Calculus 1 for Social Sciences **Name:** _____
Winter 2019
Exam 1 **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.**
- 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.

Problem	Points	Score
1	12	
2	11	
3	9	
4	9	
Total:	41	

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

(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) (3 points) $g(x) = 2x^2 - 3x^3$

   (b) (4 points) $h(x) = \dfrac{2x+1}{3x^2+1}$

   (c) (4 points) $f(x) = (x^2 + x + 1)(\sqrt{x} - x)$

3. Evaluate the following limits

(a) (3 points) $\lim_{x\to\infty} \dfrac{4x^2-1}{x+2} =$

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

(b) (3 points) $\lim_{x\to -1} f(x) =$

(c) (3 points) $\lim_{x\to 0} f(x) =$

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 a is a real number. Evaluate,

(a) (3 points) $\lim_{x \to 1^-} f(x) =$

(b) (3 points) $\lim_{x \to 1^+} f(x) =$

(c) (3 points) Find the value of a such that $f(x)$ is continuous at $x = 1$