Math 250B Test One
Section X01

Time: 50 Minutes
Total: 17 Marks

Name:_____

1. [3 marks] Calculate $\frac{\partial z}{\partial x}$ given:

$$z = 2s^4t^4 - \frac{3s^3}{t} + 7x^3, \quad s = x^2 + y^2, \quad t = 4x + 8y$$

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

a) $z = 9 - x^2 - y^2$
b) $z^2 = 9(x^2 + y^2)$

3. [4 marks] The maximum relative error in x is $\pm 5\%$. The maximum relative error in y is $\pm 7\%$. Find the maximum relative error in $f = \frac{4x}{y^3}$

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

$z = 3x^2 \ln(2y + 1) + x^3 \cos 3y$

5. [4 marks] Find the absolute maximum of $z = x^2y^2$ over the region $x^2 + y^2 \leq \frac{1}{3}$.