Assignment #8 4/7/04

Exercise Set 2.4

18. $f(x) = -3x^2 - x + 1$

$(-1, f(-1))$

$m_t(t) = \lim_{h \to 0} \frac{s(t+h) + s(t)}{h} = \lim_{h \to 0} \frac{[-3(t+h)^2 - (t+h) + 1] - [-3(t)^2 - t + 1]}{h}$

$= \lim_{h \to 0} \frac{[-3(t^2 + 2th + h^2) - t - h + 1] - [-3t^2 - t + 1]}{h} = \lim_{h \to 0} \frac{-3t^2 - 6th - 3h^2 - t - h + 1 + 3t^2 + t - 1}{h}$

$= \lim_{h \to 0} \frac{-6th - 3h^2 - h}{h} = \lim_{h \to 0} -6t - 3h - 1 = -6t - 1$

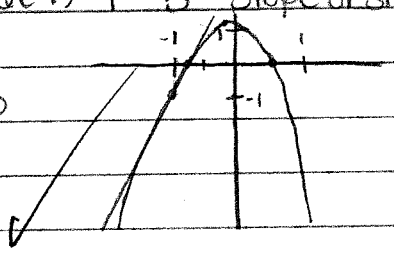
$m_t(-1) = -6(-1) - 1 = 5 =$ Slope or simultaneous velocity

$y = 5x + b$

$-1 = 5(-1) + b$

$4 = b$

$y = 5x + 4$



The slope of the line is 5. I found this by using the equation $\lim_{h \to 0} \frac{s(t+h) + s(t)}{h}$ which the answer you can use as a slope check. Then I put that into the equation $y = mx + b$ which when figured shows the equation of the slope of the line tangent to the graph to be $y = 5x + 4$.