MATH 181 WORKSHEET 5 ¾ SPRING 2012

If an answer does not exist write "***DNE'*** and explain why it does not exist.

1. Suppose a particle is moving in such a manner as to lie on a line and motion "+" is to the right and motion "–" is to the left.

Suppose the particle's position is found by the function $p(t) = (3t-9)^2(2t+1)$ where the position is in inches and time is in seconds. $p:[-2,5] \longrightarrow \mathbb{R}$

Find:

A. the particle's position at time 3 seconds.
B. the particle's speed at time 3 seconds.
C. the particle's velocity at time 3 seconds.
D. the particle's acceleration at time 3 seconds.
E. the time(s) the particle switches direction.
F. the time(s) the particle is at the origin.
G. the time(s) the particle changes from deceleration to acceleration or visa versa.
H. the time(s) the particle is at position 1000 inches.

2. Suppose we have the well defined function $g(x) = \frac{6}{x^9}$ $g:(-\infty,0)\cup(0,\infty) \longrightarrow \mathbb{R}$

Find:

A. the equation of the tangent line to g at the point $(1, 6)$

B. the equation of the normal line to g at the point $(-2, \frac{-3}{256})$

C. the point(s) where there is a horizontal tangent to g.

3. Suppose we have the well defined function $f(x) = (x+1)(x+3)^2(x-1)^2$ $f:[-5,5) \longrightarrow \mathbb{R}$

Find:

A. the equation of the tangent line to f at the point $(1, 0)$
B. the equation of the normal line to f at the point $(3, 576)$
C. the point(s) where there is a horizontal tangent to f.