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**

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

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

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

Find the derivatives of the following functions. **DO NOT SIMPLIFY YOUR ANSWERS.** **SCORE: ___ / 3 POINTS**

[a] $f(t) = (12t^6 - 7t^5 + 3t^2 - 6)(5t^4 + 2t^3 - 4t + 9)$

$f'(t) = (72t^5 - 35t^4 + 6t)(5t^4 + 2t^3 - 4t + 9)$ ½ ½
$+ (12t^6 - 7t^5 + 3t^2 - 6)(20t^3 + 6t^2 - 4)$

[b] $f(x) = \dfrac{4 + 5x^3 - 7x^6}{6x^4 - x^5 + 1}$

$f'(x) = \dfrac{(15x^2 - 42x^5)(6x^4 - x^5 + 1) - (4 + 5x^3 - 7x^6)(24x^3 - 5x^4)}{(6x^4 - x^5 + 1)^2}$ 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** ¼

SHOW YOUR WORK.

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

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

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

$3x^2 - 4x + 5$

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