Homework 1

Sections 2.1 & 2.2
Due: 6-11-14

1. The following table gives the position of a particle moving along the x-axis as a function of time, t, in seconds, where x is in centimeters. What is the average velocity of the particle from $t = 2$ to $t = 6$?

t	0	2	4	6	8
$x(t)$	0	14	-6	-18	-4

2. Use a table (including at least 6 h-values) to numerically estimate the instantaneous velocity at time $t = 1$ of an object whose motion at time t is given by $s(t) = e^t$.

3. A particle moves at varying velocity along a line and $s = f(t)$ represents the particle's distance from a point as a function of time, t. Sketch a possible graph for f if the average velocity of the particle between $t = 2$ and $t = 6$ is the same as the instantaneous velocity at $t = 5$.

4. If g is an odd function and $g'(4) = 5$, what is $g'(-4)$? Show your work!
Hint: It can be shown (using an equivalent definition of the derivative) that

$$g'(4) = \lim_{h \to 0} \frac{g(4) - g(4-h)}{h}.$$

Use the standard definition of the derivative to compute $g'(-4)$ and remember that g is an odd function.

5. Use algebra to evaluate the following limit:

$$\lim_{h \to 0} \frac{1/(1+h) - 1}{h}.$$