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 graphical sequences of Taylor polynomials for a given function centered about different points of expansion.

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

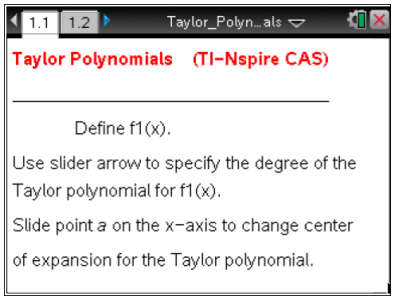
Typically, you set the point *a* = 0 and investigate the increasing accuracy of the approximation as the degree *n* increases. Alternatively, setting *n* = 1 and dragging *a* provides a movable tangent line approximation. Setting *n* = 2 and dragging *a* provides a movable "parabola of best fit." This 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™ Navigator™

- Use Class Capture to monitor students' work.
- Use Live Presenter as a demonstration tool.

Activity Materials

Compatible TI Technologies : TI-Nspire™ CX Handhelds, TI-Nspire™ Apps for iPad®, TI-Nspire™ Software



Tech Tips:

- This activity includes screen captures from the TI-Nspire CX handheld. It is also appropriate for use with the TI-Nspire family of products including TI-Nspire software and TI-Nspire Apps. Slight variations to these directions may be required if using other technologies besides the handheld.
- Watch for additional Tech Tips throughout the activity for the specific technology you are using.
- Access free tutorials at http://education.ti.com/calculators/pd/US/Online-Learning/Tutorials

Lesson Files:

- Taylor_Polynomials.tns