Sainik School Amethi

SUMMER HOLIDAY HOMEWORK

(2024-25)

CLASS: 9TH

SUBJECT: MATHEMATICS

Instructions –

1. **All the questions are compulsory. Writing the question before the answer of the question and INDEX page is also necessary.**

2. **Solve the given worksheet and activities in a separate notebook.**

3. **Detailed solution of all the questions is required. Given activities is to be done as per instruction given in the question.**

MULTIPLE CHOICE QUESTIONS:

1. The three rational numbers between 3 and 4 are:

   a. 5/2, 6/2, 7/2
   b. 13/4, 14/4, 15/4
   c. 12/7, 13/7, 14/7
   d.11/4, 12/4, 13/4

2. In between any two numbers, there are:

   a. Only one rational number
   b. Two rational numbers
   c. Infinite rational numbers
   d. No rational number

3. Every rational number is:

   a. Whole number
   b. Natural number
   c. Integer
   d. Real number

4. √9 is_____ number.

   a. A rational
   b. An irrational
   c. Neither rational nor irrational
   d. None of the above

5. Which of the following is an irrational number?

a. $\sqrt{16}$ b. $\sqrt{(12/3)}$ c. $\sqrt{12}$ d. $\sqrt{100}$

6. $3\sqrt{6} + 4\sqrt{6}$ is equal to:

   a. $6\sqrt{6}$ b. $7\sqrt{6}$ c. $4\sqrt{12}$ d. $7\sqrt{12}$

7. $\sqrt{6} \times \sqrt{27}$ is equal to:

   a. $9\sqrt{2}$ b. $3\sqrt{3}$ c. $2\sqrt{2}$ d. $9\sqrt{3}$

8. Which of the following is equal to x^3?

   a. $x^6 - x^3$ b. $x^6.x^3$ c. x^6/x^3 d. $(x^6)^3$

9. Which of the following is an irrational number?

   a. $\sqrt{23}$ b. $\sqrt{225}$ c. 0.3796 d. 7.478478

10. The number obtained on rationalising the denominator of $1/ (\sqrt{7} - 2)$ is

    a. $(\sqrt{7}+2)/3$ b. $(\sqrt{7}-2)/3$ c. $(\sqrt{7}+2)/5$ d. $(\sqrt{7}+2)/45$

11. The irrational number between 2 and 2.5 is

    a. $\sqrt{11}$ b. $\sqrt{5}$ c. $\sqrt{22.5}$ d. $\sqrt{12.5}$

12. The value of $\sqrt{10}$ times $\sqrt{15}$ is equal to

    a. $5\sqrt{6}$b. $\sqrt{25}$c. $10\sqrt{5}$d. $\sqrt{5}$

13. The decimal representation of the rational number is

    a. Always terminating

    b. Either terminating or repeating

    c. Either terminating or non-repeating

    d. Neither terminating nor repeating

14. Which of the following is a rational number?

    a. 0 b. $2\sqrt{3}$ c. $2+\sqrt{3}$ d. π

15. Which of the following is an irrational number?

a. $\sqrt{(4/9)}$ b. $\sqrt{12}/\sqrt{3}$ c. $\sqrt{7}$ d. $\sqrt{81}$

16. x^2-2x+1 is a polynomial in:

a. One Variable b. Two Variables
c. Three variable d. None of the above

17. The coefficient of x^2 in $3x^3+2x^2-x+1$ is:

a. 1 b. 2 c. 3 d. -1

18. A binomial of degree 20 in the following is:

a. $20x + 1$ b. $x/20 + 1$ c. $x^{20} +1$ d. x^2+20

19. The degree of $4x^3-12x^2+3x+9$ is:

a. 0 b. 1 c. 2 d. 3

20. $x^2 – x$ is _____ polynomial.

a. Linear b. Quadratic c. Cubic d. None of the above

21. $x – x^3$ is a _____ polynomial.

a. Linear b. Quadratic c. Cubic d. None of the above

22. $1+3x$ is a _____ polynomial.

a. Linear b. Quadratic c. Cubic d. None of the above

23. The value of $f(x) = 5x-4x^2+3$ when $x = -1$, is:

a. 3 b. -12 c. -6 d. 6

24. The value of $p(t) = 2+t+2t^2-t^3$ when $t=0$ is:

a. 2 b. 1 c. 4 d. 0

25. The zero of the polynomial $f(x) = 2x+7$ is:

a. 2/7 b. -2/7 c. 7/2 d. -7/2

26. What is the degree of the polynomial $\sqrt{3}$?

a. 0 b. 1 c. ½ d. 2

27. The degree of the constant polynomial is:

a. 0 b. 1 c. 2 d. 3

28. One of the linear factors of $3x^2+8x+5$ is:

a. (x+1) b. (x-2) c. (x+2) d. (x-4)

29. The coefficient of x in $7x^2+6x-2$ is:

a. 2 b. 6 c. -2 d. 7

30. Which of the following is an example of the quadratic polynomial?

a. 7x+3 b. $2x^2+x-1$ c. $x+3x^3-9$ d. None of the above

31. If $x^2+kx+6 = (x+2)(x+3)$ for all k, find the value of k.

a. -1 b. 1 c. 3 d. 5

32. What is the zero of the polynomial $p(x)=c\,x+ d$?

a. -c b. -d c. -d/c d. d/c

33. The zero of the polynomial $p(x) = -5x+5$ is:

a. 0 b. -5 c. -1 d. 1

34. Which of the following is a constant polynomial?

a. 4x+1 b. 3 c. $2x^2$ d. 6x+3

35. The name of the horizontal line in the cartesian plane which determines the position of a point is called:

a. Origin b. X-axis c. Y-axis d. Quadrants

36. The name of the vertical line in the cartesian plane which determines the position of a point is called:

a. Origin b. X-axis c. Y-axis d. Quadrants

37. The section formed by horizontal and vertical lines determining the position of the point in a cartesian plane is called:

a. Origin b. X-axis c. Y-axis d. Quadrants

38. The point of intersection of horizontal and vertical lines determining the position of a point in a cartesian plane is called:

a. Origin b. X-axis c. Y-axis d. Quadrants

39. If the coordinates of a point are (0, -4), then it lies in:

a. X-axis b. Y-axis c. At origin d. Between x-axis and y-axis

40. If the coordinates of a point are (3, 0), then it lies in:

a. X-axis b. Y-axis c. At origin d. Between x-axis and y-axis

41. If the coordinates of a point are (-3, 4), then it lies in:

a. First quadrant b. Second quadrant c. Third quadrant
d. Fourth quadrant

42. If the coordinates of a point are (-3, -4), then it lies in:

a. First quadrant b. Second quadrant c. Third quadrant

d. Fourth quadrant

43. Points (1, 2), (-2, -3), (2, -3);

a. First quadrant b. Do not lie in the same quadrant

c. Third quadrant d. Fourth quadrant

44. If x coordinate of a point is zero, then the point lies on:

a. First quadrant b. Second quadrant

c. X-axis d. Y-axis

45. Signs of the abscissa and ordinate of a point in the second quadrant are respectively

a. +, + b. +, – c. -, + d. -, –

46. The point (-10, 0) lies in

a. Third quadrant b. Fourth quadrant

c. On the negative direction of the x-axis

d. On the negative direction of the y-axis

47. A quadrant in which both x and y values are negative is

a. First quadrant b. Second quadrant

c. Third quadrant d. Fourth quadrant

48. Abscissa of all the points on the x-axis is

a. 0 b. 1 c. 2 d. Any number

49. Ordinate of all points on the x-axis is

a. -1 b. 0 c. 1 d. Any number

50. Abscissa of a point is positive in:

a. I quadrant b. I and II quadrants

c. II quadrant only d. I and IV quadrants

51. Points (1, -1), (2, -2), (4, -5), (-3, -4)

a. lie in II quadrant b. lie in III quadrant

c. lie in IV quadrant d. Does not lie in the same quadrant

52. Abscissa of all the points on the y-axis is

a. 0 b. 1 c. -1 d. Any number

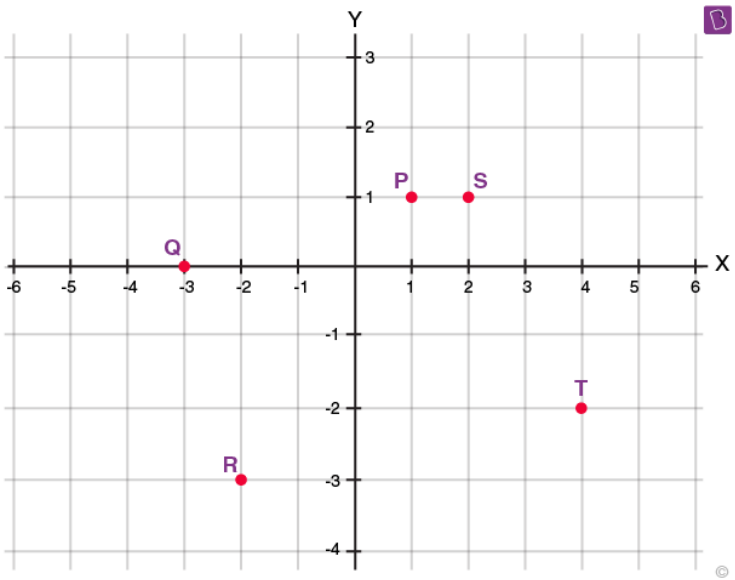
53. Ordinate of all the points on the y-axis is

a. 0 b. 1 c. -1 d. Any number

54. The point which lies on the y-axis at a distance of 5 units in the negative direction of the y-axis is

a. (5, 0) b. (0, 5) c. (-5, 0) d. (0, -5)

55. Write the coordinates of each of the points P, Q, R, S, T and O from the figure given.



56. The linear equation 3x-11y=10 has:

a. Unique solution b. Two solutions

c. Infinitely many solutions d. No solutions

57. 3x+10 = 0 will have:

a. Unique solution b. Two solutions

c. Infinitely many solutions d. No solutions

58. The solution of equation $x-2y = 4$ is:

a. (0,2) b. (2,0) c. (4,0) d. (1,1)

59. Find the value of k, if $x = 1$, $y = 2$ is a solution of the equation $2x + 3y = k$.

a. 5 b. 6 c. 7 d. 8

60. Point (3, 4) lies on the graph of the equation $3y = kx + 7$. The value of k is:

a. 4/3 b. 5/3 c. 3 d. 7/3

61. The graph of linear equation $x+2y = 2$, cuts the y-axis at:

a. (2,0) b. (0,2) c. (0,1) d. (1,1)

62. Any point on line $x = y$ is of the form:

a. (k, -k) b. (0, k) c. (k, 0) d. (k, k)

63. The graph of $x = 3$ is a line:

a. Parallel to the x-axis at a distance of 3 units from the origin

b. Parallel to the y-axis at a distance of 3 units from the origin

c. Makes an intercept 3 on the x-axis

d. Makes an intercept 3 on the y-axis

64. In equation, $y = m x +c$, m is:

a. Intercept b. Slope

c. Solution of the equation d. None of the above

65. If x and y are both positive solutions of equation $a x+ b y+ c=0$, always lie in the:

a. First quadrant b. Second quadrant

c. Third quadrant d. Fourth quadrant

66. A linear equation in two variables is of the form $ax + by + c = 0$, where

(a) $a = 0, c = 0$

(b) $a \neq 0, b = 0$

(c) $a = 0, b \neq 0$

(d) $a \neq 0, b \neq 0$

67. Any point on the x-axis is of the form

(a) (x, y) (b) (0, y) (c) (x, 0) (d) (x, x)

68. Any point on the y-axis is of the form

(a) (y, y) (b) (0, y) (c) (x, y) (d) (x, 0)

69. The linear equation $2x – 5y = 7$ has

(a) No solution (b) unique solution

(c) Two solutions (d) Infinitely many solutions

70. The linear equation $3x – y = x – 1$ has

(a) No solution (b) unique solution

(c) Two solutions (d) Infinitely many solutions

71. The graph of the linear equation $2x + 3y = 6$ cuts the y-axis at the point

(a) (2, 0) (b) (0, 2) (c) (3, 0) (d) (0, 3)

72. The equation $2x + 5y = 7$ has a unique solution, if x, y are:

(a) Rational numbers (b) Real numbers

(c) Natural numbers (d) Positive real numbers

73. The point of the form (a, a) always lies on:

(a) On the line x + y = 0 (b) On the line y = x

(c) x-axis (d) y-axis

74. If we multiply or divide both sides of a linear equation with the same non-zero number, then the solution of the linear equation:

(a) Remains the same (b) Changes

(c) Changes in case of multiplication only
(d) Changes in case of division only

75. If (2, 0) is a solution of the linear equation 2x + 3y = k, then the value of k is:

(a) 2 (b) 4 (c) 5 (d) 6

SHORT QUESTIONS:

76. Plot the following points and check whether they are collinear or not:

(i) (1, 3), (– 1, – 1), (– 2, – 3)

(ii) (1, 1), (2, – 3), (– 1, – 2)

(iii) (0, 0), (2, 2), (5, 5)

77. Points A (5, 3), B (–2, 3) and D (5, –4) are three vertices of a square ABCD. Plot these points on a graph paper and hence find the coordinates of the vertex C.

78. Write the coordinates of the vertices of a rectangle whose length and breadth are 5 and 3 units respectively, one vertex is at the origin, the longer side lies on the x-axis, and one of the vertices lies in the third quadrant.

79. Plot the following points and write the name of the figure obtained by joining them in order:

80. P (– 3, 2), Q (– 7, – 3), R (6, – 3), S (2, 2)

81. Add $2\sqrt{2} + 5\sqrt{3}$ and $\sqrt{2} - 3\sqrt{3}$.

82. Multiply $6\sqrt{2}$ by $2\sqrt{2}$.

83. Rationalize the denominator of $\sqrt{2}/(\sqrt{3}-\sqrt{5})$.

84. Simplify:

(i) $2^{1/3}.2^{2/3}$

(ii) $(3^{1/5})^4$

(iii) $7^{1/3}/7^{1/5}$

(iv) $13^{1/7}.17^{1/7}$

85. Find six rational numbers between 3 and 4.

86. Show how $\sqrt{5}$ can be represented on the number line.

87. You know that 1/7 = 0.142857. Can you predict what the decimal expansions of 2/7, 3/7, 4/7, 5/7, 6/7 are, without actually doing the long division? If so, how?

88. Express the following linear equations in the form ax + by + c = 0 and indicate the values of a, b and c in each case:

(i) $x - y/5 - 10 = 0$

(ii) $-2x+3y = 6$

(iii) $y - 2 = 0$

89. Write four solutions for each of the following equations:

(i) $2x + y = 7$

(il) $2x + 3y = 17$

90. Find the value of k, if x = 2, y = 1 is a solution of the equation 2x + 3y = k.

91. Draw the graph of each of the following linear equations in two variables:

(i) $y = 3x$ (ii) $3 = 2x + y$

92. If the point (3, 4) lies on the graph of the equation $3y = ax + 7$, find the value of a.

93. Show that the points A (1, 2), B (– 1, – 16) and C (0, – 7) lie on the graph of the linear equation $y = 9x – 7$.

94. Draw the graph of the linear equation $3x + 4y = 6$. At what points, the graph cuts X and Y-axis?

95. Compute the value of $9x^2 + 4y^2$ if $xy = 6$ and $3x + 2y = 12$.

96. Find the value of the polynomial $5x – 4x^2 + 3$ at $x = 2$ and $x = –1$.

97. Find the value of $x^3 + y^3 + z^3 – 3xyz$ if $x^2 + y^2 + z^2 = 83$ and $x + y + z = 15$

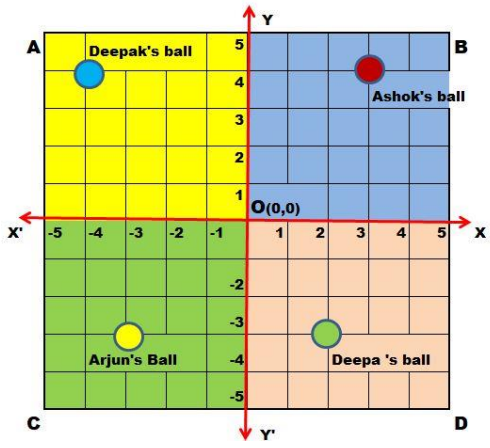
98. If $a + b + c = 15$ and $a^2 + b^2 + c^2 = 83$, find the value of $a^3 + b^3 + c^3 – 3abc$.

99. Find the values of a and b so that $(2x^3 + ax^2 + x + b)$ has $(x + 2)$ and $(2x – 1)$ as factors.

100. Factorize $x^2 – 1 – 2a – a^2$.

Case Based Questions:

101. Read the Source/Text given below and answer any four questions:



There is a square park ABCD in the middle of Saket colony in Delhi. Four children Deepak, Ashok, Arjun and Deepa went to play with their balls. The colour of the ball of Ashok, Deepak, Arjun and Deepa are red, blue, yellow and green respectively.

All four children roll their ball from centre point O in the direction of **XOY, X'OY, X'OY' and XOY'**. Their balls stopped as shown in the above image.

Answer the following questions:

I. What are the coordinates of the ball of Ashok?
(4, 3) (3, 4) (4, 4) (3, 3)

II. What are the coordinates of the ball of Deepa?
(2, -3) (3, 2) (2, 3) (2, 2)

III. What the line XOX' is called?
y-axis ordinate x-axis origin

IV. What the point O (0,0) is called?
y-axis ordinate x-axis origin

V. What is the ordinate of the ball of Arjun?
-3 3 4 2

102. Anil went to buy some vegetables, he bought 'x' kgs. of tomato and 'y' kgs. of potato. The total cost of vegetables comes out to be of Rs. 200. Now if the cost of 1 kg of tomato is Rs. 50 and 1 kg of potato is Rs. 20, then answer the following questions.

(i) Which of the following equations represent the total cost.

(a) $5x - 2y = 20$

(b) $5y + 2x = 20$

(c) $5x + 2y = 20$

(d) $2x + 5y = 20$

(ii) If Anil bought 'x' kgs of tomato and 2.5 kgs. of potato, then find the value of 'x'.
(a) 5
(b) 2
(c) 3
(d) 4

(iii) If Anil bought '2' kgs of tomato and 'y' kgs of potato, then find the value of 'y'.
(a) 5
(b) 2
(c) 3
(d) 4

(iv) The graph of $5x + 2y = 20$ cuts x-axis at the point.
(a) (10, 0)
(b) (4, 0)
(c) (0, 0)
(d) it is parallel to x-axis

(v) The graph of $5x + 2y = 20$ cuts y-axis at the point.
(a) (0, 10)
(b) (0, 4)
(c) (0, 0)
(d) it is parallel to y-axis

103. On one day, principal of a particular school visited the classroom. Class teacher was teaching the concept of polynomial to students. He was very much impressed by her way of teaching. To check, whether the students also understand the concept taught by her or not, he asked various questions to students. Some of them are given below. Answer them.

(i) Which one of the following is not a polynomial?
(a) $4x^2 + 2x - 1$ (b) $y + (3/y)$
(c) $x^3 - 1$ (d) $y^2 + 5y + 1$

(ii) The polynomial of the type $ax^2 + bx + c$, $a = 0$ is called
(a) Linear polynomial (b) Quadratic polynomial
(c) Cubic polynomial (d) Biquadratic polynomial

(iii) The value of k, if $(x - 1)$ is a factor of $4x^3 + 3x^2 - 4x + k$, is:
(a) 1 (b) –2 (c) –3 (d) 3

(iv) If $x + 2$ is the factor of $x^3 - 2ax^2 + 16$, then value of a is:
(a) –7 (b) 1 (c) –1 (d) 7

(v) The number of zeroes of the polynomial $x^2 + 4x + 2$ is:
(a) 1 (b) 2 (c) 3 (d) 4

Activity:

104. To construct a square-root spiral.

Materials required: Coloured threads, adhesive, drawing pins, nails, geometry box, sketch pens, marker, a piece of chart paper

105. To verify the algebraic identity:

$(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

Materials required: Colored threads, adhesive, drawing pins, nails, geometry box, sketch pens, a piece of chart paper

106. Practice and write all the examples given in chapter 1,2,3 and 4 of NCERT and M. L. Aggarwal book in your notebook.

107. Learn and write the formulae and facts given as what we discussed on last page of chapter 1,2,3 and 4 of NCERT book in your notebook.

108. Write the biographies of Euclid and Rene Descartes and explain their contribution in the field of mathematics.

109. Determine the point on the graph of the linear equation $2x + 5y = 19$ whose ordinate is 1½ times its abscissa.

110. Draw the graph of the equation represented by a straight line which is parallel to the x-axis and at 3 units below.

111. Draw the graph of the linear equation whose solutions are represented by the points having the sum of the coordinates as 10 units.

112. For what value of m is $x^3 - 2mx^2 + 16$ divisible by $x + 2$?

113. If $x + 2a$ is a factor of $x^5 - 4a^2x^3 + 2x + 2a + 3$, find a.

114. Without actual division, prove that $2x^4 - 5x^3 + 2x^2 - x + 2$ is divisible by $x^2 - 3x + 2$.

115. If $\surd 2 = 1.414$, $\surd 3 = 1.732$, then find the value of:

$$\frac{4}{3\sqrt{3}-2\sqrt{2}}+\frac{3}{3\sqrt{3}+2\sqrt{2}}$$

Qns 116 to 120 are assertion based qns. Out of four any one option is correct:

a.) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion

b.) Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.

c.) assertion is true but the reason is false.

d.) both assertion and reason are false.

116. Assertion: The constant polynomial 0 is called zero polynomial.

Reason: $\surd x+3$ is a polynomial.

117. Assertion: degree of non-zero constant polynomial is zero

Reason: polynomial having two terms are called binomial.

118. Assertion: An equation of the form a x + by + c = 0, where a, b and c are real numbers, such that a and b are not both zero, is called a linear equation in two variables.

Reason: A linear equation in two variables has infinitely many solutions.

119. Assertion: the graph of y = a is a straight line parallel to the y-axis.

Reason: The graph of x= a is a straight line parallel to the x-axis.

120. Assertion: The perpendicular distance of a point from y-axis is called its x-coordinate.

Reason: The x co-ordinate of the point on y-axis is zero.