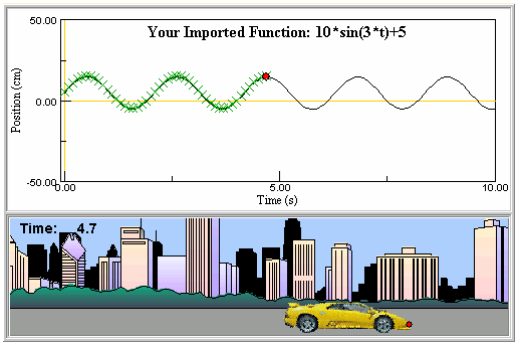
Worksheet for Exploration 1.3: Input Data, Formulas



In many animations you will be expected to enter a formula to control the animation **(position is given in centimeters and time is given in seconds)**. Restart. In the current Exploration, you are to enter in a function x(t) to control the position of the toy yellow Lamborghini. There are a few important rules for entering functions. Notice that the default value in the text box is 3*t and **NOT** 3t. This is the way the computer understands multiplication. You must enter in the multiplication sign "*" every time you mean to multiply two things together. Remove the * and see what happens.

i. What happens when you remove the *?

You get an error and you can see what you entered. Division is represented as t/2 and **NOT** t\2. In addition, the Physlet understands the following functions:

sin(a)	**cos(a)**	**tan(a)**	**sinh(a)**	**cosh(a)**	**tanh(a)**	
asin(a)	**acos(a)**	**atan(a)**	**asinh (a)**	**acosh(a)**	**atanh(a)**	
step(a)	**sqrt(a)**	**sqr(a)**	**exp(a)**	**ln(a)**	**log(a)**	
abs(a)	**ceil(a)**	**floor(a)**	**round(a)**	**sign(a)**	**int(a)**	**frac(a)**

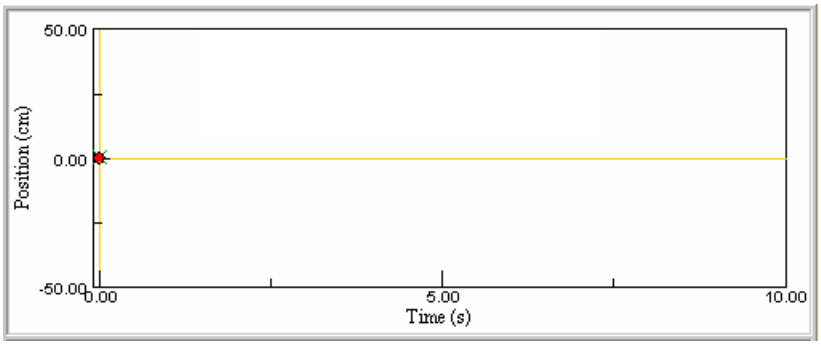
where "a" represents the variable expected in the function (here it is t).

Try the following functions to control the Lamborghini (note that you are controlling x(t) of the red ball attached to the Lamborghini):

a. 0.3*t*t

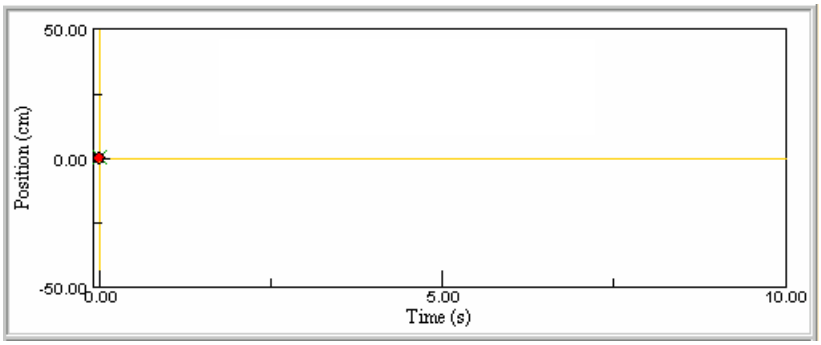
i. Does the Lamborghini stay on the screen?

ii. Sketch of graph:



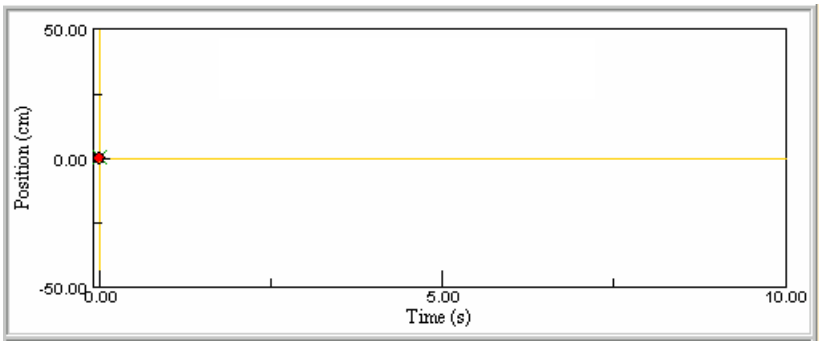
b. -20*t+3*t^2 (note that t^2 is equivalent to t*t)

i. Sketch of graph:



c. int(t)

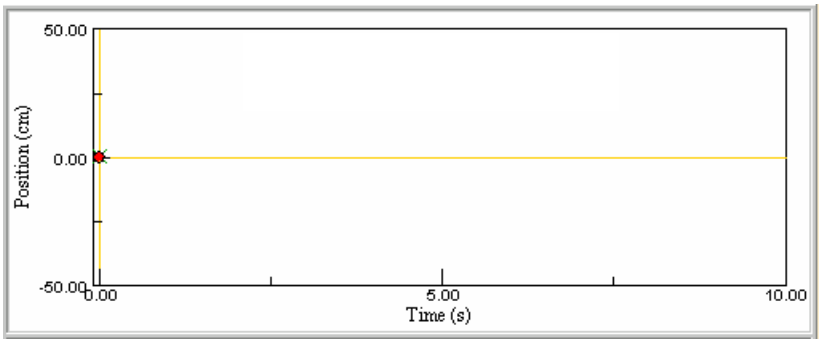
i. Sketch of graph:



ii. What does the function int(t) do, i.e. what does the notation int(t) mean?

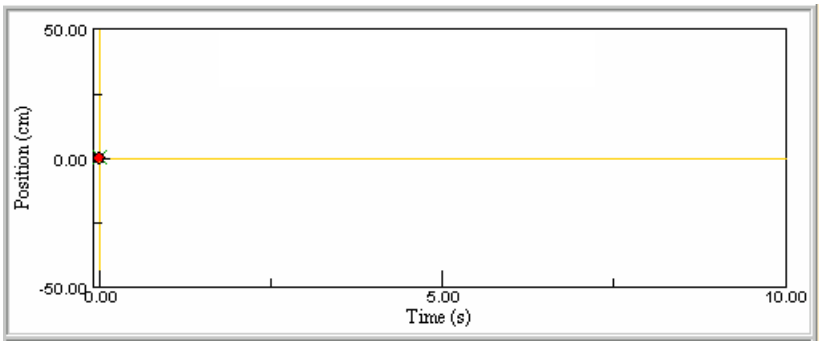
d. 10*sin(pi*t/2)

i. Sketch of graph:



e. step(t-2)*3*(t-2)

i. Sketch of graph:



Try some others for the practice. Try to keep the Lamborghini on the screen!

i. Function that keeps Lamborghini on the screen:

ii. Sketch of graph: