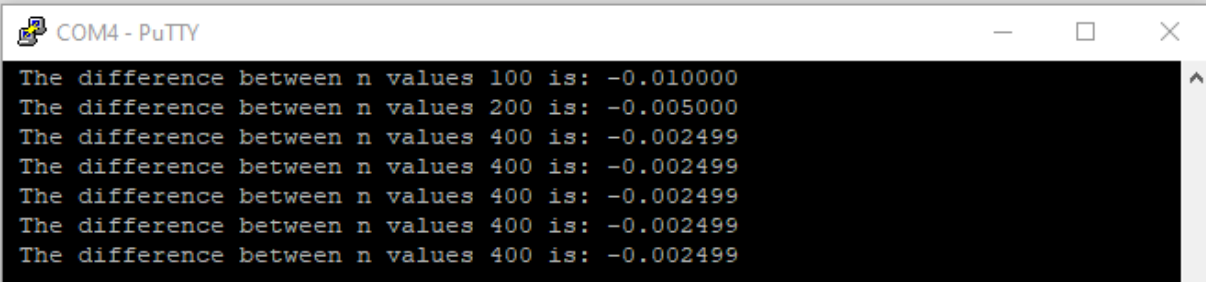1.

```
4     #include <math.h>
5
6    └ #include "mcc_generated_files/mcc.h"
7
8    ┌ /*
9    │                  Main application
10   └ */
11    void main(void)
12   ┌ {
13        // Initialize the device
14        SYSTEM_Initialize();
15
16        float pi=0, pi2=4*atanf(1);
17
18
19        for(int i=0;i<400;i++)
20        {
21            pi += pow(-1,i)*4/(2*i+1);
22        }
23
24        float difference= pi-pi2;
25
26        printf("\n\r The difference between n values 400 is: %f", difference);
27
```

COM4 - PuTTY   —   □   ×

```
The difference between n values 100 is: -0.010000
The difference between n values 200 is: -0.005000
The difference between n values 400 is: -0.002499
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```

2. and 3.

```
26          float difference= pi-pi2;
27
28          printf("\n\r\n\r The difference between n values 400 is: %f", difference);
29
30
31
32          #2
33
34          long long factorial=1;
35
36          int number=10;
37
38          for(int i=0;i<number;i++)
39          {
40              factorial *= number-i;
41
42          }
43
44
45
 9              printf("\n\r The factorial of %d is: %llu", number, factorial);
47
48
49
50
51
52          #3
53
54
55          float a=0,b=1.0; //limits of integration
```

```
Xn is: 0.540302
sum 1 is: 40.527637
sum2 is: 84.152702 sum3 is: 126.220642
The area under the function using Simpson's Rule is: 0.841471
The exact answer is sin(1) = 0.841471
The difference between the two is: 0.000000

The difference between n values 400 is: -0.002499
The factorial of 10 is: 3628800

deltax is: 0.020000
X1 is: 1.000000
Xn is: 0.540302
sum 1 is: 40.527637
sum2 is: 84.152702 sum3 is: 126.220642
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```

```c
#3


    float a=0,b=1.0; //limits of integration
int i=0;

int n=50; //number from Simpson's Rule

float deltax= (b-a)/n; //delta x for the approximated integral solution

printf("\n\r\n\r deltax is: %f", deltax);

float X=0, X1=0, Xn=0, sum1=0, sum2=0; // the Simpson's rule terms up to f of Xn

for(i=0;i<n+1;i++)
{
    /*X1=0.5*i;
    printf(" \n X1 is: %f", X1);
    */

    if(i==0)
    {
        X1= cos(a);
        printf("\n\r X1 is: %f", X1);
    }

    else
        {
                    if(i==n)
                    {

                    Xn=cos(b);
                    printf("\n\r Xn is: %f", Xn);
                    }
                    else
                        {
                            if(i%2 == 0)
                            {
```

```c
                                if(i%2 == 0)
                                {
                                    sum1 +=   2*cos((a+(i*(b-a)/n)));
                                }
                                else
                                {
                                    sum2 += 4*cos((a+(i*(b-a)/n))) ;
                                }

                                //printf("\n sum 1 is: %f \n sum2 is: %f ", sum1, sum2);
                        }
                }

        }

        printf("\n\r sum 1 is: %f \n\r sum2 is: %f ", sum1, sum2);

    /*for(i=n;i<n+1;i++)
    {
        Xn= 0.5*b;
        printf("\n\r Xn is: %f", Xn);
    }
    */
    float area, sum3;

    sum3= X1 + Xn + sum1 + sum2;

    area = sum3* deltax/3;

    float A= sin(1);

    float diff= A-area;


    printf("sum3 is: %f",sum3);
    printf("\n\r The area under the function using Simpson's Rule is: %f  \n\r The exact answer is sin(1) = %f \n\r The difference be
```