The sine function can be represented by the infinite series shown to the right. Any degree of decimal accuracy for the function can obtained by increasing the number of terms used for it's calculation. The variable x is expressed in radians (not degrees)

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + ..$$

Letting x = 1.0 radians for example, we can use a calculator to compute to 10 decimal places.

$$\sin(1) = 0.8414709848$$

The sin(x) Curve

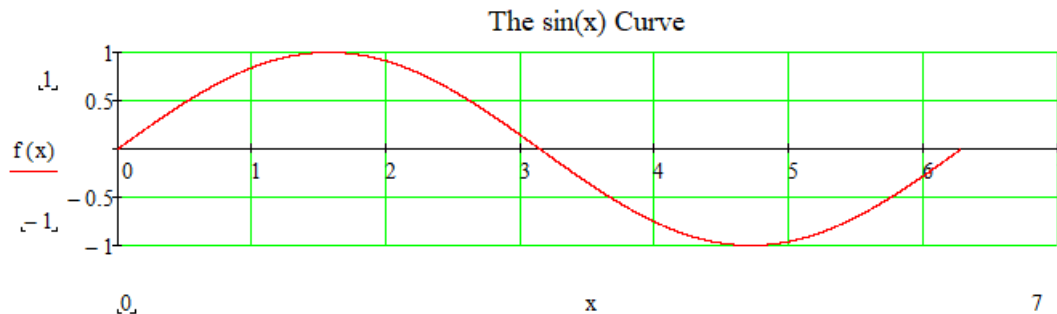The first 4 terms of the infinite series are used to compute the same are shown below.

$$x := 1$$

$$\frac{x^1}{1!} = 1.00000000$$

$$\frac{x^1}{1!} - \frac{x^3}{3!} = 0.8333333333$$

$$\frac{x^1}{1!} - \frac{x^3}{3!} + \frac{x^5}{5!} = 0.8416666667$$

$$\frac{x^1}{1!} - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} = 0.8414682540$$

The Mathcad code in the grey box calculates this series for n terms with results shown to the right

$$n := 1..9$$

$$f_{\sin}(x,n) := \text{for } i \in 1,3..n$$

$$s \leftarrow \left| -1 \cdot \frac{x^i}{i!} \text{ if } s > 0 \right.$$

$$\left. \frac{x^i}{i!} \text{ otherwise} \right.$$

$$t \leftarrow t + s$$

$n =$	$f_{\sin}(1,n) =$
1	1
2	1
3	0.833333
4	0.833333
5	0.841667
6	0.841667
7	0.841468
8	0.841468
9	0.841471

Create a JAVA project named CalcSineApplication having two (2) classes named:

- CalcSineApp (a tester class with the main statement)
- CalcSine

Permit the user to send the angle and number of terms of the infinite series to be used to class CalcSine.

Have class CalcSine return to CalcSineApp the approximated value of sine (to 5 decimal places) given angle and using the number of terms provided.

Send an MS.docx containing all codes with input/output as an email attachment to mheinen_1@msn.com.

Use the following angle to test your class: 135 degrees.

Example input/output below:

```
run:
******* Calculate Sine Using Infinite Series ********
Enter angle in degrees: 135
Enter number of terms: to use: 6

        after term 1 sum = 2.356194490192345
        after term 3 sum = 0.1760656611087641
        after term 5 sum = 0.7812315416655949
        after term 7 sum = 0.7012393831191733
        after term 9 sum = 0.7074072812445046
        after term 11 sum = 0.7070959900908971

Calculated  sin(135.00000) = 0.70710
Actual  sin(135.00000) = 0.70711

BUILD SUCCESSFUL (total time: 11 seconds)
```