Calculus 1 for Social Sciences **Name:** _____
Winter 2019
Exam 2 **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.**

Problem	Points	Score
1	5	
2	8	
3	5	
4	5	
5	15	
6	12	
Total:	50	

- When you have completed your test, hand it to me and have a great night.

1. (5 points) Find dy/dx if $y = \left((2x+2)^3 + 3\right)^2$, don't worry about simplifying. (hint: use the chain rule twice)

2. (8 points) find the second derivative of the function $f(x) = \sqrt{3x+1}$

3. (5 points) Find the 4th derivative of the function $f(x) = x^3 - 2x^2 + 3x - 1$

4. (5 points) Find the equation of the tangent line to the function $f(x) = (2x^2 - 1)^4$ at the point $(0, 1)$.

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

(a) (5 points) $f(x) = (3x^2 + 2x + 1)^{-2}$

(b) (5 points) $g(x) = (5x^4 + 1)^2$

(c) (5 points) $h(x) = \sqrt[5]{-x^3 - 4}$

6. The weekly demand for LED tvs is $p = 600 - 0.5x$, where p denotes the wholesale unit price in dollars and x denotes the quantity demanded. The weekly total costs function is given by $C(x) = 0.000002x^3 - 0.03x^2 + 400x + 80000$ where $C(x)$ denotes the the total cost incurred in producing x sets.

   (a) (4 points) find the revenue function and profit function.

   (b) (4 points) find the marginal cost function and the marginal revenue function.

   (c) (4 points) Compute $C'(2000)$ and $R'(2000)$ and interpret your results.