

Name: _____

1. Let $f(x) = e^{-2x}$. Answer the following questions. Show all supporting work!!
 - a. Find the Taylor polynomial of order four for $f(x)$ at $x = 0$.
 - b. Use the approximation from part “a” to approximate $f(0.2)$
 - c. Find the error bound for your approximation if $|x| \leq 0.2$.

2. Let $f(x) = 2 \sin x$. Answer the following questions. Show all supporting work!!
 - a. Find the Taylor polynomial of order five for $f(x)$ at $x = 0$.
 - b. Find the Lagrange Error Bound if $|x| \leq 0.1$.

3. Let $f(x)$ be a continuous, differentiable function such that $f(3) = 1, f'(3) = 3, f''(3) = 7, f'''(3) = 5$.
 - a. Write a 3rd order Taylor polynomial for $f(x)$ about 3 ($a = 3$)
 - b. Use the polynomial to approximate $f(2.9)$
 - c. Given $f^{(4)}(x) \leq 6$ for all x , find the Lagrange error bound for the approximation

4. Let $f(x)$ be a function with a 3rd degree Taylor polynomial about $x = 2$ given by
$$P(x) = 7 - 9(x - 2)^2 - 3(x - 2)^3$$
 - a. Given $f^{(4)}(x) \leq 6$ for all x on $[0, 2]$, find the Lagrange error bound for the approximation.
 - b. Give a convincing argument as to why $f(0)$ must be negative.

5. For $f(x) = \sin x$, determine the order of the Taylor polynomial about $x = 0$ needed to approximate $\sin(0.3)$ with an error of less than 0.001.