

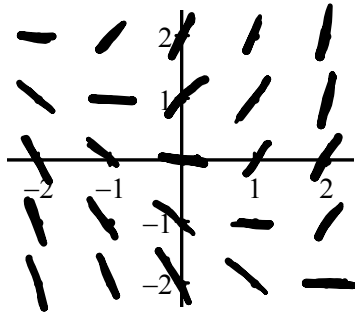
7.3 Sketching Slope Fields

Practice

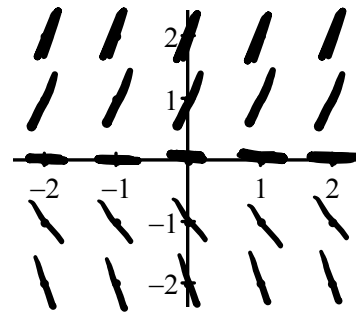
Calculus

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

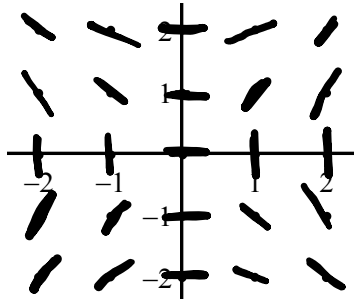
1. $\frac{dy}{dx} = x + y$



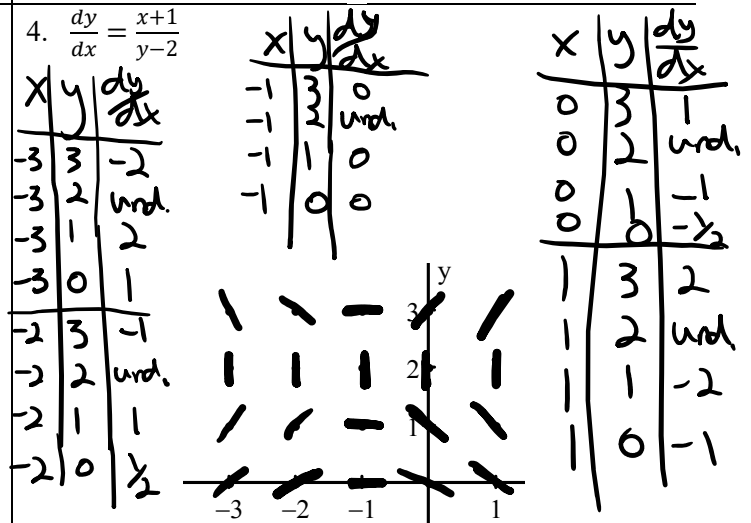
2. $\frac{dy}{dx} = 2y$



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. E $\frac{dy}{dx} = \sin x$

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

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

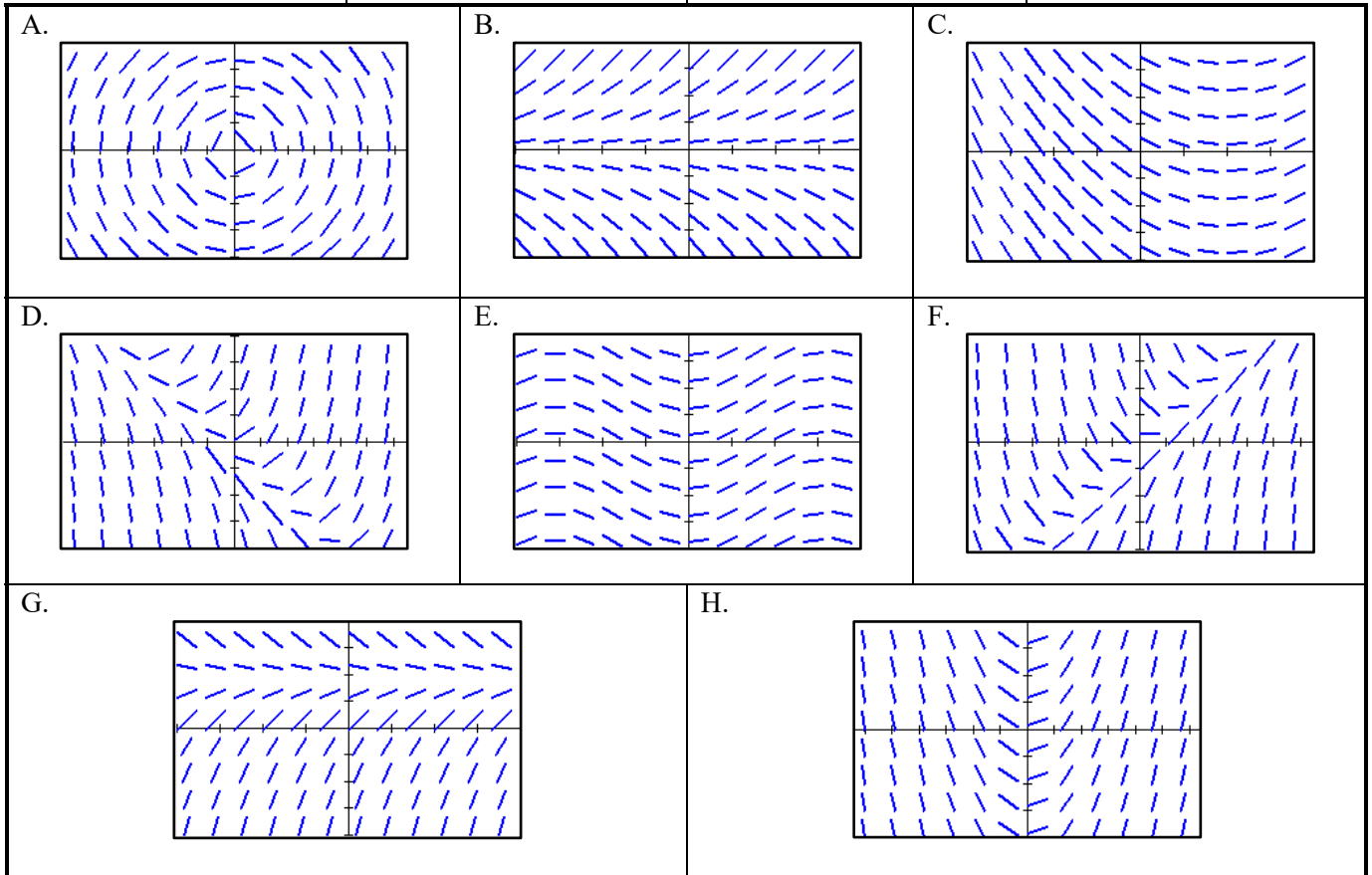
8. B $\frac{dy}{dx} = 0.5y$

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

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

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

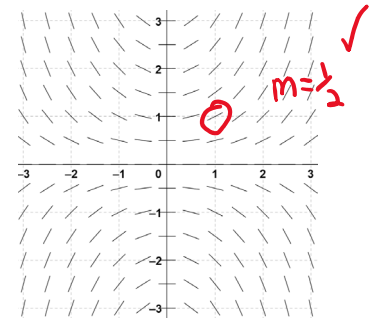
12. D $\frac{dy}{dx} = x + y$



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.

$$\frac{(1)(1)}{2} = \frac{1}{2}$$



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 $f(1.2)$.

$$y - 1 = \frac{1}{2}(x - 1)$$

$$y - 1 = \frac{1}{2}(1.2 - 1)$$

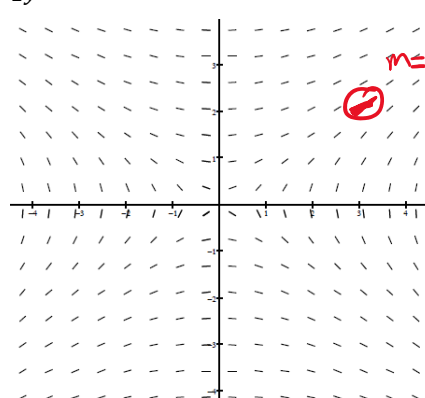
$$y - 1 = 0.5(0.2)$$

$$y = 0.1 + 1 = \boxed{1.1}$$

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.

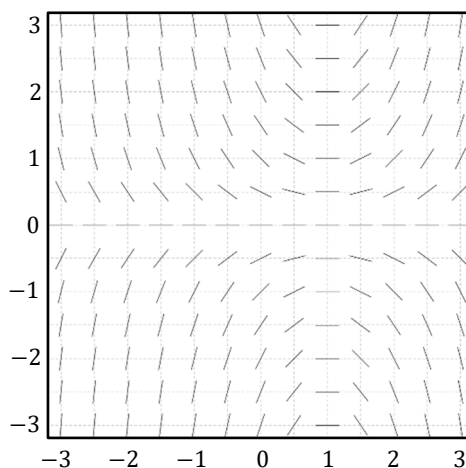
$$\frac{3}{2(2)} = \frac{3}{4}$$



- 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).

$$y - 2 = \frac{3}{4}(x - 3)$$

15.



Check the following:

If $y = 0$, $\frac{dy}{dx} = 0$

If $x = 1$, $\frac{dy}{dx} = 0$

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

- (A) $\frac{dy}{dx} = xy - y$ ✓ ✓ Check more test points. At (0, -1) $\frac{dy}{dx} \approx 1$
- (B) $\frac{dy}{dx} = xy + y$ ✗
- (C) $\frac{dy}{dx} = x - y^2$ ✗
- (D) $\frac{dy}{dx} = (x - 1)y^2$ ✓ ✗
- (E) $\frac{dy}{dx} = (x - 1)^3$ ✓ ✗