Applied Academy

H-76 Sec 22

MATHS CH 1&2

Class 10 - Mathematics

1. If $9^{x+2} = 240 + 9^x$, then the value of x is **[1]**

   a) 0.5 b) 0.1

   c) 0.3 d) 0.2

2. A charitable trust donates 28 different books of Maths, 16 different books of Science and 12 different books of Social Science to poor students. Each student is given maximum number of books of only one subject of their interest and each student got equal number of books. **[1]**

   i. Find the number of books each student got.

   ii. Find the total number of students who got books.

   a) (i) - (3), (ii) - (15) b) (i) - (4), (ii) - (10)

   c) (i) - (3), (ii) - (10) d) (i) - (4), (ii) - (14)

3. If p and q are co-prime numbers, then p^2 and q^2 are **[1]**

   a) even b) coprime

   c) not coprime d) odd

4. If $n = 2^3 \times 3^4 \times 5^4 \times 7$, then the number of consecutive zeros in n, where n is a natural number, is **[1]**

   a) 2 b) 3

   c) 7 d) 4

5. Which of the following is an irrational number? **[1]**

   i. $\frac{22}{7}$

   ii. 3.1416

   iii. $3.\overline{1416}$

   iv. 3.141141114...

   a) Option (iv) b) Option (iii)

   c) Option (i) d) Option (ii)

6. HCF of 144 and 198 is: **[1]**

   a) 18 b) 12

   c) 9 d) 6

7. If a = $(2^2 \times 3^3 \times 5^4)$ and b = $(2^3 \times 3^2 \times 5)$ then HCF (a, b) = ? **[1]**

   a) 360 b) 90

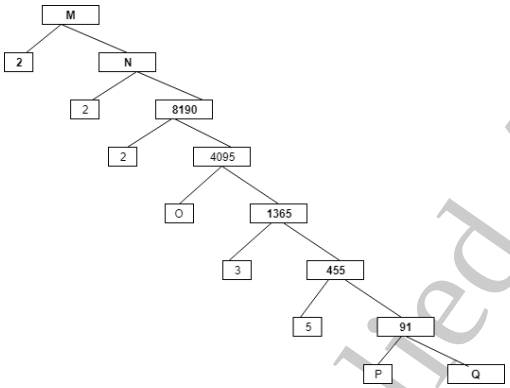
c) 180 d) 540

8. The sum of two irrational numbers is always **[1]**

a) a rational number b) an irrational number

c) an integer d) a rational number or an irrational number

9. Given that HCF (306, 657) = 9, find LCM (306, 657). **[1]**
10. Express 3825 as product of its prime factors. **[1]**
11. Express 3825 as a product of its prime factors. **[1]**
12. Express 288 as the product of its prime factors. **[1]**
13. If the product of two numbers is 1050 and their HCF is 25, find their LCM. **[1]**
14. Find the prime factor of 8 by applying the prime factorization method. **[1]**
15. Express the given number as the product of its prime factors: 5005. **[1]**
16. The HCF of 45 and 105 is 15. Write their LCM. **[1]**
17. Two alarm clocks ring their alarms at regular intervals of 20 minutes and 25 minutes respectively. If they first beep together at 12 noon, at what time will they beep again together next time? **[2]**
18. What is the least number which should be added to 2497 so that the sum is exactly divisible by 5, 6, 4 and 3? **[2]**
19. Complete the factor-tree and find the composite number M. **[2]**



20. Define HCF of two positive integers and find the HCF of the pair of numbers: 100 and 190. **[2]**
21. Prove that 11 + $3\sqrt{2}$ is an irrational number, given that $\sqrt{2}$ is an irrational number. **[2]**
22. Prove that $\frac{2-\sqrt{3}}{5}$ is an irrational number, given that $\sqrt{3}$ is an irrational number. **[2]**
23. Find the LCM and HCF of 92 and 510, using prime factorisation. **[2]**
24. Prove that $6+\sqrt{2}$ is irrational. **[2]**
25. A mason has to fit a bathroom with square marble tiles of the largest possible size. The size of the bathroom is 10 ft. by 8 ft. What would be the size (in inches) of the tile required that has to be cut and how many such tiles are required? **[3]**
26. Define HCF of any two positive integers and find the HCF of the pair of numbers: 32 and 54 **[3]**
27. If the HCF of 657 and 963 is expressible in the form of 657x + 963 × (-15), find the value of x. **[3]**
28. Find the LCM and HCF of 404 and 96 and verify that LCM × HCF = product of the two numbers **[3]**
29. Define HCF of two positive integers and find the HCF of the pair of numbers: 155 and 1385. **[3]**
30. Prove that $4-5\sqrt{2}$ is an irrational number. **[3]**
31. Prove $\frac{1}{2+\sqrt{3}}$ is an irrational number. **[3]**
32. Shekar wants to plant 45 corn plants, 81 tomato plants, and 63 ginger plants. If he plants them in such a way that each row has the same number of plants and each row has only one type of plant, what is the greatest number of plants he can plant in a row? **[3]**

[5]

33. On dividing the polynomial $4x^4 - 5x^3 - 39x^2 - 46x - 2$ by the polynomial g(x), the quotient is $x^2 - 3x - 5$ and the remainder is - 5x + 8. Find the polynomial g(x).

34. In a seminar the number of participants in Mathematics, Physics and Biology are 336, 240 and 96. Find the minimum number of rooms required if in each room same number of participants is to be seated and all of them being in the same subject. **[5]**

35. State Fundamental theorem of Arithmetic. Find LCM of numbers 2520 and 10530 by prime factorization method. **[5]**

36. Show that $(4 + 3\sqrt{2})$ is irrational. **[5]**

37. Explain why the numbers $8 \times 7 \times 6 \times 5 \times 4 + 5 \times 4$ and $11 \times 13 \times 15 + 11$ are composite numbers? **[5]**

38. **Assertion (A):** H.C.F. of 12 and 77 is 1. **[1]**

Reason (R): L.C.M. of two coprime numbers is equal to their product.

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.

39. **Assertion (A):** If L.C.M. {p, q} = 30 and H.C.F. {p, q} = 5, then $p \cdot q$ = 150 **[1]**

Reason (R): L.C.M. of (a, b) $\times$ H.C.F. of (a, b) = $a \cdot b$

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.

40. If one zero of the quadratic polynomial $x^2 - 5x + k$ is -4 , then the value of k is **[1]**

a) -36

b) -18

c) 36

d) 18

41. The zeroes of the quadratic polynomial $2x^2 - 3x - 9$ are: **[1]**

a) $-3, \frac{-3}{2}$

b) $3, \frac{3}{2}$

c) $3, \frac{-3}{2}$

d) $-3, \frac{3}{2}$

42. If α and β are the zeros of the polynomial $f(x) = x^2 + px + q$, then a polynomial having $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ is its zero is **[1]**

a) $qx^2 + px + 1$

b) $x^2 + qx + p$

c) $x^2 - px + q$

d) $px^2 + qx + 1$

43. The sum and product of the zeroes of the polynomial $x^2 - 6x + 8$ are respectively **[1]**

a) $\frac{-3}{2}$ and 1

b) $\frac{-3}{2}$ and – 1

c) $\frac{3}{2}$ and 1

d) 6 and 8

44. The zeroes of the quadratic polynomial $x^2 + kx + k$, $k \neq 0$, **[1]**

a) cannot be both negative

b) cannot be both positive

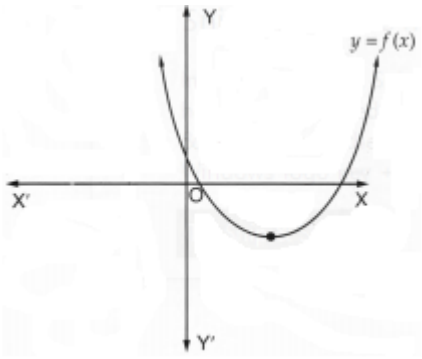
c) are always equal

d) are always unequal

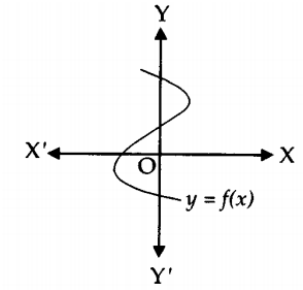
45. If α, β are zeroes of $x^2 + 5x + 5$, find the value of $\alpha^{-1} + \beta^{-1}$. **[1]**

46. If α, β are zeroes of the polynomial $8x^2 + 14x + 3$, then find the value of $\left(\frac{1}{\alpha} + \frac{1}{\beta}\right)$. **[1]**

47. Identify that the graph corresponds to a linear polynomial or a quadratic polynomial. **[1]**



48. In the adjoining figure, the graph of f(x) is drawn. Find the number of zeroes of f(x). **[1]**



49. Define a polynomial with real coefficients. **[1]**

50. Show that the polynomial f(x) = $x^4 + 4x^2 + 6$ has no real zero. **[2]**

51. A teacher after teaching the chapter polynomial in class 10th wrote the sum and product of zeros respectively on the blackboard to test the skill grasped by his students. Find out the Polynomials that the teacher have in his mind. **[2]**

i. 0 and $\sqrt{2}$

ii. $2+\sqrt{3}$ and $2-\sqrt{3}$

iii. $2\sqrt{5}$ and $-\sqrt{5}$

iv. $\frac{3}{2}$ and $-\frac{1}{2}$

52. Find the zeroes of the polynomial $4x^2 + 4x - 3$ and verify the relationship between zeroes and coefficients of the polynomial. **[2]**

53. If α and β are the zeros of the quadratic polynomial $f(t) = t^2 - 4t + 3$, find the value of $\alpha^4\beta^3 + \alpha^3\beta^4$. **[2]**

54. Find the zeroes of the polynomial $3x^2 + 4x - 4$ by factorisation method and verify the relation between the zero and the coefficient of the polynomial. **[2]**

55. If α, β are zeroes of the quadratic polynomial $x^2 - 5x + 6$, form another quadratic polynomial whose zeroes are $\frac{1}{\alpha}, \frac{1}{\beta}$. **[2]**

56. Find the zeroes of quadratic polynomial $3x^2 - x - 4$ and verify the relationship between the zeroes and their coefficients. **[2]**

57. If α and β are the zeros of the quadratic polynomial $f(x) = x^2 - p(x + 1) - c$, show that $(\alpha+1)(\beta+1) = 1 - c$. **[2]**

58. Find the zeroes of the quadratic polynomial $x^2 + 5x + 6$ and verify the relationship between the zeroes and the coefficients. **[2]**

59. Find the quadratic polynomial, sum of whose zeroes is 2 and product is - 8. Hence, find the zeroes of the polynomial. **[2]**

60. Find the zeroes of the quadratic polynomial $7y^2 - \frac{11}{3}y - \frac{2}{3}$ and verify the relationship between the zeroes and the coefficients. **[3]**

61. If α and β are the zeros of the quadratic polynomial f(x) = x^2 - 2x + 3, find a polynomial whose roots are $\alpha + 2, \beta + 2$ **[3]**

62. Find the zeroes of the polynomial $7y^2 - \frac{11}{3}y - \frac{2}{3}$ by factorisation method and verify the relationship between the zeroes and coefficient of the polynomial. **[3]**

63. If α and β are the zeroes of the quadratic polynomial f(x) = ax^2 +bx + c, then evaluate: $\frac{1}{\alpha} - \frac{1}{\beta}$ **[3]**

64. 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. **[3]**

65. One zero of the polynomial x^2- 2x - (7p + 3) is -1, find the value of p and the other zero. **[3]**

66. If α, β are the zeroes of the x^2 + 7x + 7, find the value of $\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$. **[3]**

67. Find the zeroes of quadratic polynomial x^2 - 2x - 8 and verify the relationship between the zeroes and their coefficients. **[3]**

68. Find a quadratic polynomial, the sum and product of whose zeroes are $\sqrt{2}$ and $\frac{1}{3}$, respectively. **[3]**

69. Find the zeroes of the quadratic polynomial $4y^2$ – 15 and verify the relationship between the zeroes and coefficient of polynomial. **[3]**

70. Find the zeroes of a quadratic polynomial $2x^2$ + 3x - 14 and verify the relationship between the zeroes and its coefficients. **[5]**

71. Without actually calculating the zeroes, form a quadratic polynomial whose zeroes are reciprocals of the zeroes of the polynomial $5x^2$ + 2x - 3. **[5]**

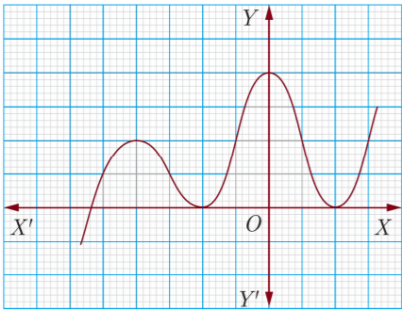
72. If β and $\frac{1}{\beta}$ are zeroes of the polynomial $(\alpha^2 + \alpha)x^2 + 61x + 6\alpha$. Find the values of β and α. **[5]**

73. Obtain the other zeroes of the polynomial p(x) = x^4 + $2x^3$ - $7x^2$ - 8x + 12 if two of its zeroes are (-2) and (-3). **[5]**

74. **Assertion (A):** Graph of a quadratic polynomial is always U shaped upward or downward. **[1]**
Reason (R): Curve of any quadratic polynomial is always symmetric about the fixed-line.

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 (A):** The graph y = f(x) is shown in figure, for the polynomial f(x). The number of zeros of f(x) is 3. **[1]**
Reason (R): The number of zero of the polynomial f(x) is the number of point of which f(x) cuts or touches the axes.



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