1. Evaluate the following limits.

   (a) $\lim\limits_{(x,y)\to(0,0)} \frac{2x^2+7y^2}{4y^2+x^2}$

   (b) $\lim\limits_{(x,y,z)\to(2,1,0)} \frac{(4y-z^3)e^{3x-6}}{4z-yx^2}$

2. Find all first and second order partial derivatives for the following functions.

   (a) $f(x,y) = x^4y^{-2} - 4xy + e^{7y} + \ln(2x)$

   (b) $f(u,v,w) = u^4\sin(w^2) - \frac{2v}{u^4} + \ln(v^2w)$

3. Given the following information use the Chain Rule to determine $\frac{\partial z}{\partial u}$ and $\frac{\partial z}{\partial v}$.

$$z = x\sin(y^2 - x), x = 3u - v^2, y = u^6$$

4. Find and classify all the critical points of the function $f(x,y) = xye^{-8(x^2+y^2)}$.

5. Find the absolute minimum and maximum of $f(x,y) = 18x^2 + 4y^2 - y^3x - 2$ on the triangle with the verticies $(-1,-1), (5,-1)$, and $(5,17)$.

6. Find the maximum and minimum values of $f(x,y,z) = xyz$ subject to the constraint $x^2 + 2y^2 + 4z^2 = 24$