Using Grapher on Macs to draw Slope Fields.
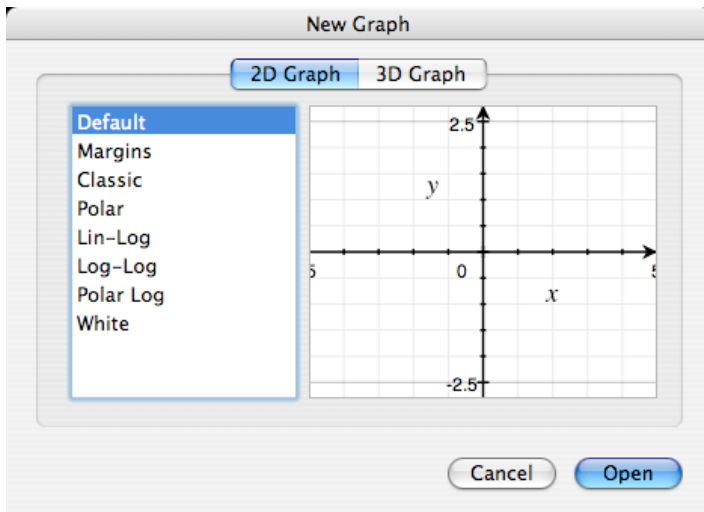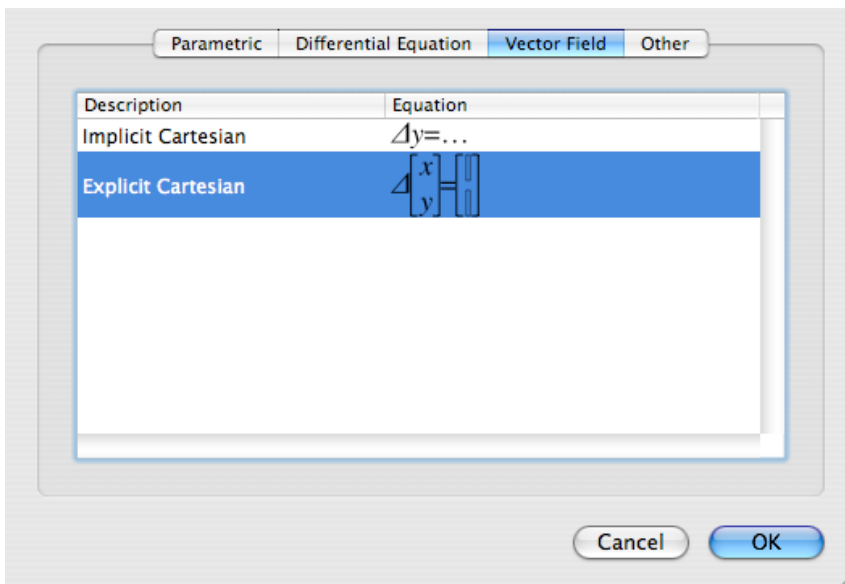
Suppose that we want a computer generated slope field for the differential equation
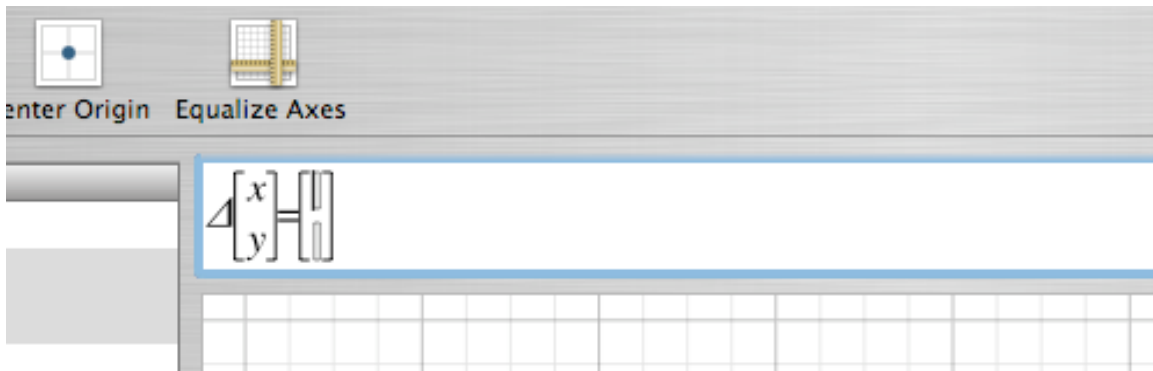y'=y-t

1. Go to a Mac that's not too old and find Grapher under the Applications ->
   Utilities Folder. Double-click to start it. Select 2D.

2. Under the Equation menu, select "New Equation From Template". Choose
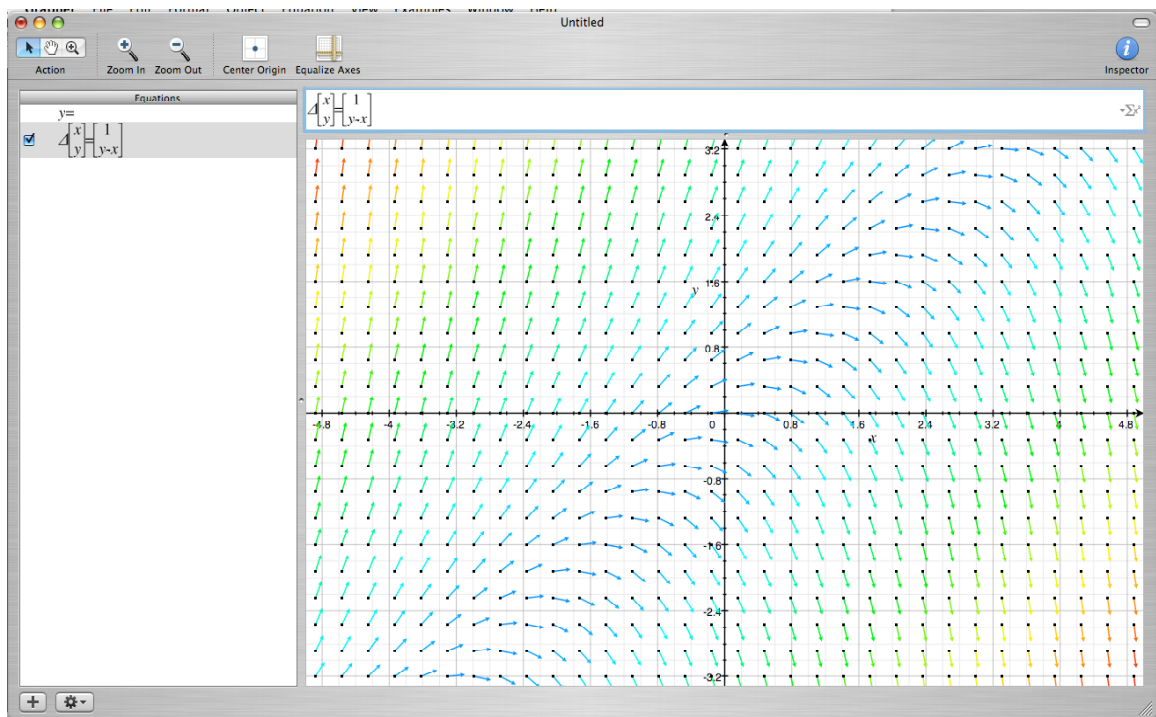   "Vector Field" and "Explicit Cartesian".

3. You will see the following formula bar:

4. In the blank spot on the top (where the cursor is in the picture) put a 1. In the second spot, put the formula for y' (in this example it is y-x). Notice that you should use an *x* rather than a *t*.
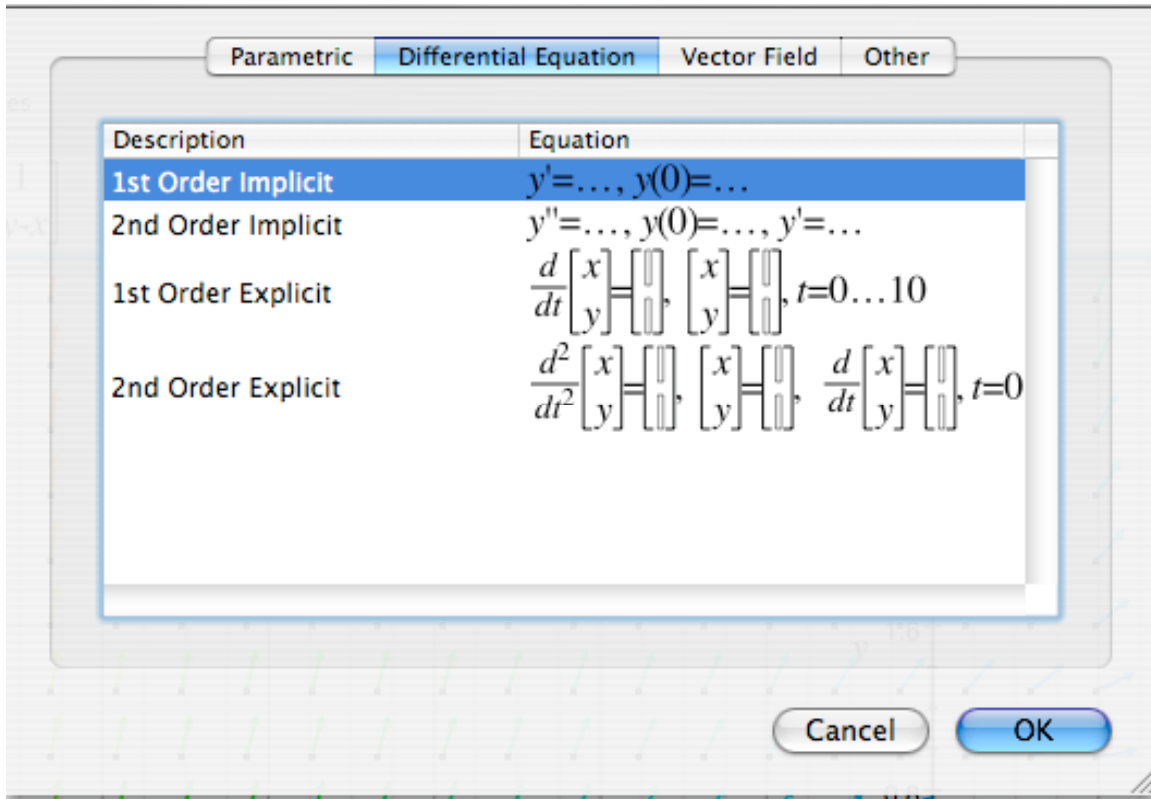

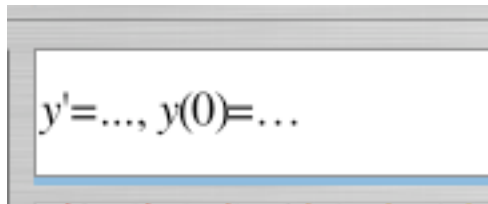5. Hit return and you should see the slope field.

To Draw A Solution Curve to the DE.

6. Under the Equation Menu, go to "New Equation from Palette". Select "Differential Equation" and choose "1ˢᵗ order implicit"

| Parametric | Differential Equation | Vector Field | Other |

Description	Equation
1st Order Implicit	$y'=\ldots,\ y(0)=\ldots$
2nd Order Implicit	$y''=\ldots,\ y(0)=\ldots,\ y'=\ldots$
1st Order Explicit	$\dfrac{d}{dt}\begin{bmatrix}x\\y\end{bmatrix}=\begin{bmatrix}\\\end{bmatrix},\ \begin{bmatrix}x\\y\end{bmatrix}=\begin{bmatrix}\\\end{bmatrix},\ t=0\ldots10$
2nd Order Explicit	$\dfrac{d^2}{dt^2}\begin{bmatrix}x\\y\end{bmatrix}=\begin{bmatrix}\\\end{bmatrix},\ \begin{bmatrix}x\\y\end{bmatrix}=\begin{bmatrix}\\\end{bmatrix},\ \dfrac{d}{dt}\begin{bmatrix}x\\y\end{bmatrix}=\begin{bmatrix}\\\end{bmatrix},\ t=0$

Cancel   OK

7. You will see:

$$y'=\ldots,\ y(0)=\ldots$$

8. You will need to enter both the DE and an initial condition, as in the next screenshot. In this screenshot we have entered the DE y'=y-x and the initial condition y(0) = -0.5

$$y'=y\text{-}x,\ y(0)=\text{-}0.5$$
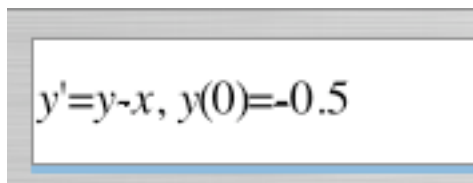
9. Hit return, and you should see the solution curve. In the next screen shot, the solution curve is drawn on top of the slope field.