Math 241 Midterm 1

Name: _____

1. Either find the following limits or show they do not exist:

a. $\lim_{(x,y)\to(0,0)} \dfrac{xy}{2x^2+y^2}$

b. $\lim_{(x,y)\to(0,0)} \dfrac{|\sin y|}{|x|+|y|}$

2. Find and classify all critical points for $xy - x^2 + y^3/3$ as local maximums, local minimums, or saddle points.

3. Maximize $\frac{2}{x} + \frac{1}{y}$ subject to $\frac{1}{x^2} + \frac{1}{2y^2} = 1$.

4. If $z = f(x, y)$, $x = st$, $y = s/t$, and $t = r^2 - r$, find $\dfrac{\partial z}{\partial s}$ and $\dfrac{\partial z}{\partial r}$ in terms of f_x, f_y, s, t and r.

5. Evaluate $\int_0^1 \int_x^1 e^{-y^2}\, dy\, dx$.