The problem numbers refer to problems from your text book (second edition). I will often assign problems which are not in the text book.

Assignment 1: Assigned Tue 01/08. Due Tue 01/15

1. **Section 1.1** 2, 12
2. **Section 1.2** 2, 5, 6, 8

These questions were added Thu Thu 01/10. The *entire* assignment is due on Tue 01/08.

3. **Section 1.3** 9, 10, 11. [You're probably wondering why there are three questions on vector calculus on this homework, when I made no mention of it in class. It's because these are pre-requisites for 131, which if you don't know it, will (eventually) kill you. So if you happened to wipe your memory tapes after your 52 final, and you can't do 9–11, then I recommend a fun filled weekend reliving your trauma from vector calculus ☺]
4. Find the general solution of the PDE $(1+x^2)\partial_x u + \partial_y u = yu^2$.

Assignment 2: Assigned Tue 01/15. Due Tue 01/22

1. **Section 1.3** 1, 2, 3, 8 [For 1.3 Q1 interpret as follows: You have a non-elastic string which you 'pluck' as we had in class for the wave equation. Except now, the string is suspended in some 'viscous' medium. Thus any motion made by the string encounters a resistive force (i.e. a force in the opposite direction) with magnitude proportional to the magnitude of the velocity of the motion.]
2. **Section 1.4** 2, 3, 6, 7 [The equations for linearized gas dynamics are stated in the 'Sound' subsection of the text. For question 2 (b), just keep in mind that the concentration of a gas behaves in a similar manner to the temperature. Namely, the gas flows from regions of high concentration to low concentration, at a rate proportional to the gradient of concentration.]
3. Let $\rho(x, y, t)$ be the density of a fluid at time t and position x, y. Let $u(x, y, t)$ be the instantaneous velocity of the fluid at time t and position x, y, and derive a PDE satisfied by ρ. [Hint: Assume that 'mass' is conserved, and compute the rate of change of mass in some region D. Your answer should be something like $\partial_t \rho \pm \nabla \cdot (\rho u) = 0$, where you need to figure out the correct sign.]