Math 1271 **Name:** _____

Worksheet: 3.10 4.1 4.2

1. Find the linearlization $L(x)$ of $f(x) = 2^x + x$ at $a = 0$.

2. Approximate $e^{0.99}$ and $\sqrt{0.99}$ using linear approximation.

3. Find the critical number of the function $f(x) = |x - 1|x$.

4. Let $f(x) = xe^{x/2}$, find the absolute maximum/minimum of f at the interval $[-3, 1]$.

   (a) Find all critical points of $f(x)$.

   (b) Evaluate f at all critical points and the end points of the interval.

   (c) Find the absolute maximum/minimum.

5. Verify the function $f(x) = x^3 - 3x + 2$ satisfy the hypothesis of Mean-Value-Theorem on the interval $[-2, 2]$. Find all numbers c that satisfy the conclusion of Mean-Value-Theorem.

6. Show that $x^4 + 2x + c = 0$ has at most two real roots.