Quiz 4 (L9-L10)

Show all work for full credit.

1. Find the derivatives. (4 pts. each)

(i) $f'(x)$ if $f(x) = 2xe^{3x} - \tan(x^3 - x)$

$f'(x) = (2)e^{3x} + 2x(3e^{3x}) - \sec^2(x^3-x)(3x^2-1)$

$= \boxed{(6x+2)e^{3x} - (3x^2-1)\sec^2(x^3-x)}$

(ii) $g'(x)$ if $g(x) = \sin^2(x^2-1) - \ln(2) + 1$

$g' = 2\sin(x^2-1) * \cos(x^2-1) * 2x$

$\boxed{= 4x \sin(x^2-1)\cos(x^2-1)}$

2. The position of a particle at time t is given by $s = 2t^2 - 5t + 3.15$, $0 \le t \le 5$, where s is in meters and t is in seconds.

(i) What is the velocity of the particle at time $t = 1.25$? (3 pts.)

$v(t) = s'(t) = 4t - 5$

$v(1.25) = 4(1.25) - 5 = \boxed{0}$

(ii) Find the particle's speed and acceleration at times $t = 0$ and $t = 5$. (4 pts.)

$v(0) = 4(0) - 5 = \boxed{-5}$

$v(5) = 4(5) - 5 = \boxed{15}$

$a(0) = v'(0) = \boxed{4}$

$a(5) = v'(5) = \boxed{4}$

note $a''(t) = v'(t) = 4$ for all t.