

Secant and Tangent Lines Demonstration Activity

- 1) Open the Secant and Tangent Lines Demonstration located at <http://demonstrations.wolfram.com/SecantAndTangentLines/>
- 2) First get familiar with the various options. Adjust the sliders for x_0 and h . Click the check box for the Tangent line to appear. Try moving the sliders again. Uncheck the Tangent line.
- 3) Answer the following questions:
 - a) What does x_0 represent?
 - b) What does h represent?
 - c) What is the slope of the secant line connecting the points $(0, f(0))$ and $(2, f(2))$?
Compute this first by hand and then use the demonstration to check your result.
 - d) What is the slope of the secant line connecting the points $(0, f(0))$ and $(1, f(1))$?
 - e) What is the slope of the secant line connecting the points $(0, f(0))$ and $(.5, f(.5))$?

f) What is the slope of the secant line connecting the points $(0, f(0))$ and $(.001, f(.001))$?

g) Use the results above to estimate the slope of the tangent line at $x = 0$.

h) Click the check box for the tangent line to check the slope of the tangent line.

i) Find the equation of the line tangent to the curve at $x = 0$.