QUIZ 7 - MATH 251 YOUR NAME:

Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Calculate the directional derivative of $f(x, y) = x^2 y^3$ in the direction of the vector $\mathbf{v} = \mathbf{i} + \mathbf{j}$ at the point (-2, 1).



2. A bug is at (3,9,4) and begins walking in a straight line towards the point (5,7,3). If the space temperature is given by $T(x, y, z) = xe^{y-z}$ in °C and the length is in meters, at what rate is the bug's temperature changing?

3. Find an equation for the tangent plane to the surface $x^2 + 3y^2 + 4z^2 = 20$ at the point P(2,2,1).

