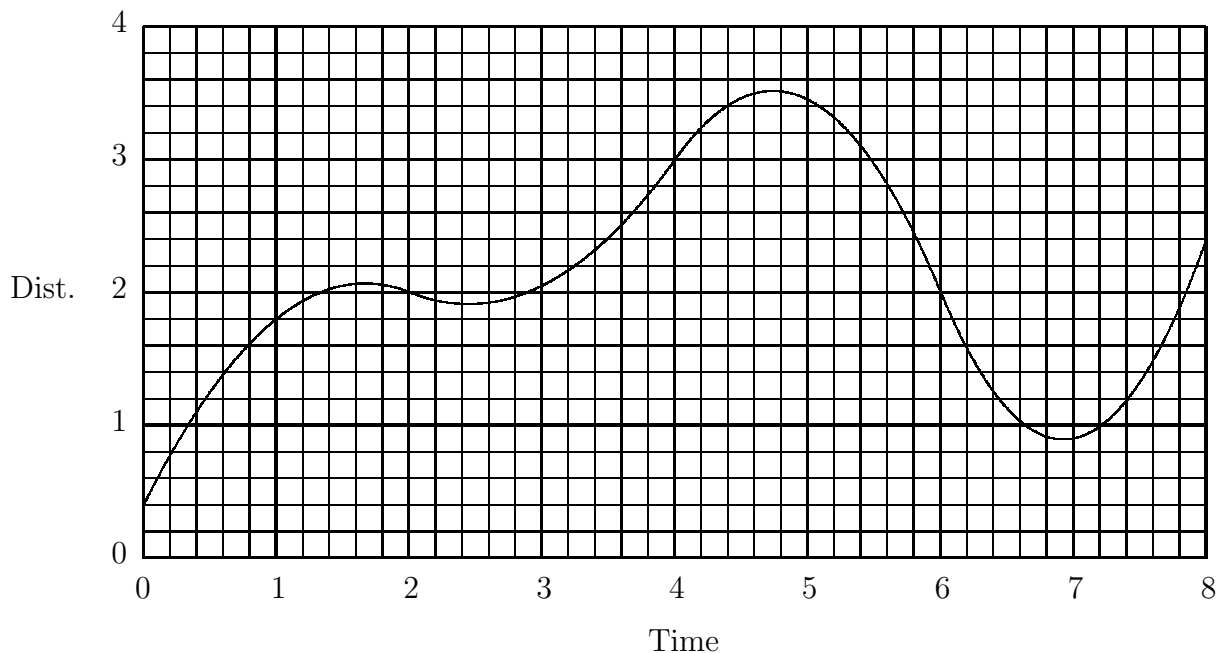# Homework due Thursday October 3

1. Read and reread Section 3.3 pages 106–116.

2. Pages 105–106 Problem 9–10.

3. Below is the graph the distance D (measured in feet) of a moth from a light bulb as a function of time t (measured in seconds). Draw a graph of the rate of change $D'(t)$ as a function of time.

4. Pages 116–119 problems 2(but only use $h = .1, .01, .001$), 10, 11.

5. Let $f(x) = x^3 - 2x$ and set

$$Q_1 = \frac{f(a + \Delta x) - f(a)}{\Delta x}, \qquad Q_2 = \frac{f(a + \Delta x) - f(a - \Delta x)}{2\Delta x}.$$

   (a) Simplify the expression for Q_1 enough so that all the Δx terms cancel out of the bottom of the fraction. (You may want to use the formula $(A + B)^3 = A^3 + 3A^2B + AB^2 + B^3$.)

   (b) Simplify the expression for Q_2 enough so that all the Δx terms cancel out of the bottom of the fraction.

   (c) Draw a picture to show what Q_1 and Q_2 mean geometrically in terms of rates of change.

   (d) If Δx is close to zero then which is small Δx or $(\Delta x)^2$?

   (e) Which of the two estimates Q_1 or Q_2 gives the better estimate and why?