

MAT 203

Midterm 2.

April 8, 2019

This is a closed notes/ closed book/ electronics off exam.

Please write legibly and show your work.

Each problem is worth 20 points.

Full Name:			
Problem	1	2	3
Grade			
Problem	4	5	Total
Grade			

Problem 1. Find the equation of the tangent plane and normal line through the point $(1, 1, 2)$ on the surface $3x^2 + 2xyz + z^2 = 11$.

Problem 2. Let z be defined implicitly as a function of x and y by the equation

$$\sin(xz) + yz^2 = 1.$$

Find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$. You may assume that $x \cos(xz) + 2yz \neq 0$.

Problem 3.

- a. Calculate the partial derivatives and total differential of

$$w = e^{x^2+y^2} \cos(xy).$$

- b. Now let $x = r \cos \theta$, $y = r \sin \theta$ and calculate $\frac{\partial w}{\partial r}$. You are not required to simplify your answer.

Problem 4. Find all local minima, local maxima and saddle points of

$$f(x, y) = x^3 - x^2 + y^2 = 0.$$

Problem 5. Find the maximum and minimum values of $f(x, y) = 2x^2 + 3x + y^2$ on the circle $x^2 + y^2 = 4$.

Use for scratch.

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