

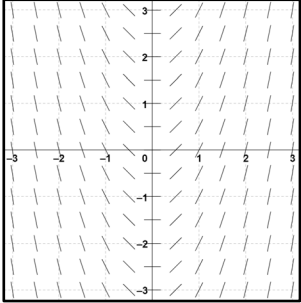
# 7.3 Sketching Slope Fields

Write your questions and thoughts here!

A slope field represents a differential equation on an  $xy$ -plane. It shows the “slope” of all the particular solutions to the differential equation.

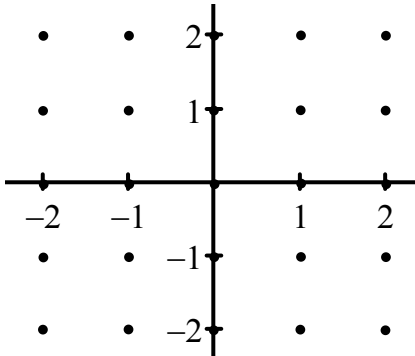
Below is a differential equation with its accompanying slope field.

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

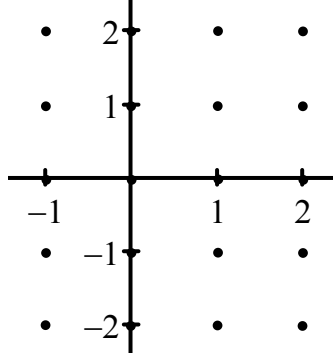


**Use the differential equation to create a slope field.**

1.  $\frac{dy}{dx} = xy$

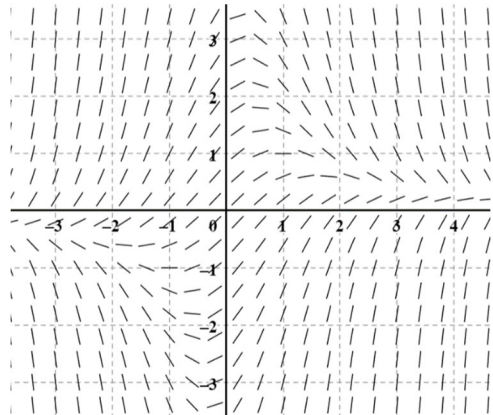


2.  $\frac{dy}{dx} = y - 2x$



3. The figure below shows the slope for the differential equation  $\frac{dy}{dx} = 1 - xy$ .

- a. Let  $f$  be the function that satisfies the given differential equation. Write an equation for the tangent line to the curve  $y = f(x)$  through the point  $(-1, -2)$ .



Write your questions and thoughts here!

4. Below is a slope field for which of the following differential equations?

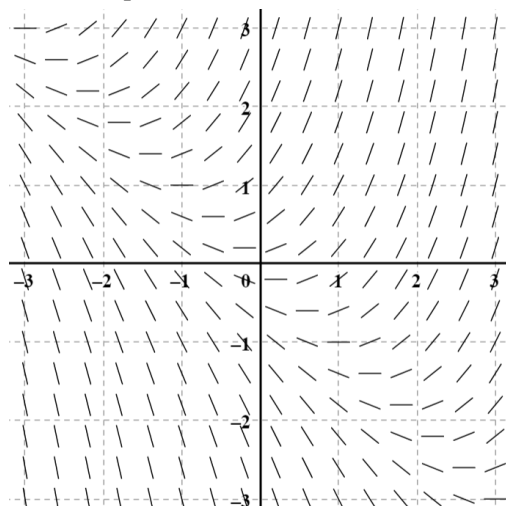
(A)  $\frac{dy}{dx} = 1 + x$

(B)  $\frac{dy}{dx} = x^2$

(C)  $\frac{dy}{dx} = x + y$

(D)  $\frac{dy}{dx} = \frac{x}{y}$

(E)  $\frac{dy}{dx} = \ln y$



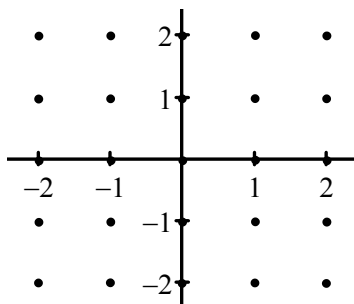
### 7.3 Sketching Slope Fields

Calculus

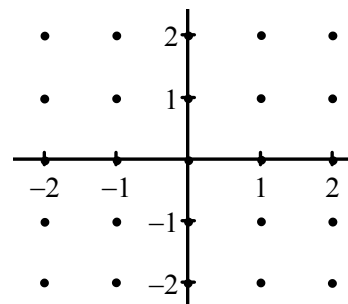
**Practice**

Draw a slope field for each of the following differential equations. Use each of the coordinate points shown in the graph.

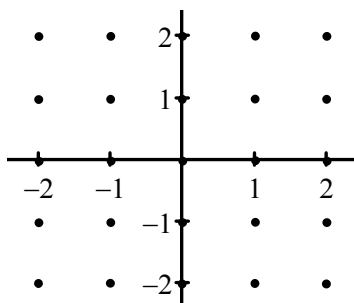
1.  $\frac{dy}{dx} = x + y$



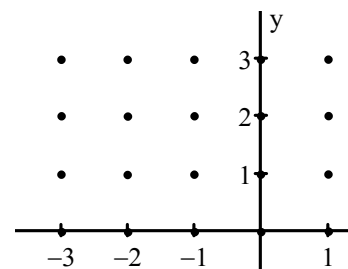
2.  $\frac{dy}{dx} = 2y$



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



4.  $\frac{dy}{dx} = \frac{x+1}{y-2}$



Write the letter of each slope field next to its matching differential equation.

5. \_\_\_\_\_  $\frac{dy}{dx} = \sin x$

6. \_\_\_\_\_  $\frac{dy}{dx} = 0.5x - 1$

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

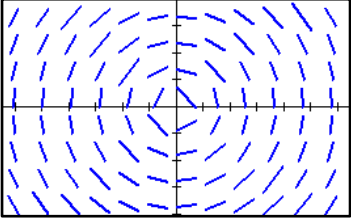
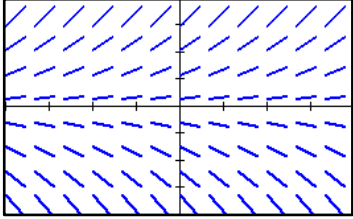
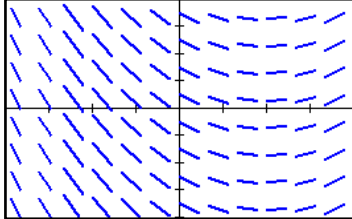
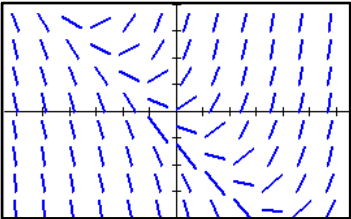
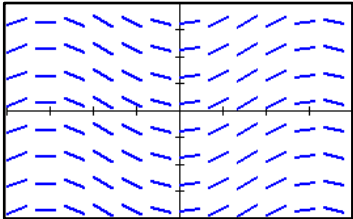
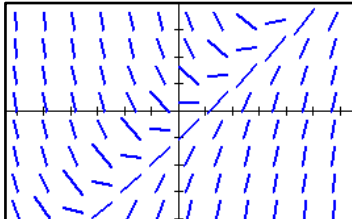
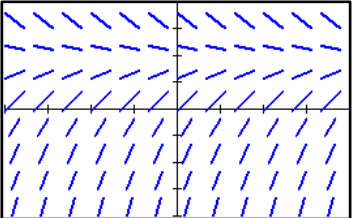
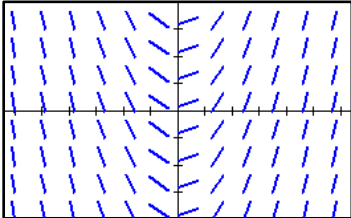
8. \_\_\_\_\_  $\frac{dy}{dx} = 0.5y$

9. \_\_\_\_\_  $\frac{dy}{dx} = 2 - y$

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

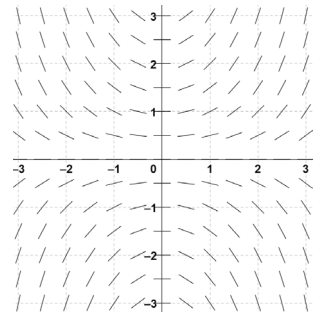
11. \_\_\_\_\_  $\frac{dy}{dx} = x$

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

<p>A.</p> 	<p>B.</p> 	<p>C.</p> 
<p>D.</p> 	<p>E.</p> 	<p>F.</p> 
<p>G.</p> 	<p>H.</p> 	

13. Consider the differential equation given by  $\frac{dy}{dx} = \frac{xy}{2}$  and its slope field shown below.

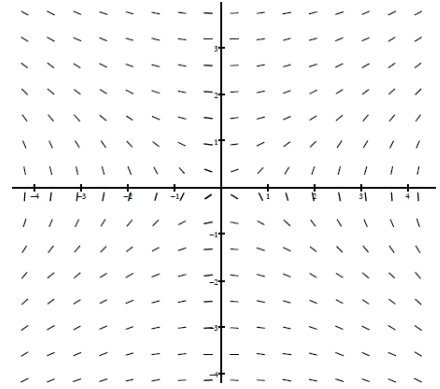
a. Calculate  $\frac{dy}{dx}$  at the point (1, 1) and verify that the result agrees with the figure.



b. Let  $f$  be the function that satisfies the given differential equation. Write an equation for the tangent line to the curve  $y = f(x)$  through the point (1, 1). Then use your tangent line equation to estimate the value of  $f(1.2)$ .

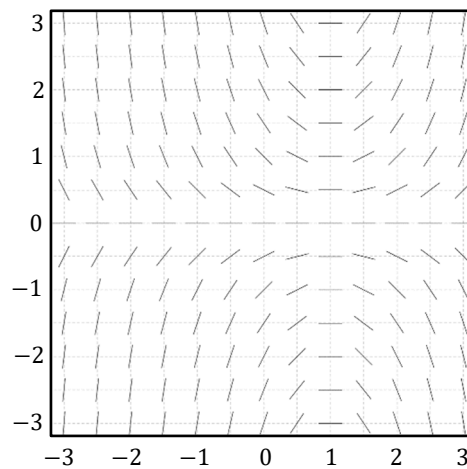
14. The figure below shows the slope field for the differential equation  $\frac{dy}{dx} = \frac{x}{2y}$ .

- a. Calculate  $\frac{dy}{dx}$  at the point  $(3, 2)$  and verify that the result agrees with the figure.



- b. Let  $f$  be the function that satisfies the given differential equation. Write an equation for the tangent line to the curve  $y = f(x)$  through the point  $(3, 2)$ .

15.



Shown above is a slope field for which of the following differential equations?

- (A)  $\frac{dy}{dx} = xy - y$
- (B)  $\frac{dy}{dx} = xy + y$
- (C)  $\frac{dy}{dx} = x - y^2$
- (D)  $\frac{dy}{dx} = (x - 1)y^2$
- (E)  $\frac{dy}{dx} = (x - 1)^3$