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	7	
4	10	
5	10	
6	20	
Total:	60	

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

1. (5 points) Find dy/dx by implicit differentiation for the expressions $x^2y^{1/2} = x + 2y^3$

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

3. (7 points) Find the equation of the tangent line to the function defined by the equation $4x^2 + 9y^2 = 16$ at the point $(2, 2\sqrt{5})$

4. 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) $g(x) = \sqrt{\dfrac{2x+1}{2x-1}}$

5. (10 points) A car leaves an intersection traveling west its position 4 sec later is 20 ft from the intersection. At the same time, another car leaves the same intersection heading north so that its position 4 sec later is 28 ft from the intersection. If the speeds of the cars at that instant of time are 8 ft/sec and 11 ft/sec, respectively, find the rate at which the distance between the two cars is changing.

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

   (d) (4 points) Find the average cost function.

   (e) (4 points) Find the marginal average cost function.

   (f) (2 points) Compute $\bar{C}'(500)$ and $\bar{C}'(10000)$ and interpret your results.