

Math 102 — Taylor polynomials

Summary. Try each of the following problems together in a small group.

Problem 1. Find the degree n Taylor polynomial of $f(x)$ using the formula

$$P_n(x) = f(0) + f'(0)x + \frac{f''(0)}{2!}x^2 + \cdots + \frac{f^{(n)}(0)}{n!}x^n.$$

- a. $f(x) = \ln(1 - x), n = 4$
- b. $f(x) = \frac{1}{1-x}, n = 4$
- c. $f(x) = (x + 1)^{1/3}, n = 4$

Problem 2. Use substitution into a known Taylor approximation to find a Taylor approximation with 4 terms for the given function.

- a. $f(x) = \sin x^2$
- b. $f(x) = \frac{1}{1-x^3}$
- c. $f(x) = \ln(1 + x)$