Homework Discussion, Week 3

Physics 1301 Dr. Andersen

Chapter 4

13.) a) The horizontal component of the velocity is not accelerated, so the horizontal component of the velocity will be the same as when the crow released the clam (i.e. 2.70 m/s). b) The initial vertical velocity is zero, and the clam is accelerated downward by gravity, so use $v_y = v_{0y} + a_y t$, with $v_{0y} = 0$ and $a_y = -g$ to solve for v_y. c) The vertical component doesn't depend on the initial speed, since the crow was flying horizontally. Therefore, the final horizontal speed will increase if the crow's speed were increased, but the vertical component would remain unchanged.

61.) There are two options here. First, since the we can assume that the ground is flat (the author doesn't say so, but also doesn't give us any other information about the slope, so flat is the most reasonable assumption), we can use the height and range equations, substituting the acceleration of gravity on Mars (3.72 m/s^2) for g. Second, we could start with the equations for the x and y position with time (e.g. from Table 4-1 in the book), solve for the time to complete one bounce (i.e. for $y = y_0$). This time can be used in the x equation to find the distance bounced horizontally (i.e. $|x - x_0|$). The maximum height occurs at halfway through the bounce, so we can substitute $t/2$ into the y equation to find the maximum height (i.e. $|y - y_0|$).

Chapter 5

10.) a) We can use $v = v_0 + at$, to solve for the speed, where $v_0 = 27.0$ m/s and we can get the acceleration by solving $F = ma$ (note that a must be given a direction opposite to v_0; if v_0 is positive, a must be negative for example.) b) We want $|x - x_0|$, so solve $x = x_0 + v_0 t + \frac{1}{2}at^2$.
Answer: a) 17.8 m/s, b) 168 m.