SAINIK SCHOOL, AMARAVATHINAGAR

IX

HOLIDAY HOMEWORK: 2019 – 2020

Class: IX **Subject:** MATHEMATICS

S. NO	TOPIC	ACTIVITY / PROJECT	TIME PERIOD	SKILL ENHANCED / LEARNING OUT COMES	ANNEXURE NO
1	Number Systems	Problem solving	10 hrs	Knowledge, understanding	A
2	Polynomials	Problem solving	8 hrs	Knowledge, understanding	B
3	Coordinate Geometry & Linear Equations	Problem solving	12 hrs	Knowledge, understanding	C
4	Algebra / Geometry	Chart making	8 hrs	Understanding, creative expression, presentation	D
5	Project	crossword puzzle	5 hrs	Understanding, creative expression, presentation	E

Annexure:

A. Number Systems - Problem solving - 18 Qns

B. Polynomials - Problem solving - 15 Qns

C. Coordinate Geometry & Linear Equations - Problem solving - 17 Qns

D. Chart making

E. Project

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Recommended By **Approved By**

Vice Principal **Principal**

ANNEXURE – A

1. NUMBER SYSTEMS

1) Insert 6 rational numbers between ½and ¾.

2) Show that $\frac{x^{-1}+y^{-1}}{x^{-1}}+\frac{x^{-1}-y^{-1}}{y^{-1}}=\frac{x^2+y^2}{xy}$

3) Simplify: $\frac{16\times 2^{n+1}-4\times 2^n}{16\times 2^{n+2}-2\times 2^{n+2}}$.

4) If $a=\frac{2-\sqrt{5}}{2+\sqrt{5}}$ and $b=\frac{2+\sqrt{5}}{2-\sqrt{5}}$, then find a^2-b^2.

5) Simplify: (i)$\left(\frac{1}{3^3}\right)^7$ (ii)$13^{\frac{1}{5}}\cdot 17^{\frac{1}{5}}$

6) If $\frac{3+\sqrt{2}}{3-\sqrt{2}}=a+b\sqrt{2}$, find the values of *a*and*b*.

7) If $x^{\frac{a}{b}}$=1, then find the value of'*a*'.

8) Represent $\sqrt{3.5}$ on the number line.

9) Express the following in the form $\frac{p}{q}$: a) $0.\overline{6}$ b) $0.4\overline{7}$ c) $0.2\overline{35}$

10) Write in the form of decimal and what kind of decimal: a) $\frac{36}{100}$ b) $\frac{1}{11}$

11) If $x = 7+\sqrt{40}$, find the value of $\sqrt{x}+\frac{1}{\sqrt{x}}$

12) Insert four irrational numbers between $3\sqrt{2}$ and $2\sqrt{3}$.

13) Arrange the following in ascending order: $\sqrt{3}$, $\sqrt[3]{5}$, $\sqrt[4]{8}$

14) Evaluate using suitable identity: (i) 108^3 (ii) 103 x 107

15) Simplify: $(i)7^{\frac{1}{2}}.8^{\frac{1}{2}}$ $(ii)2^{\frac{2}{3}}\cdot 2^{\frac{1}{5}}$ (iii)$\left(\frac{1}{3^3}\right)^7$ (iv) $13^{\frac{1}{5}}\cdot 17^{\frac{1}{5}}$

16) Rationalize the denominators of the following: a) $\frac{1}{\sqrt{7}-\sqrt{6}}$ b)$\frac{1}{\sqrt{7}-2}$

17) If a and b are two rational numbers such that, $\frac{(3+2\sqrt{3})}{(3-2\sqrt{3})}=a+b\sqrt{3}$,
find the values of *a* and *b*

18) If *a* and *b* are rational numbers and $\frac{\sqrt{2}+2\sqrt{3}}{2\sqrt{2}+\sqrt{3}}=a+b\sqrt{6}$, find the values of *a* and *b*.

2. POLYNOMIALS

ANNEXURE – B

1) Find *p*(0), *p*(1) and *p*(2) for the polynomial *p*(t) = 2 + t + $2t^2$ – t^3

2) Factories: (i) $12x^2-7x+1$ (ii) $2x^3-3x^2-17x+30$

3) Without actual division, prove that ($2x^4-6x^3+3x-2$) is exactly divisible by (x^2+3x+2)

4) Find the value of *k* is the polynomial $2x^4+3x^3+2kx^2+3x+6$ exactly divisible by ($x+2$)?

5) If $x^2+\frac{1}{x^2}$ = 7, find the value of $x^3+\frac{1}{x^3}$.

6) If$\left(x+\frac{1}{x}\right)$ = 9 ,then findthevalueof$\left(x^3+\frac{1}{x^3}\right)$.

7) Show that 2 and $-\frac{1}{3}$ are the zeroes of the polynomial $3x^3 - 2x^2 - 7x - 2$.
Also find the third zero of the polynomial.

8) Simplify: $(a + b + c)^2 - (a - b - c)^2$

9) Factorise the polynomial: $8x^3 - (2x - y)^3$

10) If $(a + b + c) = 14$, and $(a^2 + b^2 + c^2) = 74$, find the value of $(ab + bc + ca)$.

11) Using factor theorem, factorize the polynomial $x^3 - 6x + 11x - 6$.

12) If $x^2 - 1$ is a factor of $ax^4+bx^3+cx^2+dx+e$, then show that $a + b + e = c + d = 0$.

13) What is the coefficient of x in the expansion of $(x+3)^3$?

14) Ifa, b, c are all non-zero and $a + b + c = 0$, *prove that* $\frac{a^2}{bc}+\frac{b^2}{ca}+\frac{c^2}{ab}=3$

15) Using factor theorem, factorize the polynomial $x^3 - 6x + 11x - 6$.

ANNEXURE – C

3. COORDINATE GEOMETRY & LINEAR EQUATIONS

1) Three vertices of a rectangle are (3,2), (-4,2) and (-4,5).
Plot these points and find the coordinates of the fourth vertex.

2) Draw the graph of two lines whose equations are $x + y - 6 = 0$ and $x - y - 2 = 0$, on the same graph paper. Find the area of triangle formed by the two lines and y axis.

3) Find three solutions of $5x - y + 6 = 0$ after reducing it to $y = mx + c$ form.

4) Draw the graph of the equation $2x + 3y - 6 = 0$.
(i) Using graph paper determine whether $x = 3$ and $y = 0$ is a solution.
(ii) Find the value of y, if $x = -3$ and
(iii) Find the value of x, if $y = -2$ from the graph and verify

5) Find the solution of the linear equation $2x + 5y = 10$ which represents a point on
(i) x-axis (ii) y-axis

6) 4 years before, age of a mother was 3 times the age of her daughter.
Write a linear equation to represent this situation and draw its graph.

7) For what value of p, the linear equation $2x + py = 8$ has equal values of x and y for its solution?

8) Frame a linear equation in the form $ax + by + c = 0$ by using the given values of a, b and c.
(i) $a = -2$, $b = 3$, $c = 4$ (ii) $a = 5$, $b = 0$, $c = -1$

9) In which quadrant or on axis do each of the points (-2, 4), (3, -1), (-1, 0), (1, 2) and (-3, -5) lie?Verify your answer by locating them on the Cartesian plane.

10) Plot the points A(1, 2), B(-4, 2), C(-4, -1), D(1, -1). What kind of quadrilateral is ABCD?
Also find the area of the quadrilateral ABCD.

11) Plot the following points and check whether they are collinear or not:

(i) (1, 3), (-1, -1), and (-2, -3)

(ii) (1,2), (2, -1), and (-1, 4)

12) Find the points where the graph of the equation $3x + 4y = 12$ cuts the x-axis and the y-axis.

13) How many solution (s) of equation $2x + 1 = x - 3$ are there :

(a) on number line? (b) in Cartesian plane?

14) After 5 years, the age of father will be two times the age of son.

Write a linear equation in twovariables to represent this statement.

15) Express y in terms of x from the equation $3x + 2y = 8$ and check whether the point (4, –2) lies onthe line.

16) Express $3x = 5y$ in the form of $ax + by + c = 0$ and hence indicate the values of a, b and c.

17) If the point (–1, –5) lies on the graph of $3x = ay + 7$, then find the value of a.

CHART MAKING (ANY ONE OF THE FOLLOWING)

ANNEXURE – D

1) Identities of Algebraic Expressions.
2) Laws of exponents.
3) Classification of triangles according to sides and angles.
4) Types of quadrilaterals with figures.
5) Classification of angles with figures and definitions.
6) Indian Mathematicians and their contributions.
7) Values of Mathematics in life.
8) History of number π

ANNEXURE – E

PROJECT

1) Frame a crossword puzzle based on geometrical terms.