Hints on HW problem 2.3 prob. 23. There are really two problems here. For the first, set $h(0) = 5000$, $v(0) = 0$. The velocity is determined by $mv' = \text{total force} = -mg + .75|v| = -mg - .75v$ (since velocity is negative, i.e., downward in this problem.) Figure out what $m$ is and solve it. (weight is given). Then knowing $v(t)$, you can figure out $h(t)$ from integration, and using the initial condition. So now $v(10) = A$ is known and $h(10) = B$ is known. Use these values $A$, $B$ as the new initial conditions for what happens after the shoot opens. The DE changes, but everything else is the same. So you can figure out a new $v(t)$ and again by integration, a new $h(t)$. (Assume $t$ now represents the amount of time after the shoot opens.) To find limiting velocity, you can use direction field analysis to find the equilibrium solution (which is the limit velocity). To answer part d, you need to set $h(t)$ to zero. This needs to be done on a calculator. But it should be close to what you would get assuming the shoot is at its limit constant velocity all the way down, since it should settle to that soon. (If you don’t know how the zoom in on the solution with a calculator, use this approach to approximate the time in the air.)

You can skip the last part.

Answers are in the back of the book- but I’ll give E.C. for correctly working out solutions.