

Math 10A

Homework #5; Due Friday, 7/6/2018

Instructor: Roy Zhao

- Find the 2nd order Taylor polynomial that approximates each of the following functions at the given point.
 - $f(x) = e^x, a = 0$
 - $g(x) = e^{x^2}, a = 0$
- Find the first and second order Taylor polynomials for the function $f(x) = \ln(1 + x)$ at $a = 0$. Use each of these to estimate $\ln(1.01)$.
- True False If $T(x)$ is the second order Taylor polynomial approximation to the twice differentiable function $f(x)$ at $a = 2$, then $T'(2) = f'(2)$.
- True False If T is the third order Taylor polynomial approximation to the thrice differentiable function $f(x)$ at a , then $f(a) = T(a)$.
- Use Newton's method with initial guess $x_0 = 1$ to find x_1 , the first approximation to the root of $g(x) = x^5 + 2$.
- Use Newton's method to estimate a root of $g(x) = x + \cos(\pi x)$. Find x_1 with the starting value $x_0 = 1/2$.
- Use two iterations of Newton's method to approximate $\sqrt{5}$ starting with $x_0 = 2$.
- True False Newton's method always converges to the zero of a function.
- True False If we are using Newton's method to approximate $\sqrt{17}$ with an initial guess of $x_0 = 4$, then we apply Newton's method to the function $f(x) = \sqrt{x}$.