Math 135: Calculus I, Exam #1, Book#1 of 2

Name: _____

ID# (last 4 digits): _____ Section: _____

- Problems #1 – #8 are marked as "no partial credit". For these problems, you are not required to show work, and any scratch work will not be considered. You will be awarded none or all of the points, depending only on whether your answer is exactly correct.
- Problems #9 – #10 are marked as "partial credit" For these problems, you are required to show work, and you will be awarded points based on your work. Your work must be written clearly using proper notation. Answers must be justified using techniques that have been taught in this course, and answers without such justification may receive less than full credit – or no credit at all – even if the answer is correct.
- This exam is closed book. Calculators, electronic devices, notes, books, formula sheets, and other outside materials are not allowed. Phones must be turned off and put away.
- Unless otherwise stated, give exact answers: e.g., write π and $\sqrt{2}$ instead of 3.14 and 1.41. However, when an expression simplifies to a well-known value, you must use that value. For example, you must write 1 instead of e^0, and you must write $\frac{1}{2}$ instead of $\cos(\frac{\pi}{3})$.

Problem	Points	Score
1.	5	
2.	5	
3.	5	
4.	5	
5.	5	
6.	5	
7.	5	
8.	5	
9.	12	
10.	12	
11.	12	
12.	12	
13.	12	
Total:	100	

For problems #1 – #8, write your final answer in the appropriate box below.

Problem	Final Answer
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

For problems #1 – #8, you are not required to show work, and any work you do write will not be graded. Write your final answer in the table on Page #2 of the exam.

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1. Evaluate the limit or determine that it does not exist. $\lim_{x \to 0} \left(\dfrac{(2x-3)^2 - 9}{x} \right)$.

2. Evaluate the limit or determine that it does not exist. $\lim_{x \to 0} \left(\dfrac{\sin(12x)}{-7x} \right)$.

3. Evaluate the limit or determine that it does not exist.

$$\lim_{x \to 16} \left(\frac{\sqrt{x} - 4}{\frac{1}{x} - \frac{1}{16}} \right)$$

4. Calculate $g'(x)$. After calculating the derivative, do not simplify your answer.

$$g(x) = 3x^3 - \frac{1}{3x} - 4\sqrt{x} - 5\pi^2$$

5. Calculate $h'(x)$. After calculating the derivative, do not simplify your answer.

$$h(x) = \ln(3x - \tan(x))$$

.

6. Solve the inequality $\dfrac{5x - 10}{x + 4} > 0$. Write your answer using interval notation.

7. Calculate $g'(x)$. After calculating the derivative, do not simplify your answer.

$$g(x) = \sqrt{\sin(8 + x^3)}$$

.

8. Find the values of c and d that make f continuous for all x or determine that no such values of c and d exist.

$$f(x) = \begin{cases} \dfrac{\sin(6x)}{cx} & , \quad x < 0 \\ d & , \quad 0 \leq x \leq 6 \\ \dfrac{x^2 - 6x}{x - 6} & , \quad x > 6 \end{cases}$$

For problems #9 – #13, you must show all work, and your work will be graded. Your work should be clear and use proper notation.

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9. You must use the limit definition of derivative and proper notation to receive full credit.

$$\text{Let } f(x) = \sqrt{11x}. \text{ Calculate } f'(x).$$

10. Find the absolute minimum value and absolute maximum value of $f(x) = x^4 - 2x^2$ on $[-2, 0]$.

absolute minimum value:	
absolute maximum value:	

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- Problems #11 – #13 are marked as "partial credit" For these problems, you are required to show work, and you will be awarded points based on your work. Your work must be written clearly using proper notation. Answers must be justified using techniques that have been taught in this course, and answers without such justification may receive less than full credit – or no credit at all – even if the answer is correct.
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Problem	Points	Score
1.	5	
2.	5	
3.	5	
4.	5	
5.	5	
6.	5	
7.	5	
8.	5	
9.	12	
10.	12	
11.	12	
12.	12	
13.	12	
Total:	100	

For problems #11 – #13, you must show all work, and your work will be graded. Your work should be clear and use proper notation.

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11. Find all points on the graph of $y = x \ln x$ where the tangent line is horizontal.

12. Find the value of k that makes f continuous at $x = -2$ or determine that no such value of k exists. You must use limits and proper notation to receive full credit.

$$f(x) = \begin{cases} 3x + k & , \quad x < -2 \\ 4 & , \quad x = -2 \\ kx^3 + 3 & , \quad x > -2 \end{cases}$$

value of k:	

13. Find an equation of the line normal to the graph of $y = 2x^4 + x^2 - 3$ at $x = -1$. You may provide any form of the equation of a line.