## Experiment No: 28

## **Experiment Name:** Sin(x) = x – (x3/ 3!) + (x5/ 5!) – (x7/ 7!) + …

## **Objective:**

* Briefly explain the purpose of the program, which is to calculate the sine of an angle using a series expansion.
* Introduce the significance of converting degrees to radians for trigonometric calculations.
* State the key objectives of the lab report.

# **Code:**

#include<stdio.h>

#include<math.h>

double factorial(int);

void calc(float, float\*);

int main()

{

int x;

float radian, result = 0;

printf("Enter value of x in degrees\n");

scanf("%d", &x);

radian = x \* (3.14159 / 180.0); // Convert Degree To Radian

calc(radian, &result);

printf("Sin(%d) = %f\n", x, result);

return 0;

}

void calc(float num, float \*res)

{

int count, n = 1, sign = 1;

for(count = 1; (n <= 10); count += 2)

{

\*res += sign \* ( pow(num, count) / factorial(count) );

n += 1;

sign \*= -1;

}

}

double factorial(int num)

{

int count;

double sum = 1;

for(count = 1; count <= num; count++)

{

sum \*= count;

}

return(sum);

}

# **Input:**

Enter value of x in degrees

244

**Output:**

Sin(244) = -0.898793

## **Discussion:**

* Discuss the advantages and limitations of using a series expansion to calculate sine.
* Analyse the impact of the number of terms considered in the series expansion on the result.
* Address any challenges or potential improvements in the program.