

CALCULUS TUTORIALNAME:

ID#:

**Q1** Find the Following Derivatives (show work)

i)  $f(t) = 3t^3 - 1.5t^2$ ,  $\frac{df}{dt} = ?$

ii)  $g(t) = -3t^2 + 2$ ,  $\frac{dg}{dt} = ?$

iii)  $f(t) = 9t^2 - 3t$ ,  $\frac{df}{dt} = ?$

**Q2** IF  $X = -3t^2 + 2$  what is the maximum value of  $X$ ? At what time( $t$ ) does this maximum occur? SHOW all work

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Q3 Position of a particle in 1D is  
 $x = 3t^3 - 1.5t^2$  in meters (m)

a) Find velocity  $v(t) = \frac{dx}{dt}$  at  
arbitrary time  $t$  and at time  $t = 1.5$   
seconds

b) At what time(s) are the velocity  
 $v$  zero? Hint: set  $v(t) = 0$ , solve for  $t$

c) Find acceleration  $a = \frac{dv}{dt} = \frac{d^2x}{dt^2}$   
at  $t = 1$  s.

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**Q4** Find Indefinite Integrals. <sup>Hmt</sup> Look at  
Q 1, ii  
& iii

i)  $f(t) = -6t$ ,  $\int f(t) = ?$

ii)  $g(t) = 18t - 3$ ,  $\int g(t) = ?$

**Q5** find Definite integral

$$\int_{-1}^2 g(t) dt = \int_{-1}^2 (18t - 3) dt = ?$$

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Q6

In Equation 2-27 the velocity  $v$  can be found by integrating the acceleration:

$$v_2 - v_1 = \int_{t_1}^{t_2} a \, dt$$

$v_2 \equiv$  velocity at time  $t_2 = v(t_2)$

$v_1 =$  " " " "  $t_1 = v(t_1)$

Let  $t_1 = -1$ ,  $t_2 = 2$ , and  $v_1 = 12$

If  $a = 18t - 3$  Find the  
velocity  $v_2 = v(t_2)$

Hint:  $v_2 = v_1 + \int_{-1}^2 a \, dt$ , use results of p 5