Math 1A (7:30am – 8:20am)
Group Quiz 4
Wed Oct 22, 2008

Group Members' Names: _____

SCORE: ___ / 10 POINTS

NO CALCULATORS ALLOWED

For the position function $s(t) = \dfrac{2t^3 - t^2 + 3}{\sqrt{t}}$, find the acceleration function.

SCORE: ___ / 2 POINTS

$s(t) = 2t^{5/2} - t^{3/2} + 3t^{-1/2}$ 1

$s'(t) = 5t^{3/2} - \frac{3}{2}t^{1/2} - \frac{3}{2}t^{-3/2}$

$s''(t) = \frac{15}{2}t^{1/2} - \frac{3}{4}t^{-1/2} + \frac{9}{4}t^{-5/2}$ 1

Find the derivatives of the following functions. **DO NOT SIMPLIFY YOUR ANSWERS.**

SCORE: ___ / 3 POINTS

[a] $f(t) = (9t^7 - t^4 + 7t^3 - 5)(11t^6 - 4t^5 - 6t + 3)$

$f'(t) = (63t^6 - 4t^3 + 21t^2)(11t^6 - 4t^5 - 6t + 3)$ ½

$+ (9t^7 - t^4 + 7t^3 - 5)(66t^5 - 20t^4 - 6)$ ½

[b] $f(x) = \dfrac{5x^3 + 3x^2 + 12}{8 - 2x - 4x^3}$

$f'(x) = \dfrac{(15x^2 + 6x)(8 - 2x - 4x^3) - (5x^3 + 3x^2 + 12)(-2 - 12x^2)}{(8 - 2x - 4x^3)^2}$ ½ ½ ½ ½

Find a second degree polynomial $f(x)$ such that $f(0) = 5$, $f'(0) = -4$ and $f''(0) = 6$.

SCORE: ___ / 2 POINTS

SHOW YOUR WORK.

$f(x) = ax^2 + bx + c$ ¼ $\quad f(0) = c = 5$ ¼

$f'(x) = 2ax + b$ ¼ $\quad f'(0) = b = -4$ ¼

$f''(x) = 2a$ ¼ $\quad f''(0) = 2a = 6 \Rightarrow a = 3$ ¼ ¼

$3x^2 - 4x + 5$ ¼

The following table gives the function and derivative values of two differentiable functions $f(x)$ and $g(x)$ for various input values.

SCORE: ___ / 3 POINTS

x	−2	−1	0	1	2	3
$f(x)$	3	0	1	2	5	4
$f'(x)$	5	2	3	0	4	1
$g(x)$	1	5	2	4	3	0
$g'(x)$	0	4	5	3	1	2

If $k(x) = f(x)g(x)$, find the equation of the tangent line to $y = k(x)$ at $x = -1$.

$k(1) = f(1)g(1) = 0 \cdot 5 = 0$ ½

$k'(1) = f'(1)g(1) + f(1)g'(1) = 2 \cdot 5 + 0 \cdot 4 = 10$ 1 ½

OR

$y - 0 = 10(x - -1)$

$y = 10(x + 1)$ 1