Slope Fields Forever
SlopeFieldsForever.tns

Name	
Class	

Part 1 – Introducing Slope Fields

- 1. Describe your observations when you grab and move the initial condition point on the slope
 - field for $\frac{dy}{dx} = \frac{1}{2}x^2(3y y^2)$ on page 1.3.
- 2. The slope field was based on the differential

equation $\frac{dy}{dx} = \frac{1}{2}x^2(3y - y^2)$. Confirm the slope of the short segments on the slope field by finding the value of the slope as (-1, -1), (0, -3), (1, 1), (1, -1). Circle the slope at that point.

 $\frac{dy}{dx}\Big|_{\substack{x=-1\\y=-1}} = \frac{dy}{dx}\Big|_{\substack{x=0\\y=-3}} = \frac{dy}{dx}\Big|_{\substack{x=0\\y=-3}} = \frac{dy}{dx}\Big|_{\substack{x=1\\z=1}} = \frac{dy}{dx}\Big|_{\substack{$

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- **3.** For the differential equation $\frac{dy}{dx} = x + 1$, when is the slope of the tangent equal to zero?
- **4.** The slope field to the right depends on what variable(s)? What differential equation could produce this slope field?

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Part 2 – DE matching activity

Match the differential equation to its slope field on the next page of this worksheet. Use the strategies developed above to identifying the slope field for a differential equation.

You can check your answers with the slope field on page 4.2. of the TI-Nspire file. Pages 3.1-3.5 provide a tutorial for using the built-in "Graph Type" of "Differential Equation." On the TI-Nspire, slope fields can be done on a *Scratchpad Graph* or on a *Graph* application of your current document. Press **menu** > **Graph Type** > **Differential Equation**. Enter the DE.

You can change the y1 to a different letter, like *P* for population. However, the independent variable will need to be *x*. For example, dP/dt = P + t will be entered as y1'=y1+x.

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1.	 $\frac{dy}{dx}=0.3x^2$	Α.	·····5 ·······························		B.		5-27	
2.	 $\frac{dy}{dx} = 1 - y$		6.2 0.5	χ 	-6.2	5 5 5 5 5 5 5 5 5 5 5 5 5 7 4 - 1 - 5 5 5 7 5 5 5 5 5 5 5 5 7 5 5 5 5 5 5 5	0.5	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
3.	 $\frac{dy}{dx} = \cos x$						× + / / × + / / × + / /	
4.	 $\frac{dy}{dx} = x + y$	C.	· · · · · · · · · · · · · · · · · · ·		D.		5 8 1	
5.	 $\frac{dy}{dx} = 2x$		6.2, , , , , , , , 0.5	x x , , , , , , , , , , , , , , , , , , ,	-6.2	//////////////////////////////////////	0.5	6.2
6.	 $\frac{dy}{dx} = y(3-y)$		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				-5	
7.	 $\frac{dy}{dx} = x^2 + y^2$	E.	()) / / / / / / / / / / / / / / / / /				5	
8.	 $\frac{dy}{dx} = \sin x$		-6.2: · · · · · · · · · · · · · · · · · · ·		-6.2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 	0.5	
9.	 $\frac{dy}{dx} = x - y$		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	- / / / / / / / / / / / - / / / / / / /		<pre>\ \ \</pre>	5111	
10.	 $\frac{dy}{dx} = -\frac{x}{y}$	G.	· · · · · · · · · · · · · · · · · · ·		I.		5 2	
11.	 $\frac{dy}{dx} = \frac{x}{y}$			· · · · · · · · · · · · · · · · · · ·	-6.2,		0.5	6.2
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Match the following differential equations with their slope field. Check using page 4.2.