# Convergence of Taylor Series

## MATH NSPIRED

TEACHER NOTES

## Math Objectives

- Students will show graphically that a Taylor Series for a function becomes the function as the number of terms increases towards infinity.

## Activity Type

- Teacher Demonstration

## About the Lesson

- The teacher will graphically demonstrate the property of a Taylor Series becoming equal to a function as the number of terms reaches infinity. As the *n* value in the slider changes, more or less terms of the Taylor Polynomial are shown. As *n* increases, the graph of the Taylor polynomial is closer to the graph of the original function.

## Directions

- Use the button to select the up/down arrows to view more or fewer terms of the Taylor Series for the given function.
- To change the function, double-click on the graph of the function to type in your new function.

## TI-Nspire™ Navigator™ System

- Send the TI-Nspire document.
- Monitor student progress using Class Capture and Quick Poll.
- Use Live Presenter to spotlight student answers.

## Activity Materials

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


**Tech Tips:**

- This activity includes screen captures taken from the TI-Nspire CX handheld. It is appropriate for use with any of the TI-Nspire family of products including TI-Nspire software and TI-Nspire App. Slight variations to these directions might be required if using other technologies beside 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:**

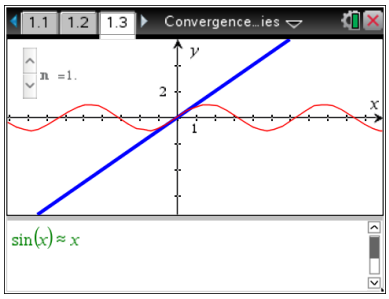
*TI-Nspire document*

- Convergence_of_Taylor_Series.tns

Visit www.mathnspired.com for lesson updates.

## Student Activity Questions and Answers

**Class Discussion:** For each function, discuss how many terms are needed until the Taylor Series matches the function in the given window.




For sin *x* and cos *x*, students should note that only odd or even values of *n* change the graph.

Other functions to examine:

1. cos *x*
2. $e^x$
3. ln *x*
4. polynomial functions