Section 5.2 – The Indefinite Integral
Section 8.3 – Slope Fields

5. Find the derivative and state the corresponding integration formula for: $\frac{d}{dx}\left[\sqrt{x^3+5}\,\right]$.

9. Evaluate the indefinite integral

a. $\int x^8 dx$ b. $\int x^{5/7} dx$ c. $\int x^3\sqrt{x}\,dx$

Evaluate the indefinite integral and check your answer by differentiating.

16. $\int (2+y^2)^2\,dy$ 20. $\int \frac{1-2t^3}{t^3}\,dt$ 25. $\int \sec x\,(\sec x+\tan x)\,dx$

26. $\int \csc x\,(\sin x+\cot x)dx$ 29. $\int \frac{\sin x}{\cos^2 x}\,dx$ 33. $\int \frac{1}{2\sqrt{1-x^2}}-\frac{3}{1+x^2}\,dx$

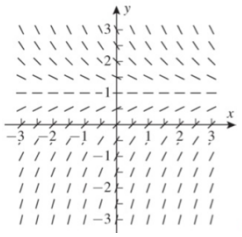
35. Evaluate the integral $\int \frac{1}{1+\sin x}\,dx$ by multiplying the numerator and denominator by an appropriate expression.

43. Solve the initial-value problem:

a. $\frac{dy}{dx}=\sqrt[3]{x},\ y(1)=2$
b. $\frac{dy}{dt}=\sin t+1,\ y\left(\frac{\pi}{3}\right)=\frac{1}{2}$
c. $\frac{dy}{dx}=\frac{x+1}{\sqrt{x}},\ y(1)=0$

54. Find an equation of the curve such that at each point (x, y) on the curve the slope is $(x+1)^2$ and passes through the point (-2,8).

3. A slope field for the differential equation $y'=1-y$ is shown in the accompanying figure. In each part, sketch the graph of the solution that satisfies the initial condition.



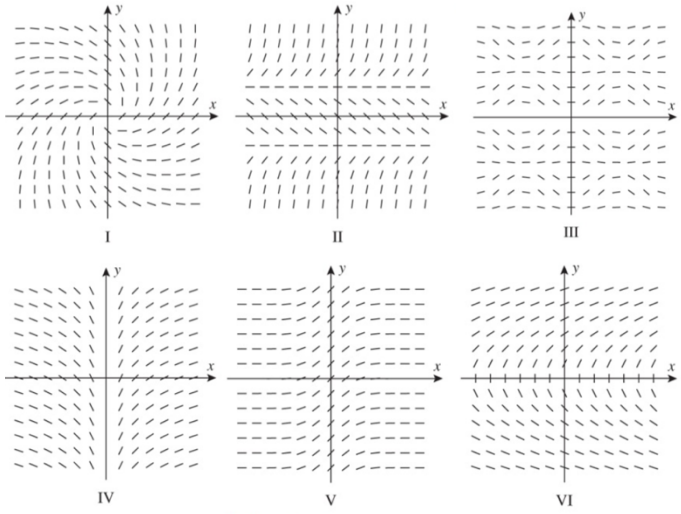
a. y(0)=-1 b. y(0)=1 c. y(0)=2

6. Match the following differential equations with the slope field and explain your reasoning.

a. $y'=\frac{1}{x}$ b. $y'=\frac{1}{y}$

c. $y'=e^{-x^2}$ d. $y'=y^2-1$

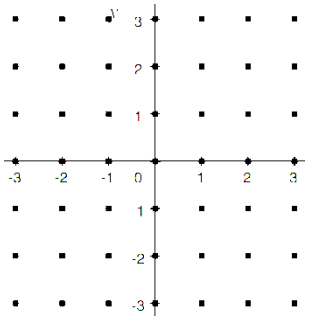
e. $y'=\frac{x+y}{x-y}$ f. $y'=(\sin x)(\cos x)$



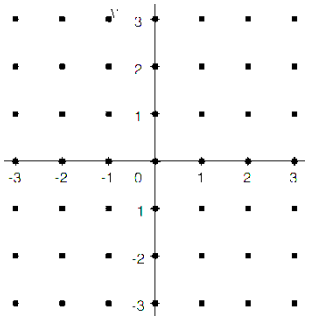
NOT IN TEXTBOOK (Okay to do write on this worksheet)

Draw a slope field for the following differential equations.

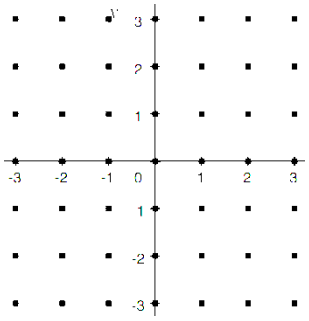
a. $\frac{dy}{dx} = x + 1$



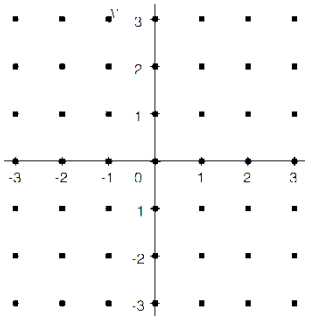
b. $\frac{dy}{dx} = y - x$



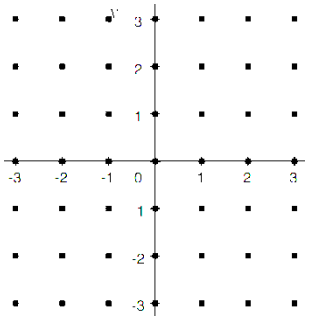
c. $\frac{dy}{dx} = x + y$



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



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



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