2 + 4x + 3$, find the polynomial whose zeroes are $1 + \frac{\beta}{\alpha}$ and $1 + \frac{\alpha}{\beta}$. . **[5]**

71. **Assertion (A):** $x^2 + 7x + 12$ has no real zeros **[1]**
Reason (R): A quadratic polynomial can have at the most two zeroes.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

72. **Assertion (A):** Zeroes of polynomial $5x^2 – 2x + 1$ are reciprocal of each other. **[1]**
Reason (R): Condition for zeroes to be reciprocal of any polynomial of form $ax^2 + bx + c$ is $a = c$

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

73. **Assertion (A):** Polynomial $x^2 + 4x$ has two real zeroes. **[1]**
Reason (R): Zeroes of the polynomial $x^2 + ax$ $(a \neq 0)$ are 0 and a.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

74. **Assertion (A):** $P(x) = 4x^3 - x^2 + 5x^4 + 3x - 2$ is a polynomial of degree 3. **[1]**
Reason (R): The highest power of x in the polynomial P(x) is the degree of the polynomial.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

75. **Assertion:** Degree of a zero polynomial is not defined. **[1]**

Reason: Degree of a non-zero constant polynomial is 0

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.