

9.1 Review

1-10 III Solve the differential equation.

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

2. $\frac{dy}{dx} = \frac{e^{2x}}{4y^3}$

3. $(x^2 + 1)y' = xy$

4. $y' = y^2 \sin x$

5. $(1 + \tan y)y' = x^2 + 1$

9. $\frac{du}{dt} = 2 + 2u + t + tu$

11-18 III Find the solution of the differential equation that satisfies the given initial condition.

11. $\frac{dy}{dx} = y^2 + 1, \quad y(1) = 0$

15. $\frac{du}{dt} = \frac{2t + \sec^2 t}{2u}, \quad u(0) = -5$

17. $y' \tan x = a + y, \quad y(\pi/3) = a, \quad 0 < x < \pi/2$

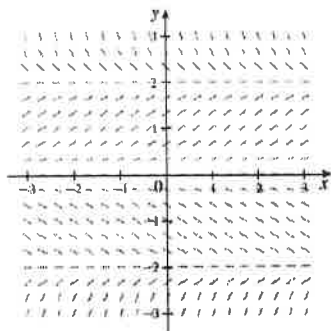
9.2 Review

1. A direction field for the differential equation $y' = y(1 - \frac{1}{3}y^2)$ is shown.

(a) Sketch the graphs of the solutions that satisfy the given initial conditions.

- (i) $y(0) = 1$ (ii) $y(0) = -1$
 (iii) $y(0) = -3$ (iv) $y(0) = 3$

(b) Find all the equilibrium solutions.

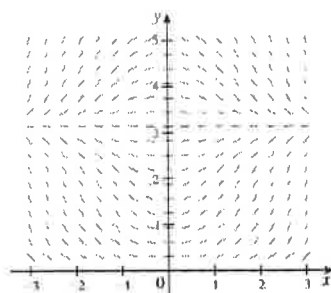


2. A direction field for the differential equation $y' = x \sin y$ is shown.

(a) Sketch the graphs of the solutions that satisfy the given initial conditions.

- (i) $y(0) = 1$ (ii) $y(0) = 2$ (iii) $y(0) = \pi$
 (iv) $y(0) = 4$ (v) $y(0) = 5$

(b) Find all the equilibrium solutions.



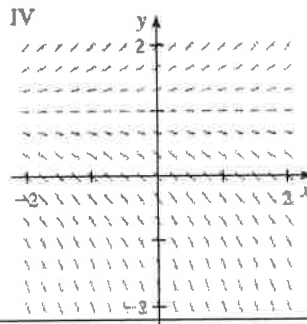
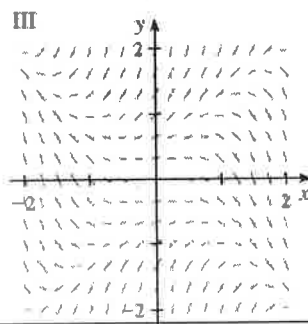
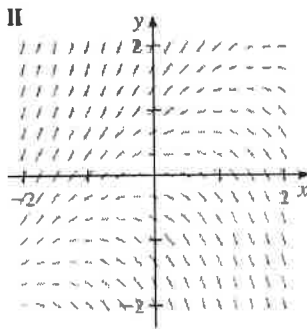
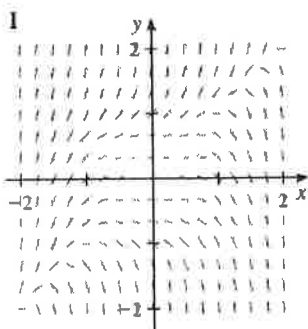
3-6 ■ Match the differential equation with its direction field (labeled I-IV). Give reasons for your answer.

3. $y' = y - 1$

4. $y' = y - x$

5. $y' = y^2 - x^2$

6. $y' = y^3 - x^3$



7. Use the direction field labeled I (for Exercises 3-6) to sketch the graphs of the solutions that satisfy the given initial conditions.

- (a) $y(0) = 1$ (b) $y(0) = 0$ (c) $y(0) = -1$

8. Repeat Exercise 7 for the direction field labeled III.

9-10 ■ Sketch a direction field for the differential equation. Then use it to sketch three solution curves.

9. $y' = 1 + y$

10. $y' = x^2 - y^2$