**Non-obvious controls:**

* The UNDO button will erase the last change (up to 50 changes); there is no REDO button.
* The ZOOM on each graph is independent of the others. Students may need some guidance to interpret. The activity ***Calculus Grapher for Math*** would be helpful.
* If you are doing a lecture demonstration, set your screen resolution to 1024x768 so the simulation will fill the screen and be seen easily.
* There is a zoom feature for all Flash simulations. Right click on the sim and select **Zoom in.** This can be helpful when you are using a projector or writing a lesson where you want a screen shot.
* To “Reset All”, refresh your browser.

**Important modeling notes / simplifications:**

* As you draw a curve, sections are changed not the entire line.
* If you want to draw a sine curve that is uses the entire length, press ZERO first.

**Insights into student use / thinking:**

* For this learning goal: *Describe in words with illustrations what the derivative and integral functions are*. Students should be able to explain that the derivative is the “rate of change” and the integral is the accumulation of the area of the function
* Students should draw the graphs vertically aligned as they are in the simulation to help construct the correct relationships between the graphs.
* Some students had difficulty understanding that one graph can be zoomed, but the others do not change.

**Suggestions for sim use:**

* The simulations have been used successfully with homework, lectures, in-class activities, or lab activities. Use them for introduction to concepts, learning new concepts, reinforcement of concepts, as visual aids for interactive demonstrations, or with in-class clicker questions. To read more, see [**Teaching Physics using PhET Simulations**](http://phet.colorado.edu/phet-dist/publications/Teaching_physics_using_PhET_TPT.pdf)
* Inquiry strategies take advantage of the simulation design. Invite the students to ***play*** with the simulation without any instruction. Use a ***guided inquiry*** approach to learning or ask ***concept questions***. For help with creating effective guided inquiry activities or questions, see: [**Guidelines for Contributions**](http://phet.colorado.edu/activities/guidelines.pdf)or[**Concept Questions**](http://phet.colorado.edu/teacher_ideas/ConceptQuestions.pdf)
* For activities and lesson plans written by the PhET team and other teachers, see: [**Teacher Ideas & Activities**](http://phet.colorado.edu/teacher_ideas/index.php)