

Math 102, Fall 2021 — Homework 11

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Due December 1 at 5:00 pm

Instructions. This homework, like most others this semester, has two parts. One part is on Webwork, and the other part is some problems that you will write solutions to by hand and submit on Gradescope.

Webwork

No webwork this week.

Written problems

Write up solutions to the following problems, making sure to show your work, write neatly, scan clearly, and generally follow the [guidelines for writing good homework solutions](#). You should submit solutions on [Gradescope](#).

Problem 1. Find the Taylor polynomials of degree n approximating the function $f(x)$ near 0.

1. $f(x) = \frac{1}{1+x}$, $n = 4, 6, 8$
2. $f(x) = \ln(1+x)$, $n = 5, 7, 9$
3. $f(x) = \sqrt{1+x}$, $n = 2, 3, 4$

Problem 2.

1. Find the second-degree Taylor polynomial for $f(x) = 4x^2 - 7x + 2$ near 0.
2. Find the third-degree Taylor polynomial $f(x) = x^3 + 7x^2 - 5x + 1$ near 0.
3. What do you notice about the previous two parts? What do you think is true about Taylor polynomials when $f(x)$ is a polynomial?

Problem 3. Find the first four nonzero terms of the Taylor series of $f(x)$ about 0.

1. $f(x) = \frac{1}{1-x}$
2. $f(x) = \ln(1-x)$
3. $f(x) = \sin(-x)$
4. $f(x) = e^{x^2}$