About the Mathematics

The Taylor Polynomials document is very simple but provides a very powerful tool for discussing graphs of Taylor polynomials. This TI-Nspire document does require CAS (Computer Algebra System).

Math Objectives

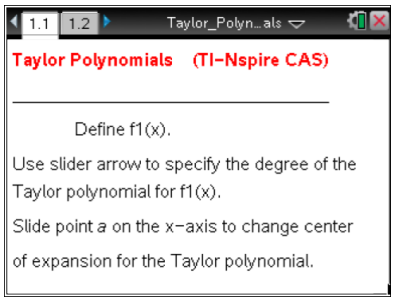
- Students will have the opportunity to see graphically sequences of Taylor polynomials for a given function centered about different points of expansion.
- Students will look for and make use of structure. (CCSS Mathematical Practice)
- Students will reason abstractly and quantitatively. (CCSS Mathematical Practice)

Using the Document

The function to be approximated is entered as **f**1(*x*). (The example provided is that of **f**1(*x*) = sin(*x*).) The definition of **f**2 is already in terms of the Taylor polynomial of degree *n* about the point *x* = *a*. On page 1.2, a slider has been set up to allow the user to easily change the degree *n* of the Taylor polynomial. A draggable point *a* on the *x*-axis allows one to change the center of expansion for the Taylor polynomial.

Possible Applications

Typically, you may set the point *a* = 0 and investigate the increasing accuracy of the approximation as the degree *n* increases. Alternatively, setting *n* = 1 and dragging *a* provides a movable tangent line approximation. Setting *n* = 2 and dragging *a* provides a movable "parabola of best fit." This in essence is a graphic "concavity detector" (opens up when the second derivative is positive, opens down when the second derivative is negative, and either disappears or becomes linear at a point of inflection).



TI-Nspire™ Technology Skills:

- Download a TI-Nspire document
- Open a document
- Move between pages
- Grab and drag a point
- Click on a minimized slider
- Define a function on the entry line

Tech Tips:

- Make sure the font size on your TI-Nspire handheld is set to Medium.
- In Graphs, you can hide or bring up the function entry line by pressing ctrl G.
- This document requires TI-Nspire CAS.

Lesson Materials:
Taylor_Polynomials.tns