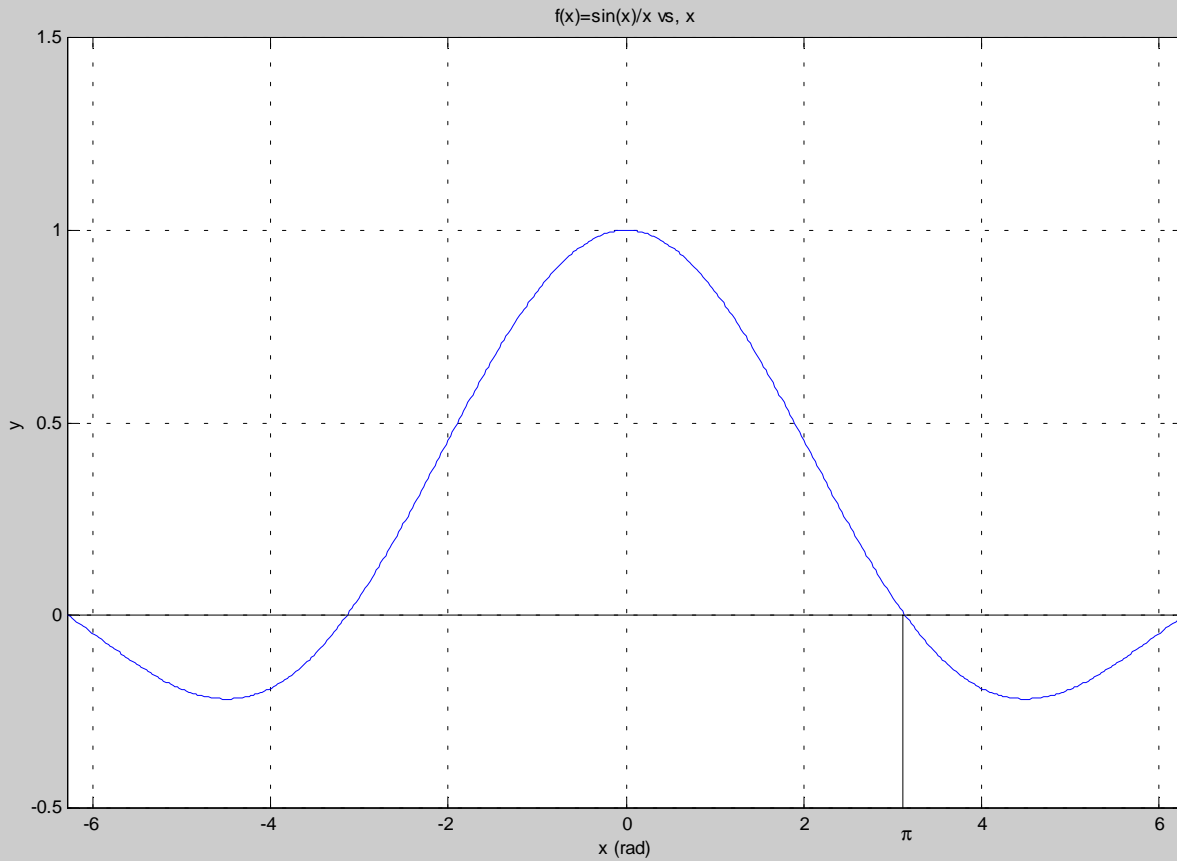


SHOW ALL WORK!

Problem 1 (30pts)

For the function $f(x) = \frac{\sin x}{x}$ shown below.



a) Find $f_2(x)$, the second order truncated Taylor Series expansion of $f(x)$ about $x_0 = \pi$.

b) Use $f_2(x)$ to approximate $f(0)$.

c) Defining $f(0)$ as

$$\lim_{x \rightarrow 0} f(x) = \lim_{x \rightarrow 0} \left[\frac{\sin x}{x} \right]$$

Use L'Hopital's rule to find $f(0)$ and the true error E_T at $x=0$.

SHOW ALL WORK!

Problem 2 (25pts)

The function $f(x) = \frac{\sin x}{x}$ has a root located between 2 and 4. Fill in the table below for the first three iterations of the Bisection Method. Express all answers to four digits after the decimal point.

Iteration	x_l	x_u	x_r	$f(x_l)$	$f(x_r)$	$e_A, \%$	$e_T, \%$
1	2.0000	4.0000					
2							
3							

SHOW ALL WORK!

Problem 3 (20pts)

For the system of equations $A\underline{x} = \underline{b}$ below

- Find the inverse of matrix A (if it exists) using the method of cofactors.
- Use the inverse A^{-1} (if it exists) to find the solution to the system of equations.

$$\begin{array}{rcccccc} x & + & 2y & + & 3z & = & 6 \\ 2x & - & 3y & - & z & = & -2 \\ 5x & + & 4y & - & 6z & = & 3 \end{array}$$

SHOW ALL WORK!

Problem 4 (25pts)

Given the following system of equations, $A\underline{x} = \underline{b}$

$$\begin{array}{cccccc} x_1 & + & x_2 & + & x_3 & + & Kx_4 & = & 0 \\ -x_1 & & & & + & x_3 & - & x_4 & = & 0 \\ 2x_1 & - & x_2 & + & 3x_3 & - & 8x_4 & = & 0 \\ & & x_2 & + & x_3 & - & 2x_4 & = & 0 \end{array}$$

Find the value(s) of K for which the above system has a unique solution?