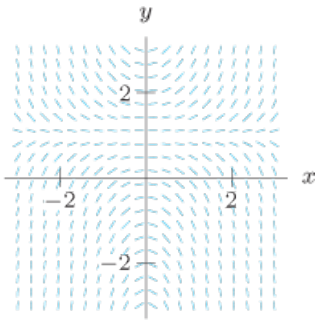
Homework 15: Differential Equations Part II (due April 27)

1. The slope field for the equation $y' = x(y-1)$ is shown below.

(a) Sketch the solutions passing through the following points: $(0,1)$, $(0,-1)$, $(0,0)$.

(b) Using your sketch, write down the equation of the solution with $y(0) = 1$.

(c) Verify your equation from part (b) is a solution by showing it satisfes the differential equation.



2. Use separation of vaiable to solve the following differential equation subject to the given initial condition:

$$\frac{dZ}{dy} = Zy \text{ with } Z = 1 \text{ when } y = 0.$$

3. Use separation of vaiable to solve the following differential equation subject to the given initial condition:

$$\frac{dw}{d\psi} = -w^2 \tan(\psi) \text{ with } w(0) = 2.$$

4. Assume $a, b > 0$. Solve the differential equation

$$\frac{dR}{dt} = aR + b$$

5. Solve the following differential equation subject to the given initial condition:

$$\frac{dy}{dt} = y(2-y) \text{ with } y(0) = 1.$$