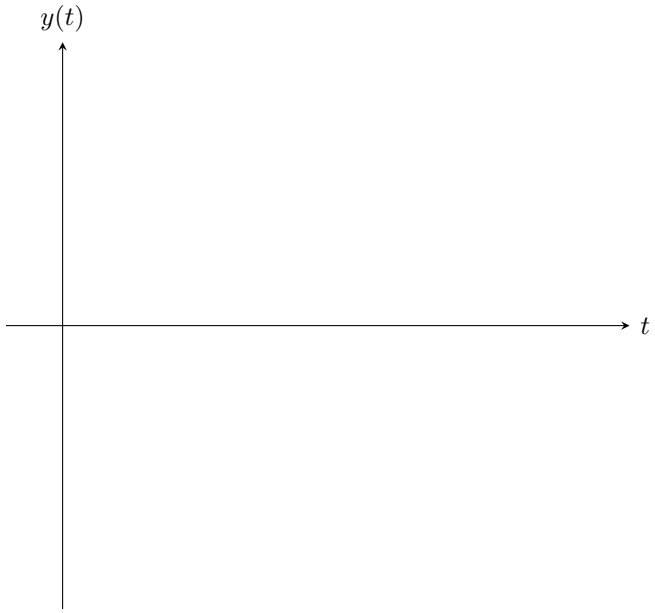
Name: _____ Sort #: _____

Worksheet 12

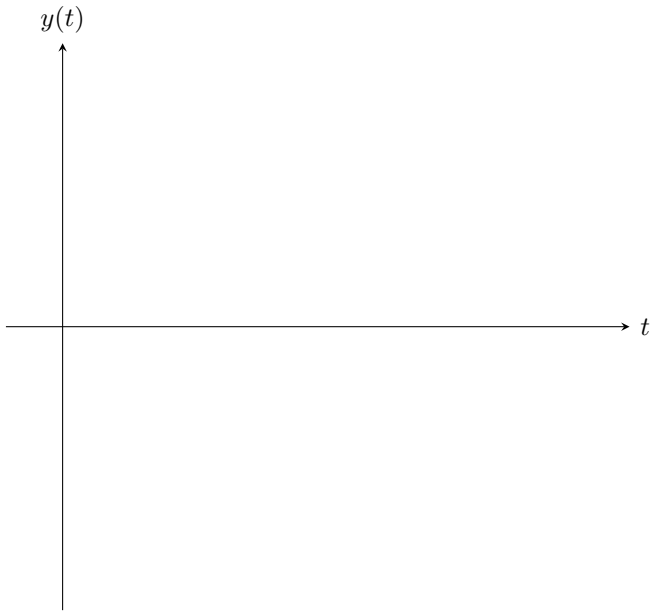
Intro to Differential Equations MATH 2205, Fall 2018

1. Plot the direction field and solution curves for several values of y_0.

   (a) $y' = -1 - 2y \quad y(0) = y_0$



   (b) $y' = 2y - 10; \quad y(0) = y_0$



2. Verify that equation

$$t^2y'' + 5ty' + 4y = 0, \quad t > 0$$

has solutions

$$y_1(t) = t^{-2}; \qquad y_2(t) = t^{-2}\ln(t)$$

3. For each of the given differential equations, determine its order and whether it is linear or nonlinear.

   (a) $t^2\dfrac{d^2y}{dt^2} + t\dfrac{dy}{dt} + 2y = \sin(t)$

   (b) $\dfrac{dy}{dt} + ty^2 = 0$

   (c) $\dfrac{d^3y}{dt^3} + t\dfrac{d^2y}{dt^2} + (\cos^2(t))y = t^3$

   (d) $\dfrac{d^3y}{dt^3} + t\dfrac{d^2y}{dt^2} + \sin(t+y) = t^3$