

Math 201 - Quiz 2 (Spring 17)

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- Write the answers to questions 1 and 4 on their sheets. The other two questions have extra sheets for you to write your answers on them. Any part of your answers written on the wrong sheet will not be graded. Note that a sheet of paper has two sides, you can write on both of them.

- There are 4 problems in total. Most questions have several parts to them. Make sure that you attempt them all.

- This is a closed book exam and no calculators are allowed.

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Name :

ID # :

Section :

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<i>Q1</i>	
<i>Q2</i>	
<i>Q3</i>	
<i>Q4</i>	
<i>TOTAL</i>	

Problem 1

(12 points each) For each of the functions below, either find its limit as $(x, y) \rightarrow (0, 0)$ or show that the limit doesn't exist:

i-

$$f(x, y) = \frac{xy}{x - y^2}$$

ii-

$$g(x, y) = \frac{xy}{2(|x| + |y|)}$$

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Problem 2

(12 points each part) Suppose $f(x, y)$ is given by the following formula:

$$f(x, y) = x^2 + y^2 + xy$$

- i- What is the domain of this function? Is it open? Closed?
- ii- Find the critical point(s) of this function. For each point identify whether it is a max/min/saddle.
- iii- Find the points on the level curve $f(x, y) = 1$ nearest and farthest from the origin.

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ADDITIONAL SHEET FOR PROBLEM 2 ANSWER

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Problem 3

(10 points each part) Let $f(x, y)$ be a function of two variables. Suppose you know that at the point $(1, 2)$, $f_x = 3$ and $f_y = 4$.

i- Is there a unit vector \vec{u} such that the derivative of f at $(1,2)$ in the direction of \vec{u} is equal to 0? If yes, give an example, if no, justify.

ii- Is there a unit vector \vec{u} such that the derivative of f at $(1,2)$ in the direction of \vec{u} is equal to 6.2? If yes, give an example, if no, justify.

iii- If $f(1, 2) = 11$, estimate $f(0.8, 2.1)$.

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ADDITIONAL SHEET FOR PROBLEM 3 ANSWER

Problem 4

(10 points) Suppose $f(x, y) = e^{-(x^2+y^2)}$. Find $\frac{\partial^{2018} f}{\partial x^{2018}}$ at the point $(0,10)$.

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