SAINIK SCHOOL, AMARAVATHI NAGAR

HOLIDAY HOMEWORK-2019-20

CLASS:10 **SUBJECT: MATHEMATICS**

S no	Topic	Activity/ Project	Time Period	Skill Enhanced/Learning Outcomes	Annexure No
1.	Real Numbers	Questions And Answers	7hrs	Remembering, Understanding, Applying,	A
2.	Pair Of Linear Equations In 2 Variables	Questions And Answers	7hrs	Applying, Analysing, Creating,	B
3.	Polynomials	Questions And Answers	7 Hrs	Remembering, Understanding, Applying	C
4.	Project Work	Project	15hrs	Applying, Analysing, Creating, Evaluating	D

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ANNEXURE:

A. Real numbers Problems (36 No's)
B. Polynomials Problems (34 No's)
C. Linear equation in 2 variables Problems (24 No's)
D. Project work Project on Indian Mathematicians and Golden Rectangle, Golden Ratio.

TEACHER'S NAME: N.Vyjayanthi SIGNATURE:

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VICE PRINCIPAL PRINCIPAL

SAINIK SCHOOL, AMARAVATHI NAGAR

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CLASS: 10 **SUBJECT: MATHEMATICS**

ANNEXURE –A

A. REAL NUMBERS

1. If 7x5x3x2 + 3 is composite number? Justify your answer

2. Express 0.363636… in the form a/b

3. Find the HCF 52 and 117 and express it in form 52x + 117y

4. The LCM of two numbers is 64699, their HCF is 97 and one of the numbers is 2231. Find the other

5. Write the HCF of smallest composite number and smallest prime number

6. Find the HCF and LCM of 26 and 91 and verify that LCM X HCF = Product of two numbers

7. If HCF (6, a) = 2 and LCM (6, a) = 60 then find a

8. Given that LCM (77, 99) = 693, find the HCF (77, 99)

9. Find the greatest number which exactly divides 280 and 1245 leaving remainder 4 and 3

10. Find the smallest number which when divided by 30, 40 and 60 leaves the remainder 7 in each case.

11. Explain why $\frac{27}{2^3 \times 5^3}$ is a terminating decimal expansion

12. The HCF of 2 numbers is 75 and their LCM is 1500. If one of the numbers is 300, find the other.

13. Two numbers are in the ratio 15: 11. If their HCF is 13 and LCM is 2145 then find the numbers

14. Prove that $\sqrt{2} + \sqrt{5}$ is irrational

15. Prove that $5 - 2\sqrt{3}$ is an irrational number

16. Prove that $\sqrt{2}$ is irrational

17. Write whether $\frac{2\sqrt{45} + 3\sqrt{20}}{2\sqrt{5}}$ on simplification give a rational or an irrational number

18. Show that any positive odd number is of the form 6q + 1, 6q + 3 or 6q + 5, where q is an integer.

19. The dimensions of a room are 6 m 75 cm, 4 m 50 cm and 2 m 25 cm. Find the length of the largest measuring rod which can measure the dimensions in exact number of times.

20. Find the HCF by Euclid's Division Algorithm.

a) 256,352 b) 450 , 500 , 625

21. Prove that $\sqrt{5} + \sqrt{3}$ is irrational.

22. Can 72 and 20 respectively be the LCM and HCF of two numbers? Write down the reason.

23. On a morning walk, three person step off together and their steps measure 40cm, 42 cm and 45 cm respectively. What is the minimum distance each should walk so that each can cover the same distance in complete step?

24. Write down 5 irrational numbers in radical form which are lying between 4 and 5.

25. Write down 2 rational numbers lying between $\sqrt{2}$ and $\sqrt{3}$

26. Prove that $\sqrt{p} + \sqrt{q}$ is irrational if p and q are prime numbers

27. Find the largest number which divides 245 and 1205 leaving the remainder 5 in each case.

28. Find the largest number which divides 303, 455 and 757 leaving the remainder 3, 5 and 7 respectively

29. Prove that $6 - 2\sqrt{3}$ is irrational.

30. Show that the square of any positive integer is of the form 3m or 3m + 1, where m is an integer.

31. Use Euclid's division lemma to show that the cube of any positive integer is of the form 9m, 9m + 1, 9m + 8, where m is an integer.

32. There are 3 consecutive traffic lights which turn "green" after every 36, 42 and 72 seconds. They all were at "green" at 9:00 AM. At what time will they all turn "green" simultaneously?

33. Show that one and only one out f *n* , (n+2) or (n+4) is divisible by 3, where n is any positive integer.

34. Show that n^2-1 is divisible by 8, if n is an odd positive integer
35 Prove that $n^2 - n$ is divisible by 2 for every positive integer n.
36. Show that any positive odd integer is of the form 4q + 1 or 4q +3 where q is a positive integer

ANNEXURE –B

B. POLYNOMIALS

(1) If α and β are the zeros of quadratic polynomial $x^2 + px + 2q$, find the value of $\alpha^2 + \beta^2$.

(2) If a and b are the zeros of quadratic polynomial $x^2 + 2px + q$, find the value of 1/a + 1/b

(3) If α and β are the zeros of quadratic polynomial $x^2 + 3x - 4$, find the value of $\alpha^3 + \beta^3$.

(4) Find the zeros of the polynomial $f(x) = x^3 - 12x^2 + 47x - 60$, if it is given that sum of its two zeros is 9.

(5) Find the quadratic polynomial such that sum of its zeros is 10 and difference between zeros is 8.

(6) Find a quadratic polynomial whose zeros are reciprocals of the zeros of the polynomial $x^2 + 7x + 12$.

(7) If two zeros of polynomial $x^3 + bx^2 + cx + d$ are $3+\sqrt{3}$ and $3-\sqrt{3}$, find its third zero.

(8) If α and β are the zeros of polynomial $x^2 - 6x + k$, such that $\alpha^2 + \beta^2 = 20$. Find the value of k.

(9) If α and β are the zeros of quadratic polynomial $x^2 - 4x - 5$, find the value of $1/\alpha^3 + 1/\beta^3$.

(10) Find the zeros of the polynomial $f(x) = x^3 - 21x^2 + 143x - 315$, if it is given that the zeros are in arithmetic progression.

(11) If α and β are the zeros of polynomial $x^2 - 7x + k$, such that $\alpha - \beta = 3$. Find the value of k.

(12) If α and β are the zeros of polynomial $x^2 - x - 2$, find a polynomial whose zeros are α^2/β^2 and β^2/α^2.

(13) If α and β are the zeros of polynomial $x^2 + 3x - 4$, find a polynomial whose zeros are $3\alpha+1$

and $3\beta+1$.

(14) Find the zeros of the polynomial $f(x) = x^3 - 2x^2 - 25x + 50$, if it is given that two of its zeros are equal in magnitude but opposite in sign.

(15) Show that $x^2 - 3$ is a factor of $2x^4 + 3x^3 - 2x^2 - 9x - 12$

(16). Divide: $4x^3 + 2x^2 + 5x - 6$ by $2x^2 + 3x + 1$ (2x-2, 9x-4)

(17). Find other zeroes of the polynomial $p(x) = 2x^4 + 7x^3 - 19x^2 - 14x + 30$ if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$ (3/2, -5)

18. Find all the zeroes of the polynomial $3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two of its zeroes are $\sqrt{5}/3$ and $-\sqrt{5}/3$ (-1,-1)

19. Find all the zeroes of $2x^4 - 3x^3 - 3x^2 + 6x - 2$, if it is known that two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$(1, ½

20. If the polynomial $f(x) = x^4 - 6x^3 + 16x^2 - 25x + 10$, is divided by another polynomial $x^2 - 2x + k$ the remainder Comes out to be x + a, find k and a

21. Find the polynomial, whose zeroes are $2 + \sqrt{3}$ and $2 - \sqrt{3}$

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

23. If α and β are zeroes of the polynomial $x^2 - 2x - 15$, then form a quadratic polynomial whose zeroes are 2α and 2β

24.Write a quadratic polynomial, the sum and product of whose zeroes are 3 and -2

25. Find the zeroes of the polynomial and verify the relationship between the zeroes and the coefficient

a) $4x^2 - 4x + 1$ b) $x^2 - 3$ c) $\sqrt{3}x^2 - 8x + 4\sqrt{3}$

26. If α and β are the zeroes of the polynomial $2y^2 + 7y + 5$, write the value of $\alpha + \beta + \alpha\beta$(-1)

27. If one root of the polynomial $5x^3 + 13x + k$ is reciprocal of the other, then find the value of k?

28. What must be subtracted from $2x^4 - 11x^3 + 29x^2 - 40x + 29$, so that the resulting polynomial is exactly divisible By $x^2-3x + 4$

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29. If the polynomial $6x^4 + 8x^3 - 5x^2 + ax + b$ is exactly divisible by the polynomial $2x^2 - 5$, then find the values of a and b

30. If the zeroes of the polynomial $x^3 - 3x^2 + x+1$ are a - b, a, a + b, find a and b(1, $\pm\sqrt{2}$)

31. On dividing $x^3 - 3x^2+ x + 2$ by a polynomial g(x), the quotient and remainder were x - 2 and -2x +4, respectively Find g(x)

32. If α and β are the zeroes of the polynomial $f(x) = x^2 - 5x + k$ such that α - β = 1, find k

33. If the product of zeroes of the polynomial $ax^2 - 6x - 6$ is 4, find the value of a (-3/2)

34.If α,β are the zeroes of quadratic polynomial $2x^2 + 5x + k$, find the value of k such that

$(\alpha + \beta)^2 - \alpha\beta = 24$

ANNEXURE –C

C. LINEAR EQUATIONS

1. Solve graphically the system of linear equations: x + 3y = 11,3x + 2y = 12
2. Draw the graph of the equation x - y + 1 = 0 and 3x + 2y - 12 = 0. Determine the coordinates of the vertices of the triangle. Formed by these lines and the x - axis, and shade the triangular region

3. Solve: a). x+ y=1,x -y =1
   b) x + y=5;x – y=7
   c) 37x + 43y = 123, 43x + 37y = 117
   d)$(a - b) x + (a + b) y = a^2 - 2ab - b^2$, $(a + b) x + (a + b) y = a^2 + b^2$

4. Find the value(s) of k for which the pair of linear equations k x + 3y = k - 2 and 12x + k y = k has no solution

5. Find the value of k, for which the pair of equations 3x + 5y = 0, k x + 10y = 0, has a non zero solution
6. Find the value of a and b for which the system of equation has infinitely many solutions:
a) 2x + 3y = 7, (a - b) x + (a +b) y = 3a +b - 2

7. Find the value of k, for which the given linear pair has a unique solution: 2x + 3y - 5 = 0, k x - 6y -8 = 0

8. 10 students of class x took part in mathematics quiz. If the number of girls is 4 more than the number of boys, find the number of boys and number of girls who took part in the quiz.

9. The larger of the two supplementary angles exceeds the smaller by 18 degrees. Find the angles

10. In a two digit number, the sum of the digits is 9. If the digits are reversed, the number is increased by 9. Find the number

11. A fraction becomes 4/5 if 1 is added to both the numerator and the denominator. However, if 5 is subtracted from both the numerator and the denominator the fraction becomes ½. Find the fraction

12. Two years ago, a father was five times as old as his son. Two years later, his age will be 8 more than three times the age of the son. Find the present ages of father and son

13. 90% and 97% pure acid solutions and mixed to obtain 21 litres of 95% pure acid solution. Find the amount of each Type of acid to be mixed to form the mixture

14. 2 women and 5 men can together finished a piece of work in 4 days, while 3 women and 6 men can finis h it in 3 days. Find the time taken by 1 woman alone to finish the work, and that taken by 1 man alone.

15. A boat goes 16km upstream and 24km downstream in 6hrs. It can go 12km up and 36km down in the same time. Find the speed of the boat in still water and the speed of the stream.

16. Students of a class are made to stand in rows. If 4 students are extra in a row , their would be 2 rows less. If 4 students are less in a row, there would be 4 more rows. Find the number of students

17. The perimeter of a rectangle is 44 cm. If its length is increased by 4 cm and its breadth is increased by 2cm, its area is increased by 72 sqcm. Find the dimensions of the rectangle.

18. The sum of two numbers is 1000 and the difference between their squares is 256000. Find the numbers

19. If $(x + 2)$ is a factor of $x^3 + ax^2 + 4bx + 12$ and $a + b = - 4$, find the values of a and b

20. Two numbers are in the ratio 3: 4 and if 4 are added to each, the ratio becomes 4:5. Find the numbers

21. Solve by the method of cross multiplication:
$(a - b) x + (a + b) y = a^2 - 2ab - b^2$, $(a + b)(x+y) = a^2 + b^2$

22. The ratio of incomes of two persons is 9: 7 and the ratio of their expenditures is 4: 3. If each of them saves Rs. 200 per Month, find their monthly expenditures.

23. Sum of the areas of two squares is $468m^2$.If the difference of their perimeter is 24m, find the sides of two square

24. A boy travels for x hrs at 8km/hr and then for y hrs at 7km/hr. If he goes 37km altogether in 5hrs, find x and y

ANNEXURE –D

D.PROJECT WORK:

1. Project on any two Indian Mathematicians and their contributions.
2. Project on Golden Rectangle and Golden Ratio.