

CNS 3320 – Numerical Software Engineering  
**Module 4 Programming Assignment**  
“Elementary Functions”

**Date Due:** See Canvas

Write a function, `mysine(x)`, that computes the value sine function with  $x$  as its argument.

Your program will do the followings:

- Reduce the input  $x$  to be in  $[-\frac{\pi}{2}, \frac{\pi}{2}]$ ,
- Use a Taylor’s Series up to  $\frac{x^{21}}{21!}$  term (you can hard code this in your function or you can write a `findn` routine to determine the number of terms that are required),
- Handle small angles, i.e., return  $x$  as  $\sin(x)$  when  $x^2 \leq \epsilon$ ,
- Handle large angles, i.e., return `nan` when  $x > 10^9$

Submit your source and the output for the angles listed below.

Use the following angle to test your program:

<code>print(mysine(1.0e-08))</code>	<code>//1e-08</code>
<code>print(mysine(0.00001))</code>	<code>//9.999999999833334e-06</code>
<code>print(mysine(0))</code>	<code>//0</code>
<code>print(mysine(math.pi/2))</code>	<code>//1.00000000000000002</code>
<code>print(mysine(math.pi))</code>	<code>//-0.0</code>
<code>print(mysine(100))</code>	<code>//-0.5063656411097555</code>
<code>print(mysine(-1000))</code>	<code>//-0.8268795405320125</code>
<code>print(mysine(999999999))</code>	<code>//-0.4101372630100049</code>
<code>print(mysine(-1000000001))</code>	<code>//nan</code>