

**HOMEWORK 3**  
**DIFFERENTIAL EQUATIONS**  
**DUE 2014-09-04**

**Show your work** unless otherwise specified.

- (1) Your friend has learned to find equilibrium solutions by looking for where the derivative is 0.
    - (a) Explain how applying this method to  $\dot{y} = y - t$  will lead your friend to find the 'equilibrium solution'  $y = t$ .
    - (b) Show that  $y = t$  is not a solution of  $\dot{y} = y - t$ .
    - (c) What part of the definition of an 'equilibrium solution' did your friend forget?
  - (2)
    - (a) Use the slope field for  $\dot{y} = y - t$  to find the slope and intercept of a linear solution  $y = mt + b$ . You need not show your work; just give values of  $m$  and  $b$ .
    - (b) Verify that your answer in (a) is actually a solution.
- **Five** book problem: #1.1.5(a); #1.2.1; #1.3.6, 7, 8. (For #1.2.1(b), look for an equilibrium solution.)