Group Exam 2

Name: ______________________________

Math 141

Name of group member: ______________________________

Name of group member: ______________________________

Problem 1: A The graph of the function $f(x)$ is given below. On the same axes, graph the derivative $f'(x)$.

List the x-values where the function f is not continuous. ______________________________

List the x-values where the function f is not differentiable. ______________________________

B Use the definition of the derivative to explain why the following derivative formula holds.

$$(f(x) - g(x))' = f'(x) - g'(x)$$

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Problem 2: An object moves along a horizontal line and it's position can be modeled by a quadratic function of the form $at^2 + bt + c$. Assume that the initial position of the object is at the zero mark of the horizontal line. If the position of the object at $t = 2$ seconds is at the 16 meter mark, and the velocity at $t = 2$ seconds is $28m/s$, find the coefficients a, b, and c so that the function $s(t) = at^2 + bt + c$ models the position of the object.

Graph the position function $s(t)$ in the space provided.

In a sentence or two, describe the movement of the object over the time interval from $t = 0$ to $t = 2$.

At what time during the interval $0 \leq t \leq 2$ is the object farthest from its initial position? What is the position of the object at this time? Use calculus to justify your answer.

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Problem 3: $\boxed{\text{A}}$ Assume that $f(x)$ and $g(x)$ are differentiable functions about which we know very little. In fact, assume that all we know about f and g is the following table of values.

x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
-2	3	1	-5	8
-1	-9	7	4	1
0	5	9	9	-3
1	3	-3	2	6
2	-5	3	8	?

1. Let $h(x) = e^x f(x)$. What is $h'(0)$?

2. Let $j(x) = -4f(x)g(x)$. What is $j'(1)$?

3. Let $k(x) = \frac{xf(x)}{g(x)}$. What is $k'(-2)$?

4. Let $w(x) = x^3 g(x)$. If $w'(2) = -48$, what is $g'(2)$?

$\boxed{\text{B}}$ Graph the function $f(x) = \cos(x)$ and its derivative in the space provided. (Label f and f'.)

Circle the function that is a best guess for the derivative of $\cos(x)$:

$\sin(x)$ $\quad$ $1 - \cos^2(x)$ $\quad$ $-\sin(x)$.

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