Ch 11 #2

Even though you'll be using F=-kx, you need to understand that x doesn't mean the length of the spring, or even the length of the stretched spring. Instead, x means the change in the length of the spring corresponding to an additional force on the spring.

Ch 11 #3

Just like #2, it's best to calculate the k value by thinking of how much the spring <u>changes</u> its length when the additional force of the driver's weight acts on it. But then when you use this k value to calculate the period/frequency of the vibrating system, you need to use the entire mass that is vibrating, which includes the car's mass.

Ch 11 #14

The speed with which the ball leaves the gun is the same as the max speed it would have (at equilibrium) if it were attached to the spring.

Ch 11 #16

Part C requires multiple steps, where you first calculate k (using period ideas) to be 24.58N/m. Then you can calculate total energy, which is easiest to think of as energy at the amplitude.

Ch 11 #21

The weird thing about #21 (as compared to #16) is that the equation is given to you with sine instead of cosine. The way to deal with this difference is… to ignore it. Since sine and cosine have the exact same graphs, just shifted from one another, the object's initial position is at zero/equilibrium when sine is in the equation, whereas its initial position is amplitude when cosine is used. But since this problem doesn't ever ask for the object's location after a certain amount of time, you can pretend it said "cosine", and do this problem just like #16.

Ch 11 #26

This is really a problem that you could have done back when we studied momentum and energy conservation. You must think of it as multiple steps…

- Since you know the system's amplitude, use this (w/E-conservation) to find the speed of the block/bullet/spring system at equilibrium.
- Assume that the equilibrium speed was its speed right after the collision, so use p-conservation to find the bullet's speed before it struck the block.

Ch 11 #53

Think of the equation $f=v/(2L)$for waves on strings, and realize that v will be constant for a given string.

So begin by solving for v on the string (in terms of L) when f = 294Hz.

Then substitute this value for v back into the equation, but when L is replaced with 2/3 L.