Slope Fields
Nancy Stephenson
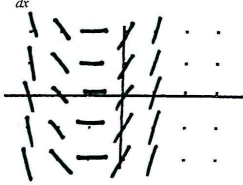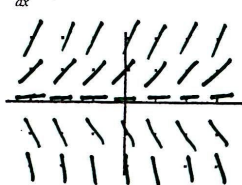Clements High School
Sugar Land, Texas

Draw a slope field for each of the following differential equations. Each tick mark is one unit.
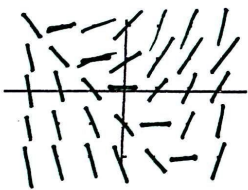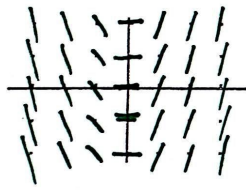
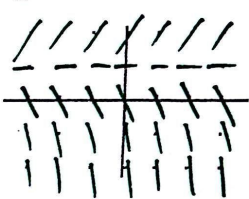1. $\dfrac{dy}{dx} = x + 1$

2. $\dfrac{dy}{dx} = 2y$

3. $\dfrac{dy}{dx} = x + y$

4. $\dfrac{dy}{dx} = 2x$

5. $\dfrac{dy}{dx} = y - 1$

6. $\dfrac{dy}{dx} = -\dfrac{y}{x}$

x	y	dy/dx
0	0	indet.
0	#	undefined
#	0	0
1	1	-1
-1	1	1
2	1	-½
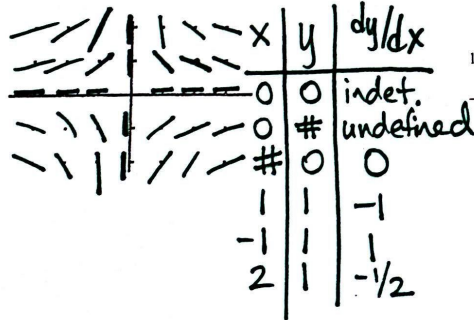
Match the slope fields with their differential equations.

(A)

(B)

(C)

(D)

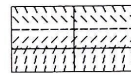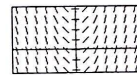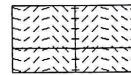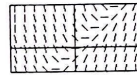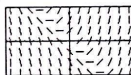7. $\dfrac{dy}{dx} = \sin x$ **C**   8. $\dfrac{dy}{dx} = x - y$ **D**   9. $\dfrac{dy}{dx} = 2 - y$ **A**   10. $\dfrac{dy}{dx} = x$ **B**
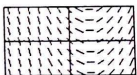
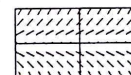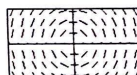Match the slope fields with their differential equations.

(A)

(B)

(C)

(D)

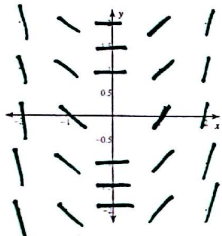11. $\dfrac{dy}{dx} = 0.5x - 1$ **B**   12. $\dfrac{dy}{dx} = 0.5y$ **C**   13. $\dfrac{dy}{dx} = -\dfrac{x}{y}$ **D**   14. $\dfrac{dy}{dx} = x + y$ **A**
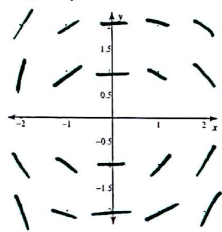
Slope Fields

Sketch the slope field for each differential equation.
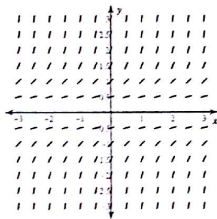
1) $\dfrac{dy}{dx} = x$

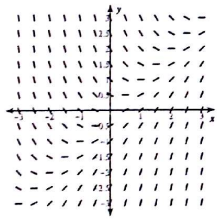2) $\dfrac{dy}{dx} = -\dfrac{x}{y}$

For each problem, find a differential equation that could be represented with the given slope field.

3)

A) $\dfrac{dy}{dx} = -\dfrac{1}{x}$ B) $\dfrac{dy}{dx} = -\dfrac{1}{y}$

C) $\dfrac{dy}{dx} = 1$ (D) $\dfrac{dy}{dx} = y^2$

4)

A) $\dfrac{dy}{dx} = x + y$ (B) $\dfrac{dy}{dx} = x - y$

C) $\dfrac{dy}{dx} = xy$ D) $\dfrac{dy}{dx} = -xy$

Introduction to Differential Equations

Find the general solution of each differential equation.

1) $\dfrac{dy}{dx} = 2x + 2$

$$y = x^2 + 2x + c$$

2) $f'(x) = -2x + 1$

$$y = -x^2 + x + c$$

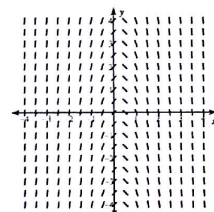3) $\dfrac{dy}{dx} = -\dfrac{1}{x^2}$

$$y = \dfrac{1}{x} + c$$

4) $\dfrac{dy}{dx} = \dfrac{1}{(x+3)^2}$
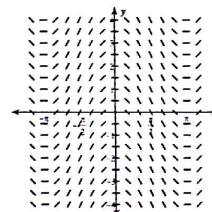
$$y = \dfrac{-1}{x+3} + c$$

For each problem, find the particular solution of the differential equation that satisfies the initial condition. You may use a graphing calculator to sketch the solution on the provided graph.

5) $\dfrac{dy}{dx} = -4x + 1,\ y(-1) = -3$

$$y = -2x^2 + x + c$$
$$c = 0$$
$$y = -2x^2 + x$$

6) $\dfrac{dy}{dx} = -2\sin x,\ y\left(\dfrac{2\pi}{3}\right) = 0$

$$y = 2\cos x + c$$
$$c = 1$$
$$y = 2\cos x + 1$$