

Introduction to Differential Equations

Find the general solution of each differential equation.

1) $\frac{dy}{dx} = 2x + 2$

2) $f'(x) = -2x + 1$

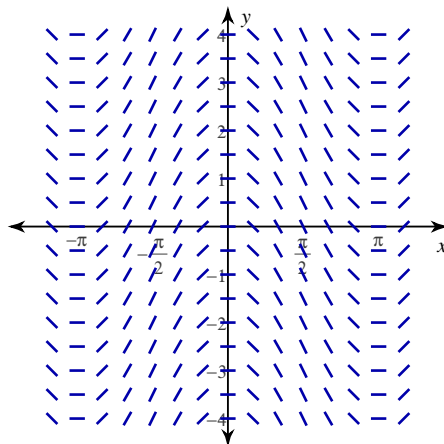
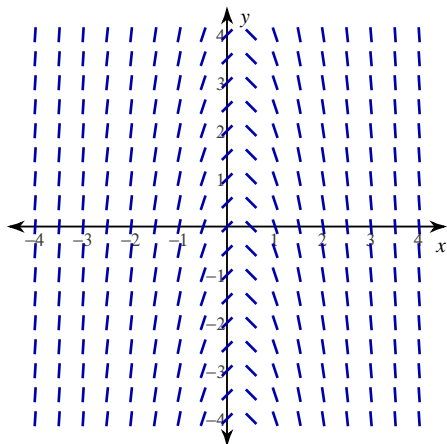
3) $\frac{dy}{dx} = -\frac{1}{x^2}$

4) $\frac{dy}{dx} = \frac{1}{(x+3)^2}$

For each problem, find the particular solution of the differential equation that satisfies the initial condition. You may use a graphing calculator to sketch the solution on the provided graph.

5) $\frac{dy}{dx} = -4x + 1, y(-1) = -3$

6) $\frac{dy}{dx} = -2\sin x, y\left(\frac{2\pi}{3}\right) = 0$



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Find the general solution of each differential equation.

$$1) \frac{dy}{dx} = 2x + 2$$

$$y = x^2 + 2x + C$$

$$2) f'(x) = -2x + 1$$

$$f(x) = -x^2 + x + C$$

$$3) \frac{dy}{dx} = -\frac{1}{x^2}$$

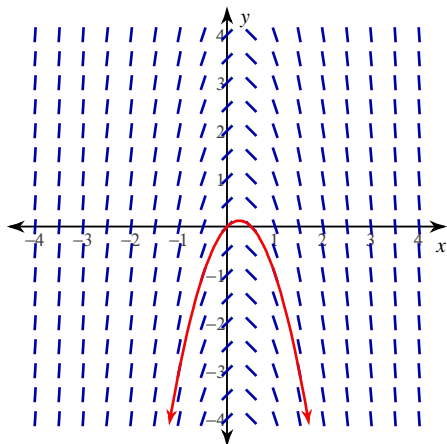
$$y = \frac{1}{x} + C$$

$$4) \frac{dy}{dx} = \frac{1}{(x+3)^2}$$

$$y = -\frac{1}{x+3} + C$$

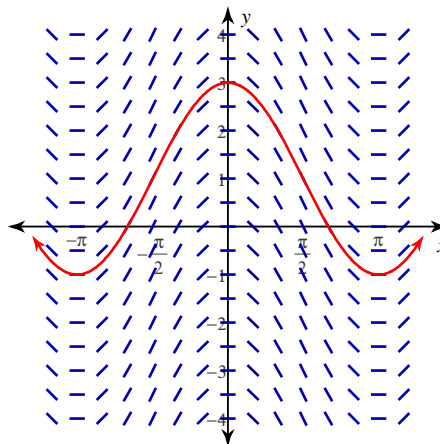
For each problem, find the particular solution of the differential equation that satisfies the initial condition. You may use a graphing calculator to sketch the solution on the provided graph.

$$5) \frac{dy}{dx} = -4x + 1, y(-1) = -3$$



$$y = -2x^2 + x$$

$$6) \frac{dy}{dx} = -2\sin x, y\left(\frac{2\pi}{3}\right) = 0$$



$$y = 2\cos x + 1$$