Suggested problems: Sec 1.1 # 8, 10, 11, 17, 18, 23; Sec. 1.3 # 1, 2, 5, 6, 8, 11; Sec 2.2 # 3, 6, 8, 9, 12, 16
Note: We will do 2.2 this week and 2.1 the following week.

This homework is pretty easy, but don't worry, I promise you'll be getting much more difficult homework problems in the following weeks.

Mandatory problems:

(1) [**7pts**] Sketch the direction field for $y' = y(3 - y) - 2$ (careful, think about it first, don't jump right into it; just checking signs won't work for this). What happens as $t \to \infty$ (i.e. outline the behavior for various domains)?

(2) [**2pts each**] What is the order of the following ODEs and state if it is linear or nonlinear.

$$\text{a) } y^2 y' = t; \qquad \text{b) } yy'' = t; \qquad \text{c) } y'' - 2ty' + t^2 y = 2;$$

(3) Consider the IVP $y' = ty(4 - y)/3$, $y(0) = y_0$
   (a) [**8pts**] Solve the IVP.
   (b) [**2pts**] How does the behavior of the solution depend on the initial value y_0 as t increases?
   (c) [**2pts**] Suppose $y_0 = 0.5$. Find the time T at which the solution first reaches the value $y = 3.98$.

A word on how the grading will work: Let m be the number of suggested problems, n the number of suggested problems completed, M the total number of points for the mandatory problems, and N the number of points earned for the mandatory problems. Then your homework score is: $\frac{n}{2m} \cdot M + \left(1 - \frac{n}{2m}\right) \cdot (N/M)$. Just be glad it's not a differential equation.