WORKSHEET FOR CLASS – 10 , Session 2023-24

1. Find the greatest number of 5 digits, that will give us remainder of 5, when divided by 8 and 9 respectively.

   (a) 99921 (b) 99931

   (c) 99941 (d) 99951

2. If the HCF of 55 and 99 is expressible in the form 55m – 99, then the value of m is _____.

3. If two positive integers a and b are written as $a = x^3y^2$ and $b = xy^3$, where x, y are prime numbers, then HCF(a, b) is

   (a) xy (b) xy^2

   (c) x^3y^3 (d) x^2y^2

4. The ratio between the LCM and HCF of 5, 15, 20 is:

(a) 9 : 1 (b) 4 : 3

   (c) 11 : 1 (d) 12 : 1

5. Two alarm clocks ring their alarms at regular intervals of 50 seconds and 48 seconds. If they first beep together at 12 noon, at what time will they beep again for the first time ?

   (a) 12.20 pm (b) 12.12 pm

   (c) 12.11 pm (d) none of these

6. If A = 2n + 13, B = n + 7, where n is a natural number then HCF of A and B is:

   (a) 2 (b) 1

   (c) 3 (d) 4

7. Two natural numbers whose difference is 66 and the least common multiple is 360, are:

   (a) 120 and 54 (b) 90 and 24

   (c) 180 and 114 (d) 130 and 64

8. The HCF and LCM of two numbers are 33 and 264 respectively. When the first number is completely divided by 2 the quotient is 33. The other number is:

   a) 66 (b) 130

   (c) 132 (d) 196

9. 4 Bells toll together at 9.00 am. They toll after 7, 8, 11 and 12 seconds respectively. How many times will they toll together again in the next 3 hours ?

(a) 3

   (b) 4

   (c) 5

   (d) 6

10. The least number that is divisible by all the numbers from 1 to 10 (both exclusive) is

    (a) 10 (b) 100

    (c) 504 (d) 2520

11. What will be the least possible number of the planks, if three pieces of timber 42 m, 49 m and 63 m long have to be divided into planks of the same length ?

    (a) 5 (b) 6

    (c) 7 (d) none of these

12. What is the greatest possible speed at which a man can walk 52 km and 91 km in an exact number of minutes ?

    (a) 17 m/min (b) 7 m/min

    (c) 13 m/min (d) 26 m/min

13. The decimal expansion of $\frac{17}{8}$ will terminate after how many places of decimals?

(a) 1 (b) 2

(c) 3 (d) will not terminate

14. Decompose 32760 into prime factors.

15. The HCF of two numbers is 145 and their LCM is 2175. If one number is 725, then find the other number.

16. Two positive numbers M and N are both divisible by 3, 5, 15, 25 and 75. What is the HCF of M and N.

17. If p(x) is a polynomial of at least degree one and p(k) = 0, then k is known as

(a) value of p(x)

(b) zero of p(x)

(c) constant term of p(x)

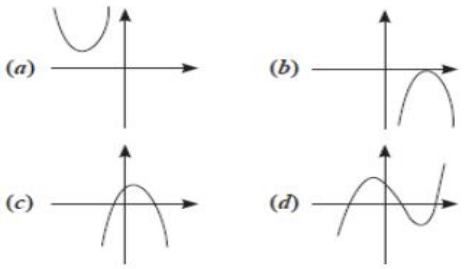
(d) none of these

18. If one of the zeroes of the quadratic polynomial $(k - 1)x^2 + kx + 1$ is –3, then the value of k is

(a) $\frac{4}{3}$ (b) $\frac{-4}{3}$

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

19. Which of the following is not the graph of a quadratic polynomial?



20. Zeroes of a polynomial can be determined graphically. No. of zeroes of a polynomial is equal to no. of points where the graph of polynomial

(a) intersects y-axis

(b) intersects x-axis

(c) intersects y-axis or intersects x-axis

(d) none of these

21. If graph of a polynomial does not intersects the x-axis but intersects y-axis in one point, then no. of zeroes of the polynomial is equal to

(a) 0

(b) 1

(c) 0 or 1

(d) none of these

22. A polynomial of degree n has

(a) only 1 zero

(b) at least n zeroes

(c) atmost n zeroes

(d) more than n zeroes

23. If $p(x) = ax^2 + bx + c$ and $a + b + c = 0$, then one zero is

(a) $\frac{-b}{a}$ (b) $\frac{c}{a}$

(c) $\frac{b}{c}$ (d) none of these

24. If $p(x) = ax^2 + bx + c$ and $a + c = b$, then one of the zeroes is

(a) $\frac{b}{a}$ (b) $\frac{c}{a}$

(c) $\frac{-c}{a}$ (d) $\frac{-b}{a}$

25. If one of the zeroes of a quadratic polynomial of the form $x^2 + ax + b$ is the negative of the other, then it

(a) has no linear term and the constant term is negative.

(b) has no linear term and the constant term is positive.

(c) can have a linear term but the constant term is negative.

(d) can have a linear term but the constant term is positive.

26. Which one of the following statements is correct

(a) if $x^6 + 1$ is divided by $x + 1$, then the remainder is -2.

(b) if $x^6 + 1$ is divided by $x - 1$, then the remainder is 2.

(c) if $x^6 + 1$ is divided by $x + 1$, then the remainder is 1.

(d) if $x^6 + 1$ is divided by $x - 1$, then the remainder is -1.

27. The number of zeroes that polynomial $f(x) = (x - 2)^2 + 4$ can have is:

(a) 1 (b) 2

(c) 0 (d) 3

28. The quadratic polynomial whose sum of zeroes is 3 and product of zeroes is -2 is:

(a) $x^2 + 3x - 2$

(b) $x^2 - 2x + 3$

(c) $x^2 - 3x + 2$

(d) $x^2 - 3x - 2$

29. If $(x + 1)$ is a factor of $2x^3 + ax^2 + 2bx + 1$, then find the values of a and b given that $2a - 3b = 4$

(a) $a = -1, b = -2$ (b) $a = 2, b = 5$

(c) $a = 5, b = 2$ (d) $a = 2, b = 0$

30. If 1 is a zero of polynomial $p(x) = ax^2 - 3(a - 1) - 1$, then find the value of a.

31. Find the product of the zeroes of $-2x^2 + kx + 6$.

32. Write the polynomial, the product and sum of whose zeroes are $-\frac{9}{2}$ and $-\frac{3}{2}$ respectively.

33. If α, β are the zeroes of a polynomial, such that $\alpha + \beta = 10$ and $\alpha\beta = 6$, then write the polynomial.

34. If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - px + q$, then find the value of $\alpha^2 + \beta^2$.

35. If α and β are the zeroes of the quadratic polynomial $f(x) = ax^2 + bx + c$, find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$.

36. If 1 is a zero of polynomial

$p(x) = ax^2 - 3(a - 1) - 1$, then find the value of a.

37. The father's age is six times of his son's age. Four years hence, the age of the father will be four times of his son's age. The present ages, in years, of the son and the father are, respectively.

(a) 4 and 24 (b) 5 and 30

(c) 6 and 36 (d) 3 and 24

38. Find the value of a so that the following system of equation has infinite solutions:

$4x - y - 5 = 0, 8x - 2y + a = 0$

39. For which values of p, does the pair of equations given below has unique solution? $4x + py + 8 = 0$ and $2x + 2y + 2 = 0$

40. Determine k for which the system of equations has infinite solutions:

$4x + y = 3$ and $8x + 2y = 5k$

41. Determine the value of k for which the following system of equations has no solution: $kx + 2y - 1 = 0, 5x - 3y + 2 = 0$

42. For what value of a the following pair of linear equation has infinitely many solution?

$ax - 3y = 1$

$-12x + ay = 2$

43. For what value of a the following pair of linear equation has infinitely many solutions?

$2x + ay = 8$

$ax + 8y = a$

44. The measures of two angles of a triangle are in the ratio 5: 3. The measure of the third angle is half the difference of the measure of the above two angles. Find the measure of each angle.

45. Find the value of k for which the pair of linear equations $kx + 3y = k - 2$ and $12x + ky = k$ has no solution.

46. If 1 is added to each of numerator and denominator of a fraction, it becomes 2/3. However, if 1 is subtracted from each of numerator and denominator it becomes 3/5. Find the fraction.

47. Solve for x and y:

$7(y + 3) - 2(x + 2) = 14, 4(y - 2) + 3(x - 3) = 2$

48. Solve for x and y:

$149x - 330y = -511, -330x + 149y = -32$

49. The sum of the numerator and denominator of a fraction is 12. If 1 is added to both the numerator and the denominator the fraction becomes $\frac{3}{4}$. Find the fraction.

50. The sum of the digits of a two digit number is 15. The number is decreased by 27 if the digits are reversed. Find the number.

51. Determine graphically the vertices of a triangle, the equations of whose sides are given below:

$2y - x = 8, 5y - x = 14, -2x + y = 1$

52. In a parallelogram, one angle is 4/5th of the adjacent angle. Determine the angles of the parallelogram.

53. If twice the son's age in years is added to the father's age, the sum is 70. But if twice the father's age is added to the son's age, the sum is 95. Find the ages of father and son.

54. A fraction reduces by 4/5 when 2 is subtracted from the numerator and 3 is added to the denominator. But it reduces to 12/17 if 6 is added to the numerator and the denominator is

multiplied by 2. Find the fraction.

55. Solve for x and y

(a) $\frac{57}{x+y}+\frac{6}{x-y}=5;\ \frac{38}{x+y}+\frac{21}{x-y}=9$

(b) Solve for x and y

$\frac{24}{2x+y}-\frac{13}{3x+2y}=2,\ \frac{26}{3x+2y}+\frac{8}{2x+y}=3$

56. Sum of two positive numbers is 100 and difference between their squares is 1000. Find the numbers.

57. Solve for x and y:

$\frac{x+2y+1}{2x-y+1}=2,\ \frac{3x-y+1}{x-y+3}=5$

58. $(x^2 + 1)^2 - x^2 = 0$ has

(a) four real roots

(b) two real roots

(c) no real roots

(d) one real root

59. If the difference of the roots of the equation $x^2 - bx + c = 0$ be 1, then

(a) $b^2 - 4c + 1 = 0$

(b) $b^2 + 4c = 0$

(c) $b^2 - 4c - 1 = 0$

(d) $b^2 - 4c = 0$

60. If $\alpha + \beta = 4$ and $\alpha^3 + \beta^3 = 44$, then α, β are the roots of the equation

(a) $2x^2 - 7x - 7 = 0$

(b) $3x^2 + 8x + 12 = 0$

(c) $3x^2 - 12x + 5 = 0$

(d) none of these

61. If the roots of equation $3x^2 + 2x + (p + 2)(p - 1) = 0$ are of opposite sign then which of the following cannot be the value of p?

62. If the equation $x^2 - (2 + m)x + (-m^2 - 4m - 4) = 0$ has coincident roots, then

(a) $m = 0, m = 1$

(b) $m = 2, m = 2$

(c) $m = -2, m = -2$

(d) $m = 6, m = 1$

63. Write the nature of roots of quadratic equation $4x^2 + 4\sqrt{3}x + 3 = 0$,

64. Write the nature of roots of the quadratic equation $9x^2 - 6x - 2 = 0$.

65. The roots of $ax^2 + bx + c = 0$, $a \neq 0$ are real and unequal. What is value of D?

66. If arithmetic mean of two numbers a and b is 8 and ab = 9, find a quadratic equation whose roots are a and b.

67. For what value of k are the roots of the quadratic equation $kx^2 + 4x + 1 = 0$ equals and reals.

68. If quadratic equation $kx^2 + 2x + k = 0$ has two equal roots, then find the value of k.

69. The side of a square exceeds the side of another square by 4 cm and the sum of the areas of the two squares is 400 sq. cm. Find the dimensions of the squares.

70. The denominator of a fraction exceeds its numerator by 3. If one is added to both numerator and denominator, the difference between the new and the original fractions is 1/24. Find the original fraction.

71. The numerator of a fraction is 3 less than its denominator. If 1 is added to the denominator, the fraction is decreased by $\frac{1}{15}$. Find the fraction.

72. One fourth of a group of people claim they are creative, twice the square root of the group claims to be caring and the remaining 15 claims they are optimistic

(i) Find the total number of people in the group.

(ii) How many persons in the group are creative?

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74. Given that $\sqrt{2}$ is irrational, prove that $(5 + 3\sqrt{2})$ is an irrational number.

75. Find a quadratic polynomial whose zeroes are -9 and $-\frac{1}{9}$.

76. Find a quadratic polynomial whose zeroes are $3 + \sqrt{5}$ and $3 - \sqrt{5}$.

77. Find a quadratic polynomial whose one zero is –5 and product of zeroes is 0.

78. α and $\frac{1}{\alpha}$ are zeroes of polynomial $4x^2 - 2x + (k - 4)$. Find the value of k.

79. Solve the following pair of linear equations using elimination method.

$2x + 5y = 7$

$6x + 15y = 17$

80. Solve the following pair of linear equations using elimination method.

$3x + 5y = 15$

$12x + 20y = 60$

81. For what value of k will the equations $x + 2y + 7 = 0$, $2x + ky + 14 = 0$ represent coincident lines?

82. For what value of k, the following system of equations $kx + 2y = 3$, $3x + 6y = 10$ has a unique solution.

83. Solve: $99x + 101y = 499$

$101x + 99y = 501$

84. An army contingent of 1000 members is to march behind an army band of 56 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?

85. Prove that $\sqrt{3}$ is an irrational number.

86. 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 book of only one subject of their interest and each student got equal number of books.

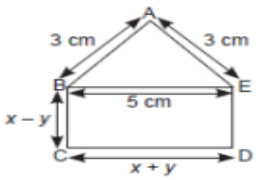
(a) Find the number of books each student got.

(b) Find the total number of students who got books.

87. Mani was asked to find $\frac{6}{7}$ of a number but instead he multiplied it by $\frac{7}{6}$. As a result he got an answer which was more than the correct answer by 299. What was the number?

88. Venu Gopal has twice as many sisters as he has brothers. If Shobha, Venu's sister has the same number of brothers as she has sisters, then find the number of brothers of Shobha.

89. In the figure below, ABCDE is a pentagon with BE || CD and BC || DE. BC is perpendicular to CD. If the perimeter of ABCDE is 21 cm, find the value of x and y.



90. If $2x + y = 23$ and $4x - y = 19$, find the values of $5y - 2x$ and $\frac{y}{x} - 2$

91. A plane left 30 minutes late than its scheduled time and in order to reach the destination 1500 km away in time, it had to increase its speed by 100 km/h from the usual speed. Find its usual speed.

92. Find the value of p for which the quadratic equation $(p + 1)x^2 - 6(p + 1)x + 3(p + 9) = 0$, $p \neq -1$ has equal roots. Hence, find the roots of the equation.

93. If the equation $(1 + m^2)x^2 + 2mcx + c^2 - a^2 = 0$ has equal roots, then show that $c^2 = a^2(1 + m^2)$.

94. If α, β are roots of the equation $2x^2 - 6x + a = 0$ and $2\alpha + 5\beta = 12$, find the value of a.

95. Show that if the roots of the following quadratic equation are equal, then ad = bc

$x^2(a^2 + b^2) + 2(ac + bd)x + (c^2 + d^2) = 0$

96. Show that $5 + 3\sqrt{2}$ is an irrational number.

97. Prove that $\frac{2\sqrt{3}}{5}$ is irrational.

98. Solve the following system of linear equations graphically:

$4x - 5y - 20 = 0$

$3x + 5y - 15 = 0$

99. A Gold crown suspected of containing some silver was found to have a mass of 800 grams and a volume of 50 cubic centimeters. The density of gold is 20 gm/cm^3. The density of silver is 10 gm/cm^3. What percent of the crown is silver?

100. Two trains each 80 m long passes each other on parallel lines. If they are going in same direction, the faster train takes one minute to pass the other completely. If they are going in opposite directions, they over take each other in three seconds. Find the speed of each train in km/hr.

101. Renu travels 400 km partly by train and partly by bus. She takes 9 hours if she travels 120 km by train and the remaining by bus. If she travels 160 km by bus and remaining by train, she takes 1 hour shorter. The speed of the bus is 10 k km/hr. Find k.

102. Two candles of equal height but different thickness are lighted. The first burns off in 6 hours and the second in 8 hours. How long, after lighting both, will the first candle be half the height of the second ?

103. A train travels at a certain average speed for a distance of 63 km and then travels at a distance of 72 km at an average speed of 6 km/hr more than its original speed. If it takes 3 hours to complete total journey, what is the original average speed?

104. Two taps running together can fill a tank in $3\frac{1}{13}$ hours. If one tap takes 3 hours more than the other to fill the tank, then how much time will each tap take to fill the tank?

105. Solve the following for x:

$$\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$$

106.find the characteristic of logarithms of the following numbers(1to2)

1. 43.84
2. 538.6
3. 7124000
4. 9.876
5. 0.01205
6. 0.00064
7. 0.00000345
8. 0.000000002708

107. Find them mantissa of logarithms of the following numbers using log tables (3to4):

1. 36.7
2. 5984
3. 62
4. 0.0135
5. 0.00000008
6. 0.7824
7. 83.2
8. 9.876

108. Evaluate the following using log tables (5to6):

(i) log6 *(ii)* log30 (iii) log76 (iv) log8.39

(v) log563.7 (vi) log0.0007 (vii) log 0.00002591 (viii) log0.00000007324

109. Using antilogtables, find x (7to8):

(i) logx=1.3649 (ii) logx=2.5179 (iii) logx=4.8291 (iv) logx=$\bar{2}$.4567

(v) logx=4.6501 (vi) logx = -2.1304

110. Evaluate the following using log tables (i) $\frac{(5.364)^3 \times (49.76)^{1/2}}{(83.45)^{1/3}}$ (ii) $(57.8)^{1/2} \times (0.0027)^{1/3}$

(iii) $\sqrt{\frac{438.2 \times 98.56}{(51.3)^3}}$