Delhi Public School Guwahati

"Under the aegis of the Delhi Public School Society, Delhi"

SUMMER HOLIDAY HOMEWORK
CLASS IX
SUBJECT – MATHEMATICS

This Holiday Homework consists of two parts: PART-A and PART - B

PART-A

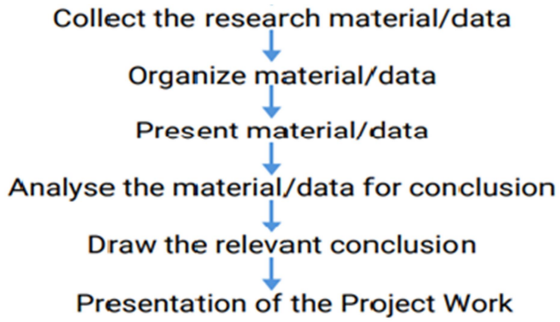
One Project has to be done by each student. This Project will be a part of the Portfolio which will be evaluated as INTERNAL ASSESSMENT FOR ANNUAL EXAMS 2023.

Topic of the project will be one among the following. Allotment of the project will be done group wise by the subject teachers in class.

1. The Story of Pi (π).
2. Indian Mathematicians and their contributions.
3. Application of Geometry in day to day life.
4. To develop Heron's formula for the area of a triangle.
5. Fibonacci sequence, their properties and similar pattern found in nature.

Steps involved in the conduct of the Project are as follows.

1.



2. Following are the pages to be included in the project work:

a) Cover page (Title of the project, Subject, Name, Class/Sec, Roll No)
b) Certificate
c) Acknowledgement
d) Contents
e) Project write ups and conclusion

** Paste photograph(s) wherever necessary

f) Bibliography
g) Use A4 size paper only

PART: B

SOLVE THE FOLLOWING QUESTIONS:

1. Is the expression $x^2 + \frac{3x^{\frac{3}{2}}}{\sqrt{x}}$ a polynomial? Justify.
2. If $p(x) = x^2 - 2\sqrt{2}x + 1$, then find the value of $p(2\sqrt{2})$.
3. If $x = \frac{-1}{2}$ is a zero of the polynomial $p(x) = -ax^2 - x - 2$, find the value of a.
4. Determine the remainder when the polynomial $p(x) = x^4 - 3x^2 + 2x + 1$ is divided by $x - 1$.
5. For what value of 'a' is $x + 2$ a factor of $p(x) = 4x^4 + 2x^3 - 3x^2 + 8x + 5a$?
6. What is the degree of the polynomial $p(x) = 4x^4 + 0x^3 + 0x^5 + 5x + 1$?
7. If $x^{140} + 2x^{151} + k$ is divisible by $x + 1$, then find the value of k.
8. What is the zero of a zero polynomial?
9. What are the factors of $27a^3 + 125b^3$?
10. Find the value of $29^3 - 11^3 - 18^3$.
11. Find the value of 103×97.
12. What is the coefficient of x and x^2 in the polynomial $(x-1)(3x-4)$?
13. What is the degree of the polynomial $\sqrt{2}$?
14. What is the zero of the polynomial $2x + 5$?
15. Using suitable identity, find the value of 103^3.
16. Determine whether $x + \sqrt{2}$ is a factor of $2\sqrt{2}x^2 + 5x + \sqrt{2}$.
17. Factorise: $2a^3b^2 - 4a^2b^3 + 8ab^4 - 16b^5$.
18. If $a + b + c = 9$ and $ab + bc + ca = 26$, find the value of $a^2 + b^2 + c^2$.
19. Without finding the cubes, factorize: (i) $(x-2y)^3 + (2y-3z)^3 + (3z-x)^3$

    (ii) $l^3(m-n)^3 + m^3(n-l)^3 + n^3(l-m)^3$
20. If $x + y = 12$ and $xy = 27$, find the value of $x^3 + y^3$.
21. Simplify $\frac{(a^2-b^2)^3 + (b^2-c^2)^3 + (c^2-a^2)^3}{(a-b)^3 + (b-c)^3 + (c-a)^3}$.
22. Find the value of $x^3 - 8y^3 - 36xy - 216$ when $x = 2y + 6$.
23. What must be subtracted from $4x^3 + 16x^2 - x + 5$ to obtain a polynomial which is exactly divisible by $x + 5$?
24. Find the product: $\left(x - \frac{1}{x}\right)\left(x + \frac{1}{x}\right)\left(x^2 + \frac{1}{x^2}\right)\left(x^4 + \frac{1}{x^4}\right)$.

25. If a,b,c are all non – zero and $a+b+c=0$ then prove that $\frac{a^2}{bc}+\frac{b^2}{ca}+\frac{c^2}{ab}=3$.

26. The polynomial *p(x)* = $x^4-2x^3+3x^2-ax+3a-7$ when divided by $x + 1$ leaves the remainder 19. Find the value of *a*. Also, find the remainder when *p(x)* is divided by $x + 2$.

27. If the polynomials az^3+4z^2+3z-4 and z^3-4z+a leave the same remainder when divided by *z-3*, find the value of *a*.

28. If $a+b+c=5$ and $ab+bc+ca=10$, then prove that $a^3+b^3+c^3-3abc=-25$.

29. If $\frac{x}{y}+\frac{y}{x}=-1$, then find the value of x^3-y^3.

30. Factorise: x^8-y^8.

31. Prove that $(x+y)^3-(x-y)^3-6y(x^2-y^2)=8y^3$

32. If $x+\frac{1}{x}=7$ then find the value of (i) $x^2+\frac{1}{x^2}$ (ii) $x^3+\frac{1}{x^3}$

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