



Slope Fields

TI AND AB & BC CALCULUS AP


Activity Overview

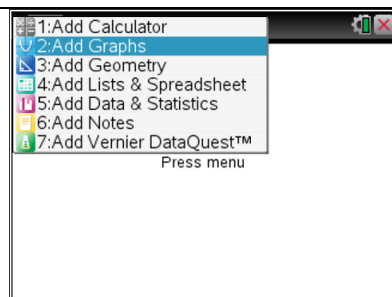
This activity provides a brief exploration of graphing a Differential Equation by using Slope Fields. This exploration is intended to help you visualize slope fields. You will **NOT** be expected to graph a slope field using technology for the AP Calculus Exam. However, you will be expected to identify slope fields and relate them to a differential equation. You will also be expected to hand-draw slope segments on a coordinate grid at specified points or hand draw a solution curve on a given slope field.

The Graph Application – Graphing Differential


Equations

Step 1: Create a new Graphs document.

Press , and select **New Document** to start a new document. Choose **Add Graphs**.

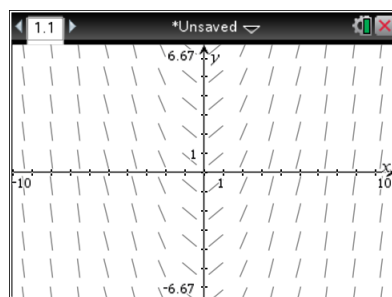
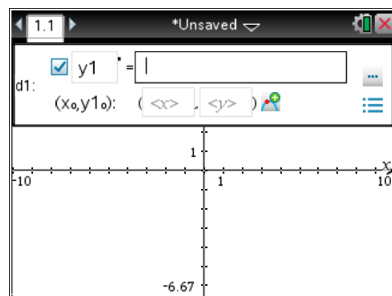


Step 2:

Initially, the Entry line displays $f1(x) =$. Select **Menu > Graph Entry/Edit > Diff Eq.** Enter the differential equation $y' = x$ and press  to graph.

Note: If the differential equation contains y , then the input must reflect the specific y of the entry line; for

$$y' = \frac{x}{y}, \text{ the entry for } y1' \text{ is } y1' = x / y1.$$






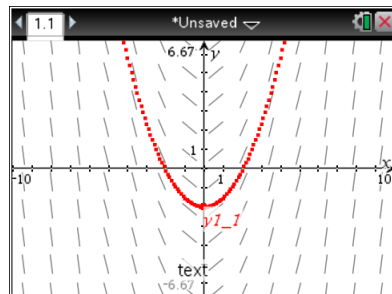
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Step 3:

To display a specific solution to the differential equation with an initial condition, press **[tab]**. Move up to the y_1' entry, and type the initial condition of $(0, -2)$ for (x_0, y_{1_0}) . Press **[enter]** to graph the specific solution curve.

Note: Additional solution curves can be graphed by using the  icon. You can also grab and drag the initial condition point on the graph screen to view additional solution curves.



You Try: Graph the slope field for the following two DE's. You may want to either edit the y_1' or insert a new problem.

1. $\frac{dy}{dx} = 2y$

2. $\frac{dy}{dx} = \frac{-x}{y}$

Note: By default, the solution method is Euler's method. Press **[tab]** and move up to the y_1' prime entry line. Press the Edit Parameters icon (...) to the right of the entry line if you would like to select the Runge-Kutta solution method. The default, Euler's Method is appropriate for all AP Calculus work.