Ch 17 #36

There's a little twist on this one, in that you're told a change in V, rather than just a single value for V, and also an increase in charge, rather than jut an amount of charge stored. Just think of the capacitance formula as $C=\Delta Q/\Delta V$, which is a valid way to think about it.

Ch 17 #37

This one feels weird at first, because it’s making a connection between charge stored on a capacitor and the E-field between those plates. You’ll eventually solve for Q by using Q=CV, but you obviously need to know C and V first. You should be able to calculate C based on the geometric arrangement of the plates. You can calculate V with the E-field value, if you find the right formula from early Chap 17.

Ch 17 #39

This one's kind of the reverse of #37. You'll use most of the same formulas, but in a different strategic order.

Ch 17 #40

Begin by finding the amount of charge stored in C_1 when it's connected to the battery. Then think about the new arrangement when C_1 is disconnected from the battery and hooked to C_2. Since the value of C_1 will not change, and since the new voltage on each capacitor is 15V, find the new amount of charge stored on C_1 in the new arrangement. Now use the fact that the <u>total</u> amount of stored charge won't change from the initial arrangement to the new arrangement, to find the charge stored by C_2 in this new arrangement. And then you're only one step away from being finished…

Ch 17 #41

This one is similar to #40, in that you can figure out initial charge stored (by both capacitors, this time), and then recognize that the total amount of charge will not change when they're connected together.

The other big thing to realize is that, after the capacitors are connected together, the new voltages across them will 'equal out'. This leads to the following helpful equation:

$$V_{1,new} = V_{2,new} \rightarrow Q_{1,new}/C_1 = Q_{2,new}/C_2$$

In this new equation, your old C values haven't changed at all. And even though the Q values have both changed, the <u>total</u> Q hasn't changed. So you should be able to write $Q_{2,new}$ as $Q_{total} - Q_{1,new}$, which will let you solve for $Q_{1,new}$.

Ch 17 #44

This is two easy problems in one. First calculate the amount of charge that is stored on the original capacitor. Then find the amount that can be stored on the final capacitor (with the dielectric). The answer to this problem is just the difference between these two values.

Ch 17 #49

a. Don’t goof the area: You’ve got to switch from inches to m, and realize that a 9in pie pan means the *diameter* is 9in.

c. Do you think it really matters that you’re halfway between the pans?

d. Remember that it’s the energy stored in a *capacitor*.