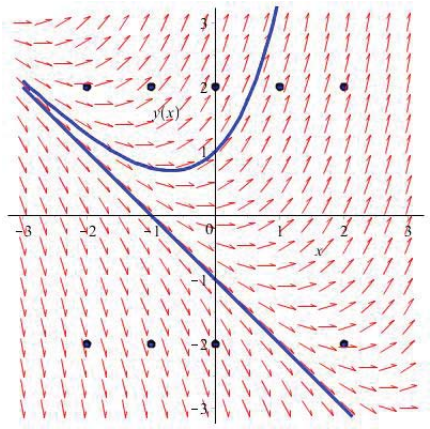
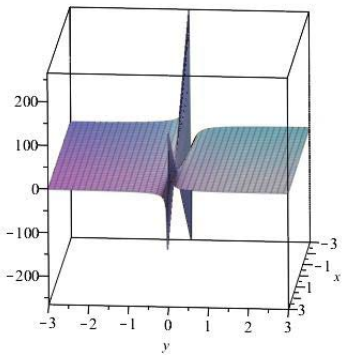
Math 256 GWS 2 - 1.3 and 1.4 Slope Fields, Solutions Curves, and Separable Equations

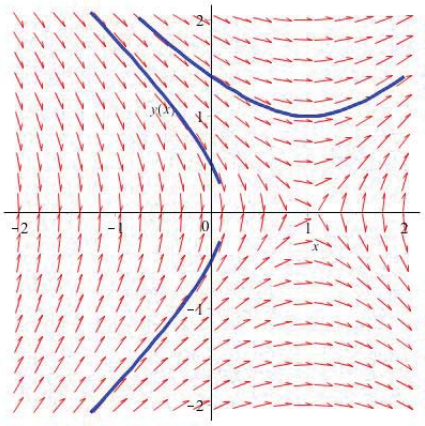
Name:_____

1. The differential equation $\frac{dy}{dx} = x + y$ has the following direction field. Draw solution curves through the shown points.

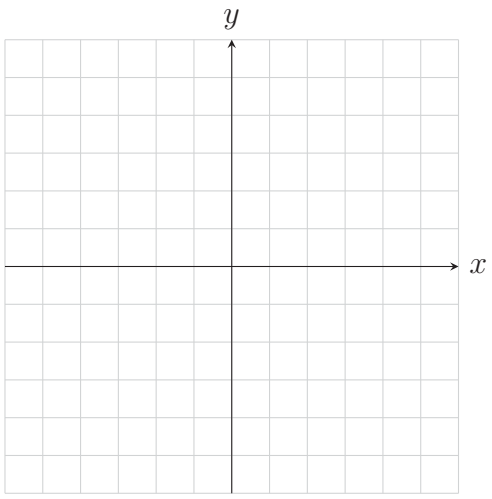


2. Determine if the differential equation $\dfrac{dy}{dx} = \dfrac{x-1}{y}$, $y(0) = 1$, is guaranteed the existence of a solution and, if so, is that solution guaranteed to be unique? What if the initial condition is $y(1) = 0$?





3. Construct a direction field for the differential equation $y' = x^2 - y^2$. Then sketch a few solution curves for different initial conditions, making sure to include the solution curve with initial condition $y(0) = 1$.



4. Find a general solution to the following separable differential equations.

(a) $\frac{dy}{dx} = (64xy)^{1/3}$

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

5. Find the particular solution of the initial value problems.

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

b. $\frac{dy}{dx} = y\cot(x), \quad y\left(\frac{1}{2}\pi\right) = \frac{1}{2}\pi$