Student Name: _______

Calculus Honors Mathematics Packet

Day 1 Problems #1-4 C.LC.1, C.LC.2	Day 2 Problems #5 C.LC.1, C.LC.2	Day 3 Problems #6-7 C.LC.1, C.LC.2	Day 4 Chain Rule: Station 1 C.CD.2	Day 5 Chain Rule: [illegible]ation 2 C.CD.2
Day 6 Chain Rule: Station 3 C.CD.2	Day 7 Chain Rule: Station 4 C.CD.2	Day 8 Chain Rule: Station 5 C.CD.2	Day 9 Chain Rule: Station 6 C.CD.2	Day 10 Connecting [illegible]e Graph #1 C.CD.1

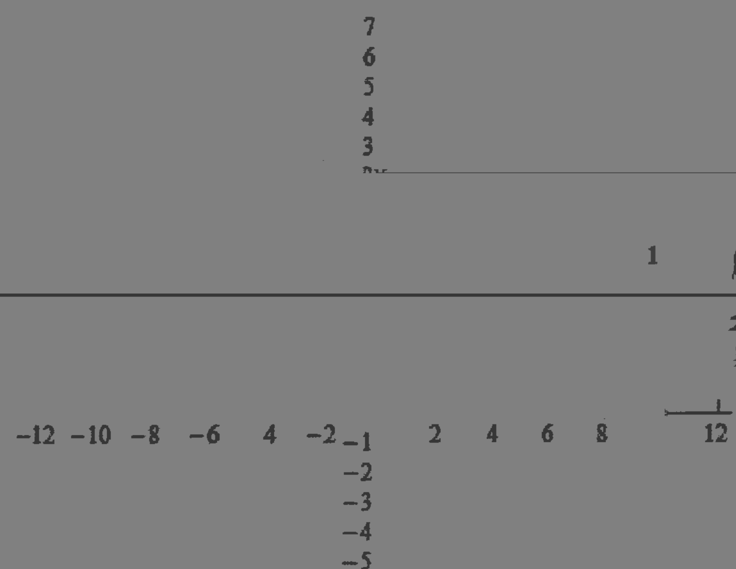
Calculus Honors

Name:

Answer all questions algebraically unless otherwise directed. Your calculator is a tool [redacted]

1. Evaluate:

a) $\lim_{x\to10} f(x) =$



b) $\lim_{x\to6^-} \quad =$

c) $\lim_{x\to6^+} f(x) =$

d) $\lim_{x\to6} f(x)$

[redacted]

[redacted]

4 Sketch a graph where f(5) does not exist but where $\lim_{x\to5} f(x)$ does exist.

5. Evaluate the following limits using the most efficient and appropriate method. Use the strategies you have been given. If all else fails you can fall back on the [redacted]

b) $\lim\limits_{x\to3}\dfrac{4x^2+14x+7}{x+3}=$

c) $\lim\limits_{x\to9}\dfrac{\sqrt{x}-3}{x-9}=$

d) $\lim\limits_{x\to0}\dfrac{x^2}{\sin^2 x}=$

e) $\lim\limits_{x\to0}\dfrac{x^4+2x+1}{x+5}=$

f) $\lim\limits_{x\to\infty}\dfrac{2x^2+2x+1}{3x^3+5}=$

g) $\lim\limits_{x\to\infty}\dfrac{2x^2+2x+1}{3x^2+5}=$

6. Sketch the graph of f(x) and then describe the continuity of the function

$$f(x)=\begin{cases} x+2, & x<0 \\ x^2+1, & x\geq 0 \end{cases}$$

7. Determine the value of k so that the function $g(x)=\begin{cases} x^2+2, & x>2 \\ kx+4, & x\leq 2 \end{cases}$ is continuous.

Chain Rule: Station 1

Let $h(x) = f(g(x))$. Use the table below to answer the following questions.

x	1	2	3
f(x)	-2	8	1
f′(x)	3	2	4
g(x)	1	-3	2
g′(x)	4	1	-3

1. $h(3) =$

2. $h'(x) =$

3. $h'(1) =$

4. Write the equation of the tangent line to h(x) at x = 3.

Chain Rule: Station 2

1. $f(x) = \sin(3x)$
   $f'(x) =$

2. $f(x) = x^2 \cos(2x+3)$
   $f'(x) =$

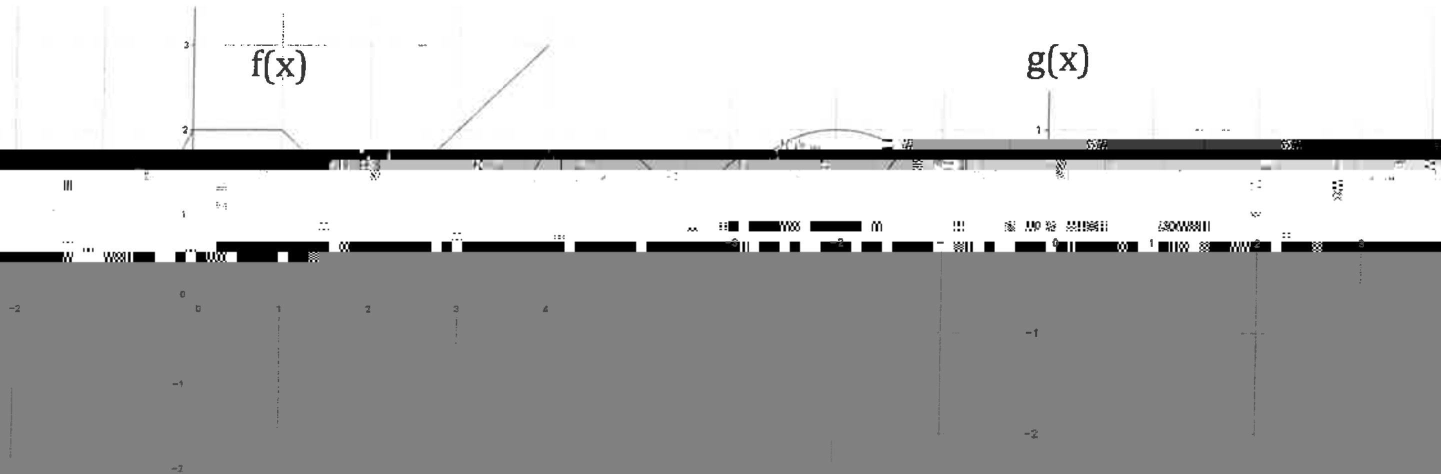
3. $g(x) = \sin^2(3x^2 - 2x + 1)$
   $g'(x) =$

1. $f(x)=\sqrt{2x}$
   $f'(2)=$

2. $f(x)=\left(x^2-2x-1\right)^{\frac{2}{3}}$
   $f'(0)=$

3. $f(x)=x\sqrt{2x-3}$
   $f'(x)=$

Chain Rule: Station 5



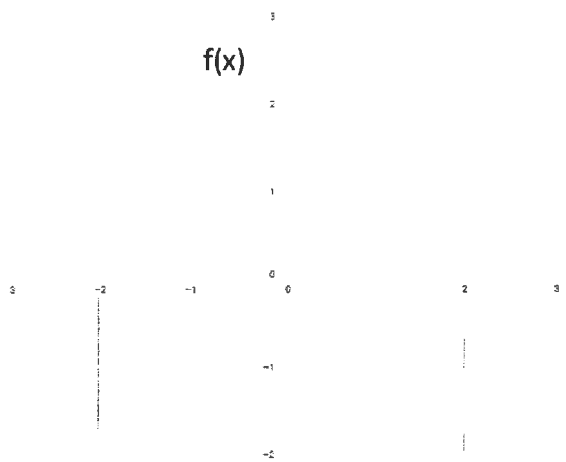
1. If $h(x)=g(f(x))$, find $h(2)$

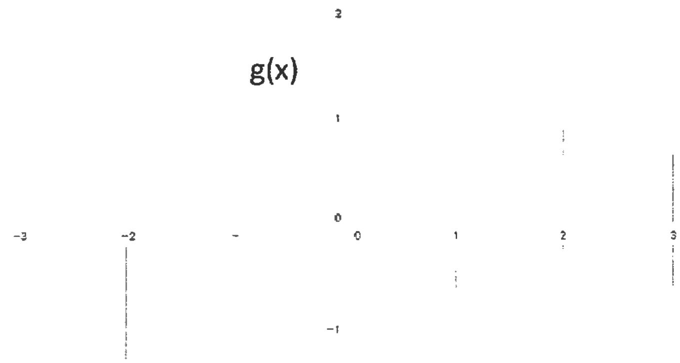
2. If $h(x)=g(f(x))$, find $h'(-1)$

3. If $k(x)=f(x^3)$, find $k'(-1)$

4. Find the equation of the tangent line to $k(x)$ at $x=-1$.

Chain Rule: Station 6





1. If $h(x)=f(g(x))$, find $h(3)$

2. If $h(x)=f(g(x))$, find $h'(2)$.

3. If $p(x)=g(x^2-x)$, find $p'(-1)$

4. If $q(x)=\frac{f(x)}{(3x-1)^2}$, find $q'(-1)$

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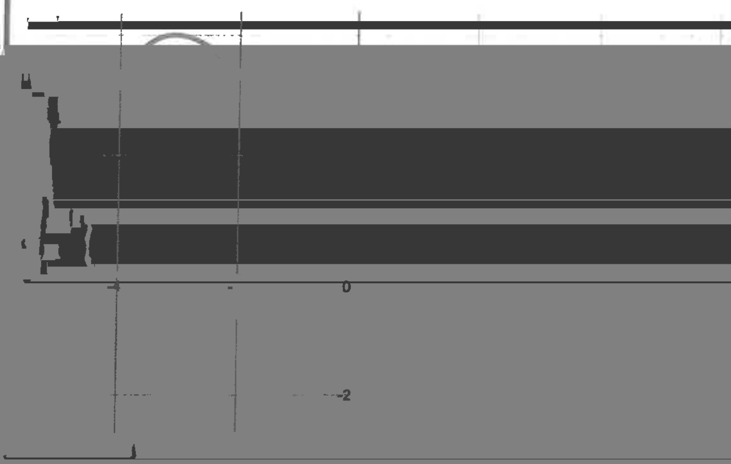


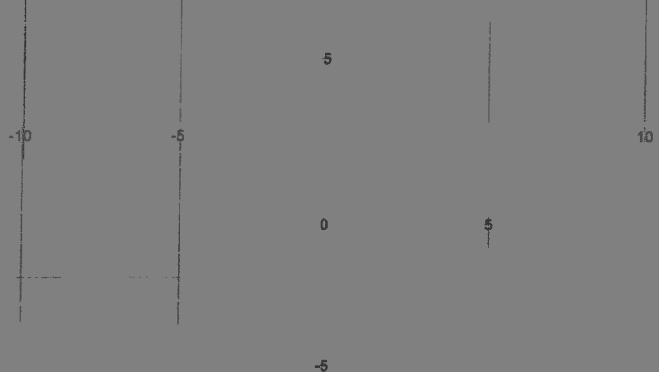
[redacted]

Max: Min:

[redacted]

Concave down:

Based on the graph of f(x) above please sketch the graph of f'(x).



Please list the zeros of the *derivative*. Please also list the intervals of increasing and decreasing, maxs and mins, and intervals of concave up and down.

Zeros:

Increasing:

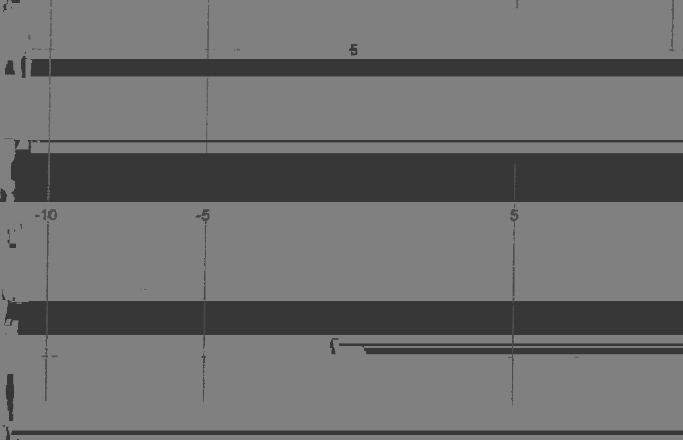
Decreasing:

Max: **Min:**

Concave up:

Concave down:

[redacted]



[redacted]

Please describe any patterns you notice among the function, first, and second derivative.