Lesson #81/82

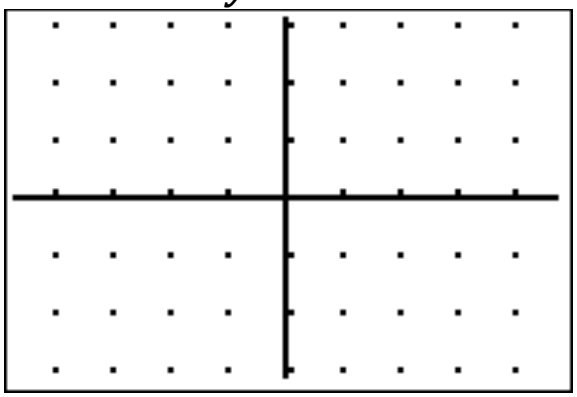
# Slope Fields and Differential Equations

A slope field is a graphical representation of the solutions of a differential equation.

Example #1:

**Draw a slope field of the differential equation.**

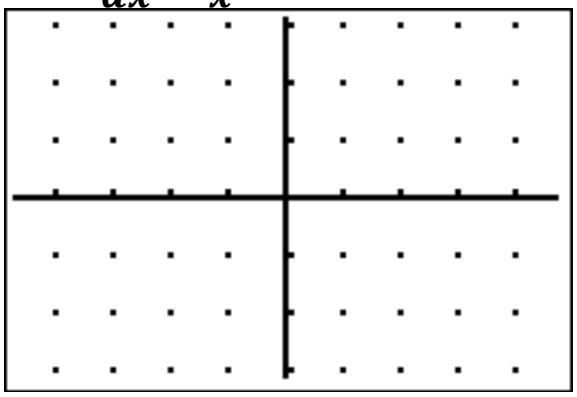
$$\frac{dy}{dx} = \frac{-x}{y}$$



**Now solve the DE.**

Example #2: **Draw the slope field and solve the DE.**

$$\frac{dy}{dx} = \frac{y}{x}$$

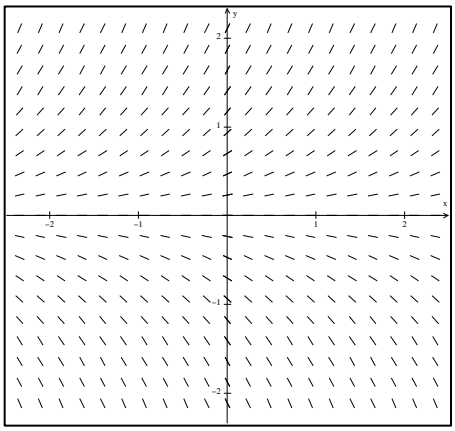


Techniques for slope fields:

1. Look for places where dy/dx=0
2. Look at slopes for places along the x & y axis.
3. Look to see if slopes "depend on x" or "depend on y"
4. Look to see when slopes are positive or negative

Lesson #81/82

The function $y = f(x)$ has the slope field shown below.



a. Sketch the path of the unique solution curve if the graph passes through (0, 1).
b. Sketch the path of the unique solution curve if the graph passes through (0, -1).
c. What familiar functions do these two graphs resemble?

d. If $\frac{dy}{dx} = y$, find the particular solution y=f(x) to the given differential equation with the initial condition f(0)=1.

e. What would the solution be if the function in part (d) passed through (0, -1) instead of (0, 1)?