Ch 6 #44

The only thing you need to know about the angle is that it lets you calculate the x-component of the projectile's velocity, which is important because it's moving at that exact speed when it's at its highest point.

Ch 6 #48

The answer should really be negative, since it's work done by friction. This is important on other problems where you have to plug work done by friction into the energy-conservation equation.

Ch 6 #48

The answer should really be negative, since it's work done by friction. This is important on other problems (like #53) where you have to plug work done by friction into the energy-conservation equation.

Ch 6 #53

Start by calculating the work done by friction, using $F_{fric}=(1/5)(mg)$. Be sure that your value you've calculated is a negative work, since it's work due to friction. (You should get -88.2m Joules.) Then use this work in the big energy conservation equation, and you should be able to solve for the final speed.

Ch 6 #55

You should be able to set up an energy conservation equation, where your initial energy is all in the form of $PE_{elastic}$, and your final energy is all in the form of $PE_{elastic}$ also. (This works because at the two end points of the spring's motion, it's not moving anymore.) So the only other place energy can be accounted for is energy that has been transformed into heat by friction.

Ch 6 #65

This one's asking for power, and it might seem from the info that neither $P=W/t$ nor $P=Fv$ would be useful with the given info. But here's a quick reminder: $W_{net}=\Delta KE$. That should be enough of a hint to get you started.

Ch 6 #69

The max angle is related to the max force that the engine can provide, so start with P=Fv (once you've converted everything to S.I. units). The force you find from that equation is just the force that the engine can provide, and you can now use it in an equilibrium equation assuming that $F_{engine} = F_{gx} + F_{fric}$ will give you the steepest angle the car can accomplish while at a constant speed.

Ch 6 #76

During its fall, you can't really use conservation of energy ideas because air resistance is acting. (In fact, you'll need to think about this in part C.) So for part A, just think about the initial situation as right at the top of the snow bank, and the final situation as when it has come to a stop at the bottom of the snow bank. Once you get part A, part B should be easy enough. For part C, go back to thinking about the 370m of fall during which air resistance acted.

Ch 6 #77

Easy conservation ideas will solve part A for you. But on part B, you need to use some weirder thinking about heights/lengths. If you think of part B's initial case as being right at the lowest point, then the ball only has kinetic energy at this point (but where you can use the speed you found in part A). Then the final case is when it's at the top of its little circular path, and at this location it has both PE and KE. Hopefully it makes sense that its height at this point is 0.4L above the lowest point. Now you should be able to solve.