Print this template and write your solution in the spaces indicated. Scan and upload your file.

The problem is 8-18a on pp 234-5 of your text.

Don't write in this column.	**Show your work in this column.**
Step 1. List the givens and the goal.	**Givens:** **Goal:**
Step 2. Select a system for which the forces are conservative. Then list the objects in your system.	
Step 3. List the forces external to the system. Indicate whether or not these forces do positive, zero, or negative work on the system. If there are none, state *none*. In the current problem, you might be thinking that the court surface does work on the ball. However, if you take the initial situation to be the instant that the ball leaves the surface, then you wouldn't include the force of the surface.	
Step 4. Give the initial and final states of the system. After you've identified these states, review your lists of givens and the goal and insert *i* and *f* subscripts as needed. Velocities and positions must be subscripted.	**Initial state:** **Final state:**
Step 5. How do the energies in your system change? The forms of energy to consider are kinetic, gravitational potential, and elastic (spring) potential. Simply indicate whether each of these changes is positive, negative, or 0 between the final states that you selected above.	**ΔK:** **ΔU_g:** **ΔU_e:**

Step 6. **Draw a diagram** in which you provide a picture of the situation and specify the following: a. positive axis directions b. the origin c. the initial and final states For the vertical axis, it's generally best to select +y to be up, as this will help you avoid sign difficulties later. If the problem involves a spring, select the origin to be the relaxed position of the spring where the elastic potential energy is 0.	
Step 7. **Write the general conservation of energy equation, $W_{ext} = \Delta E_{sys}$.** This is the starting equation for all conservation of energy problems.	
Step 8. Substitute energy terms and solve the problem. a. If there are no external forces that do work on the system, simply substitute 0 for W_{ext}. (Later we'll look at situations where W_{ext} is not 0.) b. Substitute terms for initial and final energy changes on the right-hand side of the equation. This includes terms such as ΔK, ΔU_e, ΔU_g. For the current problem, of course, there is no ΔU_e term. c. Expand the energy changes in terms of initial and final terms: K_f, K_i, U_{gf}, U_{gi}, U_{ef}, and U_{ei}. d. Substitute specific potential energy expressions such as $U_g = mgy$ and $U_e = ½kx^2$. Also Substitute 0s for the energy terms that are 0. Stop to examine your result to verify that the energy changes have the same sign as those you decided on in Step 5. e. Solve for the unknown in symbolic form.	
Step 9. Check that units and signs are correct.	
Step 10. Substitute values and units and calculate the value of the unknown.	