

Find the general solution to the exact differential equation.

$$1) \frac{dy}{dx} = x^7 - \frac{1}{x^7}$$

$$2) \frac{dy}{dx} = \frac{6}{\sqrt{x}} - \frac{1}{x^2 + 1} + \frac{1}{x}$$

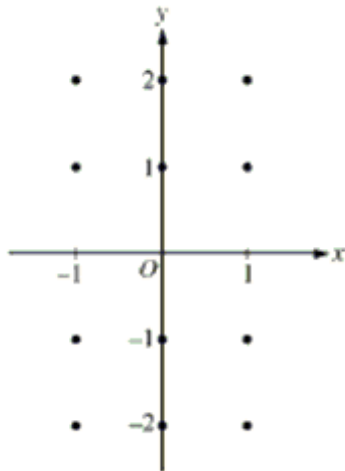
Use separation of variables to solve the initial value problem.

$$3) \frac{dy}{dx} = 3xy \text{ and } y = 5 \text{ when } x = 0$$

$$4) \frac{dy}{dx} = \frac{3x^2}{\sqrt{y}} \text{ and } y = 1 \text{ when } x = 0$$

5) Consider the differential equation $\frac{dy}{dx} = \frac{xy^3}{2}$, where

- a) On the axis provided, sketch a slope field for the given differential equation at the twelve points indicated



- b) Find the particular solution $y = f(x)$ to the given differential equation with the initial condition $f(1) = -1$.

6) Given that $f(1) = -1$ and $\frac{dy}{dx} = \frac{xy^3}{2}$, what is the approximation for $f(2)$ if Euler's Method is used with a step size of .5, starting at $x = 1$.