MATH 4334.001/CS 4334.001 Name : _____
Fall 2023
Paper Homework 2
Due 09/06/2023

Show ALL work to receive full credit.

1. In the Taylor series for the function $f(x) = \sin x + \cos x$ centered at $a = \pi/4$, find the third nonzero term.

2. Find $T_5(x)$, the Taylor polynomial of degree 5, about the center $a = 0$ for the following functions:

   (a) $f(x) = e^{x^2}$

   (b) $f(x) = \cos 2x$

   (c) $f(x) = \ln(1 + x)$

   (d) $f(x) = \sin^2 x$

3. (a) Determine $T_4(x)$ for $f(x) = x^{-2}$ about the center $a = 1$.

   (b) Use this result to approximate $f(0.9)$ and $f(1.1)$.

   (c) Use the Taylor remainder to find an error bound for each of the two approximations in part(b).

4. Carry out Exercise 3 (a)-(c) for $f(x) = \ln x$.

5. Convert the following decimal numbers to octal numbers.

   (a) 27.1

   (b) 12.34

   (c) 3.14

6. Convert the following numbers:

   (a) $(100\ 101\ 101)_2 = (\quad)_8 = (\quad)_{10}$

   (b) $(0.694)_{10} = (\quad)_8 = (\quad)_2$

   (c) $(361.4)_8 = (\quad)_2 = (\quad)_{10}$