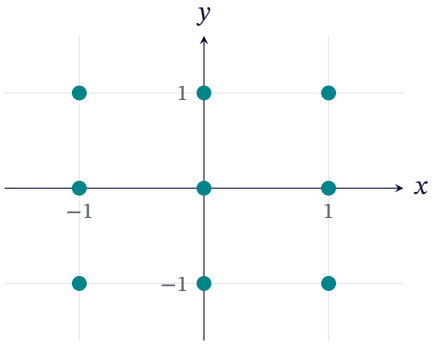
7.3 / Practice workbook

Sketching Slope Fields

Practice

Problems 1–6 / Show your reasoning

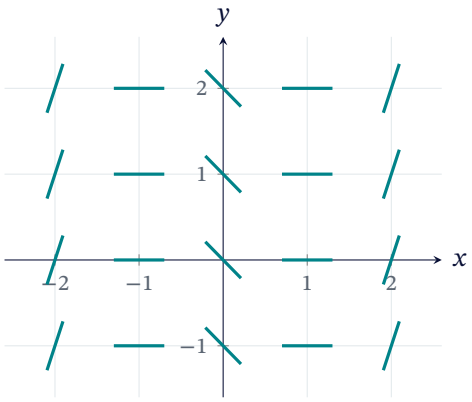
1 Consider the differential equation $\frac{dy}{dx} = 1 - xy$. Sketch its slope field at the nine points with $x = -1, 0, 1$ and $y = -1, 0, 1$.



2 In the slope field of $\frac{dy}{dx} = 2x + y$, along which line are all the segments horizontal?

A. $y = 2x$
B. $y = -2x$
C. $y = -\frac{x}{2}$
D. $x = 0$

3 Which differential equation has this slope field?

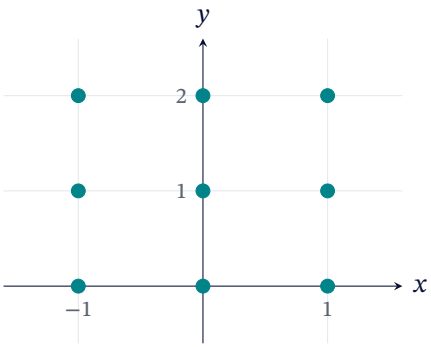


A. $y' = x^2 - 1$
B. $y' = 1 - x^2$
C. $y' = y^2 - 1$
D. $y' = x - 1$

7.3 / AP-style free response

Problem 4 ➤ */ Show the work and the reasons a grader looks for.*

Consider the differential equation $\frac{dy}{dx} = x^2 - y$.

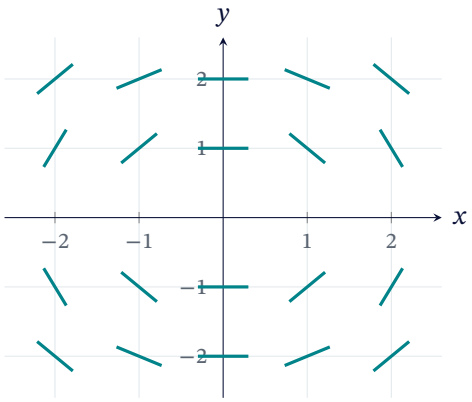


(a) Sketch its slope field at the nine points with $x = -1, 0, 1$ and $y = 0, 1, 2$.

(b) On what curve are all the segments horizontal?

(c) Describe all the points (x, y) where the segments of the slope field have a negative slope.

5 Which differential equation has this slope field? (No segments are drawn on the x-axis.)



A. $y' = \frac{x}{y}$

B. $y' = -\frac{x}{y}$

C. $y' = \frac{y}{x}$

D. $y' = -\frac{y}{x}$

6 Consider the differential equation $\frac{dy}{dx} = \frac{y-1}{x}$. Which of the following statements about its slope field are true?

I. No segments are drawn at points on the y-axis.

II. Every segment on the line $y = 1$ is horizontal.

III. All the segments in any one vertical column are parallel.

A. I only

B. I and II only

C. II and III only

D. I, II, and III

7.3 / Answer key

Sketching Slope Fields

1 $y = -1$: $0, 1, 2$; $y = 0$: $1, 1, 1$; $y = 1$: $2, 1, 0$

2 (B)

3 (A)

4 (a) $y = 0$: $1, 0, 1$; $y = 1$: $0, -1, 0$; $y = 2$: $-1, -2, -1$; (b) the parabola $y = x^2$; (c) the points above the parabola: $y > x^2$

5 (B)

6 (B)