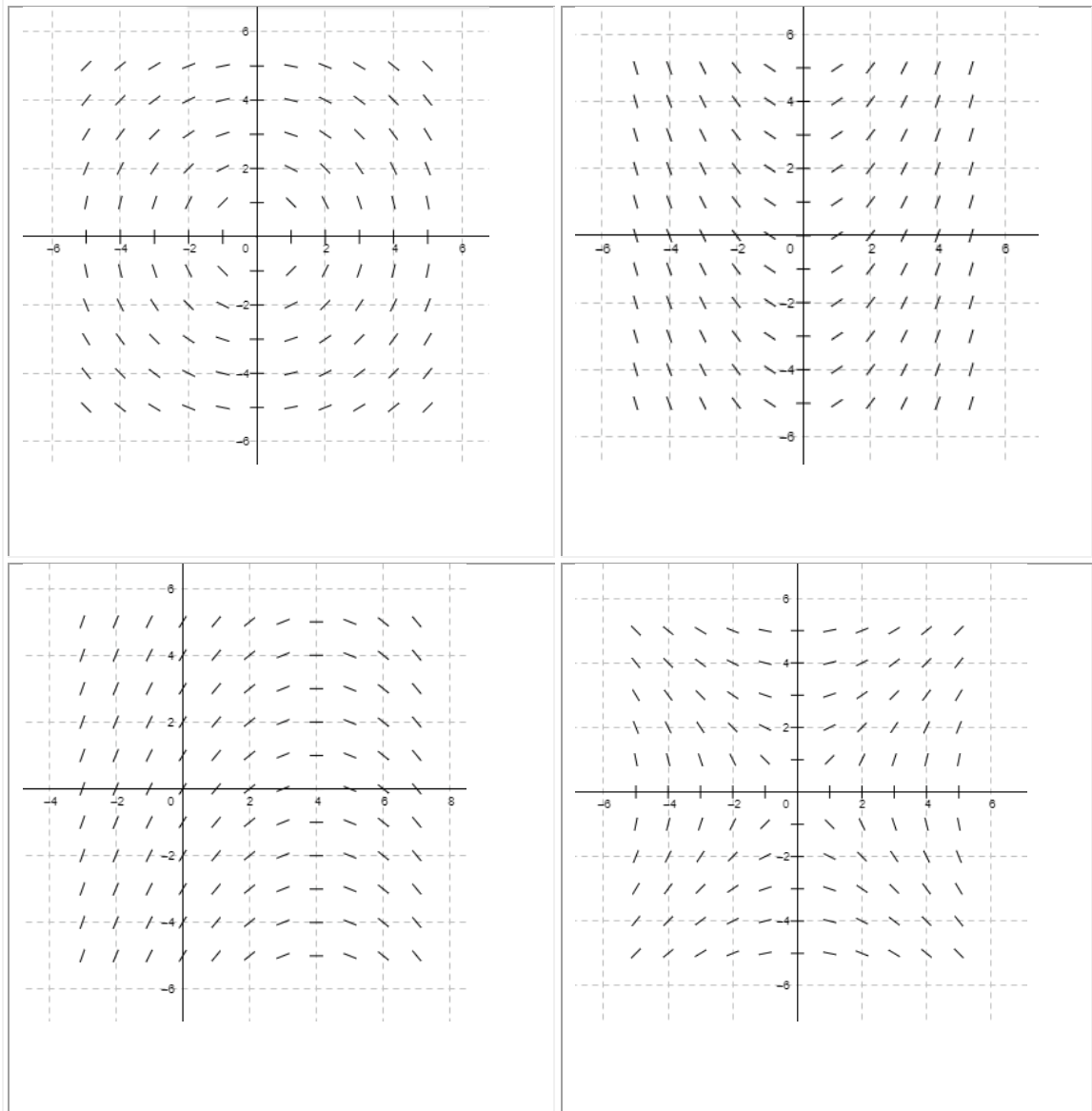


Calculus  
Lesson 6.1: Slope Fields  
Mrs. Snow, Instructor

Solving a differential equation analytically can be difficult or even impossible. Consider a differential equation of the form  $y' = F(x, y)$  where  $F(x, y)$  is some expression in terms of  $x$  and  $y$ . At each point  $(x, y)$ , the differential equation determines the slope. Remember  $y' = \text{slope}$ . We can use a graphical method to learn about the solution of a differential equation. By drawing short line segments with the slopes as calculated by several points you will get what is called a **slope field** or a **direction field** for the differential equation.

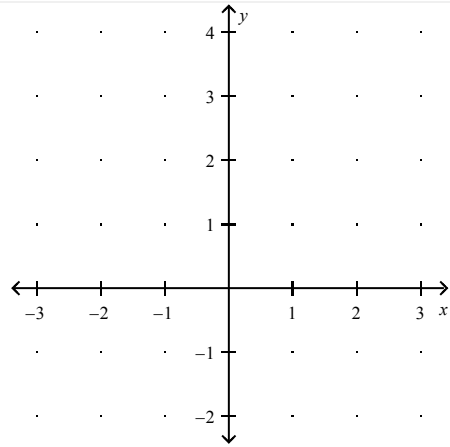


What does it look like?

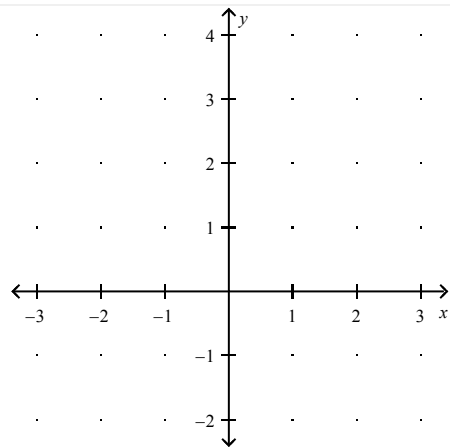


Sketch the slope fields

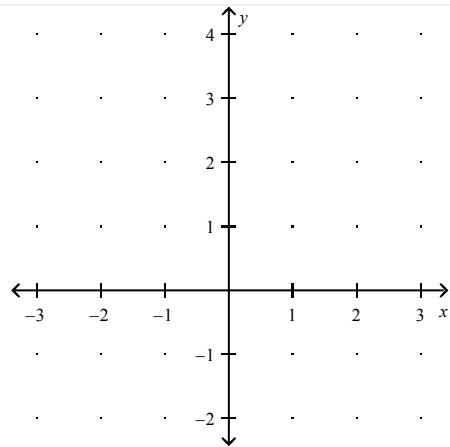
$$\frac{dy}{dx} = x - 1$$



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



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



Identify the slope field

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

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

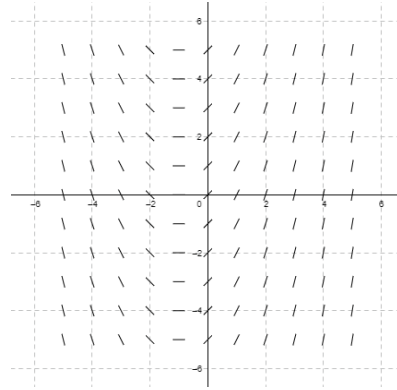
3.  $\frac{dy}{dx} = x + 1$

4.  $\frac{dy}{dx} = y - 1$

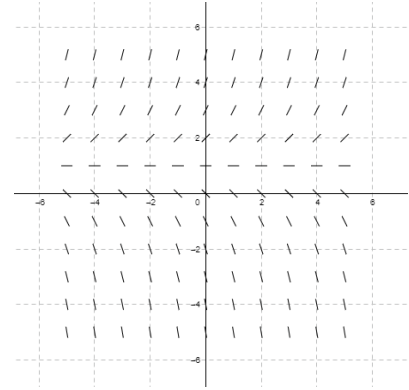
5.  $\frac{dy}{dx} = x + y$

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

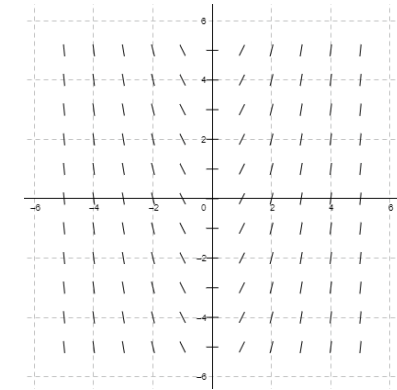
A.



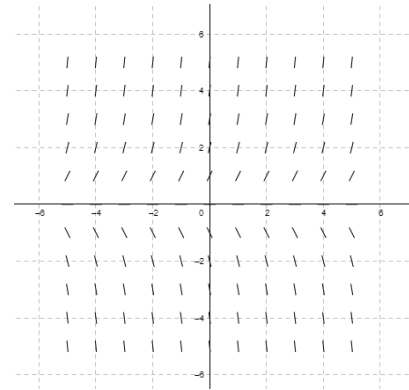
B.



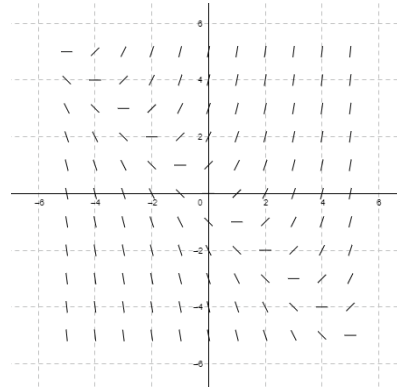
C.



D.



E.



F.

