The Concept of a Limit- HW problems

1. An object is launched vertically upwards at 64 ft/sec. The height in feet of the object above the ground is given by $s(t) = -16t^2 + 64t$, $0 \leq t \leq 4$, where t is in seconds. Find the average velocity over the following intervals:

a. $2 \leq t \leq 4$

$b.$ $2 \leq t \leq 3$

$c.$ $2 \leq t \leq 2.1$

$d.$ $2 \leq t \leq 2.01$

$e.$ $2 \leq t \leq 2 + h$, where $h > 0$

What is the instantaneous velocity at $t = 2$.

2. Suppose $f(x) = x^2 - 4x + 2$. Find the slope of the secant line between the point where $x = 1$ and

$a.$ $x = 3$

$b.$ $x = 2$

$c.$ $x = 1 - h,\ \ h > 0$

What is the slope of the tangent line to $y = f(x)$ at $x = 1$.

3. Suppose $f(x) = x^3 + x$. Find the slope of the secant line between $x = 1$ and $x = 1 + h,\ \ h > 0$. What is the slope of the tangent line to $y = f(x)$ at $x = 1$.