In Class Exercises (ICE) - 4/11/01

The foraging habits of animals are studies by (among others) economists, psychologists and biologists. One animal whose foraging habits have been quite closely studied is the Eastern Gray Squirrel (Sciurus carolinensis - dee Figure 1[1]). This might be because experimental subjects are easy to find, but squirrels (along with blue jays) are thought to be very important in maintaining and regenerating second-growth forests[2]. Some geographers theorize that squirrels were largely responsible for creating the vast forests that once covered North America.

Figure 2 shows the velocity-time graph of a squirrel. The squirrel starts at the base of a tree, and forages on the ground looking for food.

Figure 1: The Eastern Gray Squirrel (*Sciurus carolinensis*)

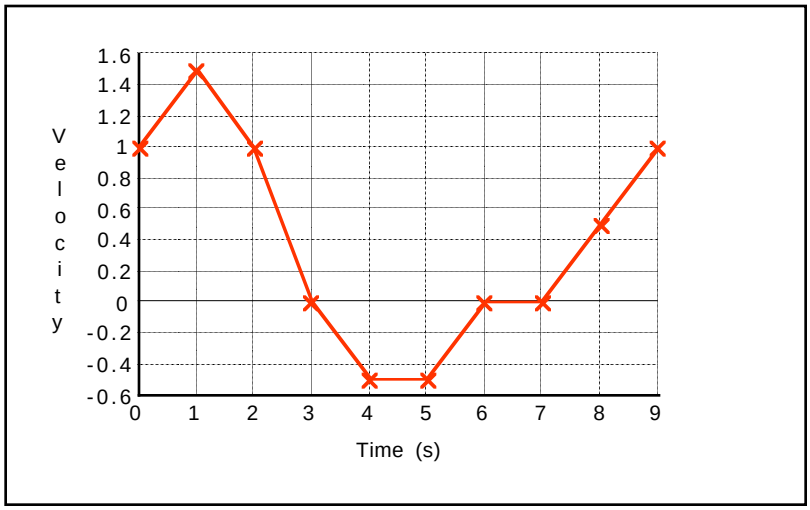


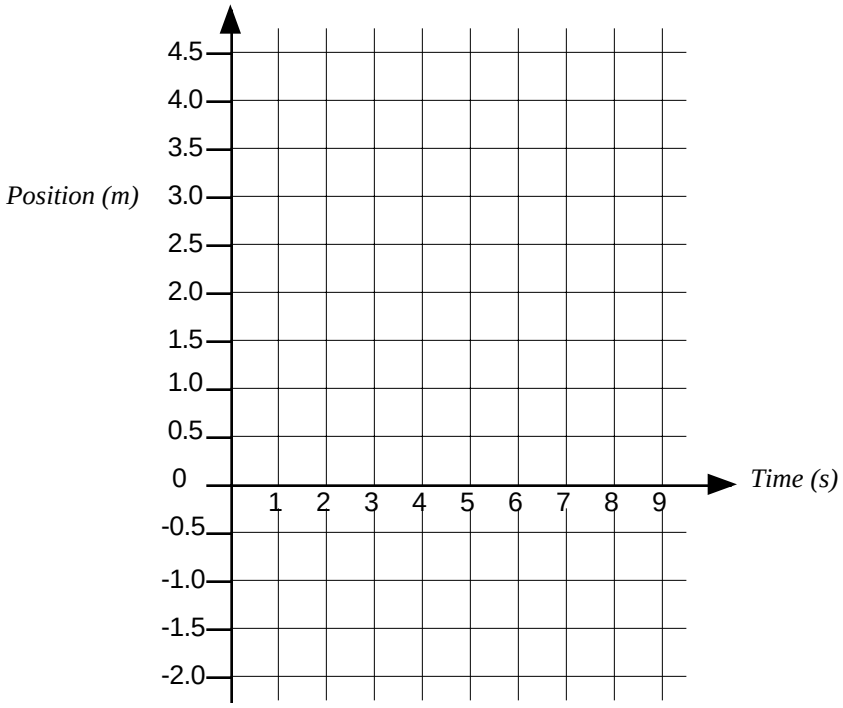
Figure 2: Velocity-time graph for a foraging squirrel. The velocities are measured in meters per second.

- ***Using the graph in Figure 2, complete the entries in the table below.***

Time	0	1	2	3	4	5	6	7	8	9
Position										

[1] Image Source: Russell Smith, Wildlife Rehabilitator.
[2] Source: Richard L. Mallery. "Nuts About Squirrels." Warner Books, 2000.

- ***Using the axes provided below, plot a graph showing the squirrel's position as a function of time.***



- ***Using the graph in Figure 2, find an equation for the velocity function that is valid between t=0 and t=1.***

- ***Using your graph of the position function above, find an equation for the position function that is valid between t=0 and t=1.***

- ***How are these two functions related? Does this make sense in terms of the physical quantities that the two functions represent?***

- ***How can what you have just done with the foraging squirrel help you to find the derivative of the area function?***

$$_0A_f(x) = \int_0^x f(t)dt$$