

Name _____

- Write as neatly as you can!
- No calculators are allowed.
- You must show your work to obtain full credit.

1. (5 points) Suppose $f(1, 2, 3) = 9$, $f_x(1, 2, 3) = \sqrt{17}$, $f_y(1, 2, 3) = \ln 5$, $f_z(1, 2, 3) = e^2$. Use this information to approximate $f(0.99, 2.01, 2.98)$.
2. (5 points) The temperature T at a location (x, y, z) is given by $T(x, y, z) = 100e^{-(x^2+y^2/4+z^2/9)}$. At $(1, 2, 3)$, what is the direction in which T increases most rapidly? What is the direction of most rapid decrease in T ?