Math 307 - Homework 1 - Dr. Loveless

The problems refer to the 10th edition of the book! Hand in your work in the order it is assigned below. Staple all your work together before coming to class. Read all my instructions below before you start the homework. This is a minimal list of problems, I strongly encourage you to do more problems from the textbook than are assigned.

Textbook Questions:

1. 1.1/17-20, 21, 22, 23, 25(see note below)
2. 2.2/2, 4, 6, 9(a)(c), 13(a)(c), 23
3. 2.1/1(see note below), 13, 15, 18, 19, 40(see note below)

NOTES:

- On 1.1/21, 22, 23, and 25, set up the differential equation and initial conditions and STOP (ignore any other instructions from the problem). That is, I just want you to practice setting up differential equations. For example, your answer to 1.1/21 will look like $\frac{dy}{dt} = ???$ and your answer to 1.1/22 will look like $\frac{dV}{dt} = ???$ (fill in the questions marks with t's, y's, v's and constants appropriately).
- On 2.1/1, I just want you to print out the slope field that goes with the differential equation. I have a link to a slope field plotter on my course website. Include a print out in your homework.
  The direct link to the slope field generator is: http://slopefield.nathangrigg.net/
  You have to type in all multiplication signs as well. For example, to type in $\frac{dy}{dt} = 3t - 4y^2 + 2\cos(ty)$, you have to type in '3*t - 4*y^2 + 2*cos(t*y)'.
  You need to set 't-min: 0', 't-max: 6', 'y-min: 0', 'y-max: 3'
  (don't change 't-ticks', 'y-ticks', or 'step').
  You can set 't0' to any value between 0 and 6 and 'y0' to any value you want between 0 and 3 (try several different values to see what happens).
- On 2.1/40, read problem 38 first, then use the formula from 38(b) to write down a formula for $A'(t)$. Then integrate to get $A(t)$. Finally, give the general solution to the differential equation. This is a light introduction to the method of variation of parameters which we will see later for second order systems. Note: This problem can be solved using the same method as you do for the rest of the problems in 2.1 (I just wanted you to try the method from problem 38 and see if you get the same answer).