Homework #5 — due Friday, 5/17

To hand in:

3.5: 18
3.7: 3, 4, 11†, 14
3.8: 10*, 12, 16**

† *Note on 3.7 #11:* To find the damping coefficient γ, note that the problem says that the damping force is 3 N when $u' = 5$. In the standard equation for the motion a mass on a spring, $mu''+\gamma u'+ku = F(t)$, the term $\gamma u'$ is the damping force, so you can these pieces of information to find γ. Also, the rule I gave in class isn't enough to find k in this problem. Here is a more general fact about springs that you can use to find k in this problem (and probably all others we'll face in 307): applying a force of F to a spring with spring constant k will stretch it a distance of $L = F/k$ (so the higher k is, the stronger the spring is and the less it stretches). In class, we only talked about how to find k when we know how much the mass stretches the spring. This is a special case of the rule above, where F is the force due to gravity, $F = mg$.

* *Note on 3.8 #10:* When using standard units (instead of metric units), remember that pounds are a unit of force. To get mass from pounds, divide by the acceleration due to gravity, $g = 32\text{ft/s}^2$. You'll also need to convert the measurements in inches to feet.

** *Note on 3.8#16:* We haven't yet covered circuits like this one in class. The book explains how to set up the differential equation for these circuits on pages 201–202.

To do (not to be handed in):

3.7: 13, 18
3.8: 11