

Name:

Exam 1

Calculus 1 for Social Sciences
Summer 2019
Exam 1

Name: _____

Time Limit: 90 min

- **DO NOT open the exam booklet until you are told to begin. You should write your name and section number at the top and read the instructions.**

Problem	Points	Score
1	12	
2	15	
3	15	
4	8	
Total:	50	

- Organize your work, in a reasonably neat and coherent way, in the space provided. If you wish for something to not be graded, please strike it out neatly. I will grade only work on the exam paper, unless you clearly indicate your desire for me to grade work on additional pages.
- You needn't spend your time rewriting definitions or axioms on the exam.
- **Show all your work. Correct answers without supporting work may not receive credit.**
- When you have completed your test, hand it to me and have a great night.

1. (a) (4 points) Use the definition of the derivative to calculate the derivative of $f(x) = 3x^2 + 2$

(b) (2 points) Evaluate $f'(2)$

(c) (4 points) Determine the equation of the tangent line to $f(x)$ at $x = 2$.

(d) (2 points) What are the x and y intercepts for the line?

2. Compute the derivatives of the following functions. Show all of your work.

(a) (5 points) $g(x) = 2x^2 - \frac{1}{x}$

(b) (5 points) $h(x) = \frac{1 - 4x}{4x - 1}$

(c) (5 points) $f(x) = (x^3 + x + 1)(\sqrt{x} - x)$

3. Evaluate the following limits

(a) (5 points) $\lim_{x \rightarrow \infty} \frac{4x^2 - 1}{x + 2} =$

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

(b) (5 points) $\lim_{x \rightarrow -1} f(x) =$

(c) (5 points) $\lim_{x \rightarrow 0} f(x) =$

4. For the function

$$f(x) = \begin{cases} x + b & \text{if } x < 1 \\ x^2 + 3 & \text{if } x \geq 1 \end{cases}$$

where b is a real number. Evaluate,

(a) (2 points) $\lim_{x \rightarrow 1^-} f(x) =$

(b) (2 points) $\lim_{x \rightarrow 1^+} f(x) =$

(c) (4 points) Find the value of b such that $f(x)$ is continuous at $x = 1$