

Math 250B Test One  
Section X02

Time: 50 Minutes  
Total: 17 Marks

Name: \_\_\_\_\_

1. [3 marks] Calculate  $\frac{\partial z}{\partial x}$  given  $x^3 + y^3 + z^3 + 8xyz^4 = 0$

2. [2 marks] Sketch the following surfaces. Clearly label the  $x$ -axis,  $y$ -axis, and  $z$ -axis.

a)  $z = 9 - \sqrt{x^2 + y^2}$

b)  $z^2 = 9 - x^2 - y^2$

3. [4 marks] The maximum relative error in  $a$  is  $\pm 2\%$ . The maximum relative error in  $b$  is  $\pm 4\%$ . Find the maximum relative error in  $f = \frac{a^3}{b^2}$

4. [4 marks] Find the equation of the tangent plane to the following surface at the point where  $x = 2$  and  $y = 0$ :

$$z = 4x^3 \ln(2y + 1) + x^4 e^{3y}$$

5. [4 marks] Find the absolute maximum of  $z = x^2y^2$  over the region  $x^2 + y^2 \leq \frac{1}{5}$ .