

MAT1575 Module 8 – Estimating function values using Taylor polynomials.

Objectives: .

1. Let $f(x)$ be a function with n derivatives that exist at $x = c$. Give a formula for the Taylor polynomial of degree n of $f(x)$ centered at $x = c$.
2. Compute the Taylor polynomials $p_2(x)$, $p_3(x)$, and $p_4(x)$ for $f(x) = e^x$ centered at $x = 0$.
3. Use your results to find a general formula for $p_n(x)$ (the n th degree Taylor polynomial approximation of e^x at $x = 0$).
4. Implement the Taylor polynomial above as python function of two variables (x and n). Compare your numerical results for different values of x and n with the built-in python functions. You can find a basic skeleton of the program here: <https://trinket.io/python/d02151a7ce>
What happens to your approximation as x gets larger? What can you do to increase the accuracy of your function for large x ?