Physics 111
Solution to Physlets Assignment 2

Prob 2.3: Of the three animations, only the first animation has a graph of the x-component of velocity that correctly matches the motion of the helicopter. In the first animation, the helicopter is always moving to the left, and therefore $v_x$ should always be negative. Also, for the first half of its motion, the speed is decreasing. Therefore, for the first half of the motion, the acceleration should be positive (opposite to the velocity). This is represented by the positive slope of the graph. At the midpoint, the speed is zero, and the graph reflects that. Then the helicopter accelerates in the negative direction.

In the second animation, $v_x$ is constant, even though $v_y$ is not. In the third animation, the shape of the graph is right, but it not correctly placed according to the vertical axis labels. The velocity component $v_x$ should be a maximum at the midpoint of time, but that maximum should not be zero.

Prob 2.7:

a. For this one, it is easiest to use the change in velocity over the change in time to get $a = 2\text{m/s}^2$.

b. For this one, it is easiest to use the formula $\Delta x = \frac{1}{2} a (\Delta t)^2$ to get $a = 2.3 \text{ m/s}^2$. You can make several measurements to confirm the acceleration is constant.

c. After making several measurements, you should be able to confirm that the speed is constant and therefore $a = 0$.

d. Again, a couple measurements are required to confirm that the acceleration is constant. Then, since you know velocity and position, it is easiest to use $v^2 = v_0^2 + 2 a \Delta x$. Then you get $a = 2.42 \text{ m/s}^2$.

e. Again again, a couple measurements are required to confirm that the acceleration is constant. Then, since you know velocity and position, it is easiest to use $v^2 = v_0^2 + 2 a \Delta x$. Then you get $a = -2.47 \text{ m/s}^2$. Note: the displacement is negative, so the acceleration is negative.

f. Again again again, a couple measurements are required to confirm that the acceleration is constant. Then, since you know velocity and position, it is easiest to use $v^2 = v_0^2 + 2 a \Delta x$. Then you get $a = -2.5 \text{ m/s}^2$. Note: the final velocity is less than the initial velocity and the displacement is positive, so the acceleration is negative.