

Honors Analysis

Name _____

Copy original problem.

Per _____

Date _____

Convince *me* that **you** understand the concept!*No Calculators.*

Chapter 4 – Mechanical Exam

I Find and identify (including “relative” or “absolute”) the coordinates of all extrema for each of the following. Remember to consider the domain limits. Do **not** draw the graph of the function. All conclusions must be properly justified. Be *very* sure the reader understands your logic! (25 pts ea)

a) $f(x) = 2x^3 - 4x^2 \quad x \in [-2, 3]$

b) $f(x) = 2\cos x(\sin x - 1) \quad x \in [-\frac{\pi}{2}, \frac{3\pi}{2}]$

II Given: $x^4 + 2x^2y + y^2 = 4$. Find the equations of the tangent lines at $x = 1$ (20 pts)

III Given the following table with function values:

$(fg)'|_{x=2}$ translates to: “the derivative of the product of f and g evaluated at $x = 2$ ”

Evaluate:

$x \rightarrow$	2	3
$f(x)$	3	5
$f'(x)$	12	12
$g(x)$	3	2
$g'(x)$	-2	-3

(20 pts tot)

a) $(fg)'|_{x=2}$

b) $\left(\frac{f}{f+g}\right)'|_{x=3}$

c) $(f(g))'|_{x=3}$

IV Given: $f(x) = \frac{2(9x-2)}{135}\sqrt{(3x+1)^3}$. Find $f'(x)$ (simplify completely). (10 pts)

Extra Credit ----- 5 pts -----

Reconsider the equation given in II above. Find any and all coordinates where the tangent line would be horizontal.