2 For lecture on 10/1

1. Find the domain for the following functions.
   (a) $f(x,y) = \frac{\sqrt{x-2y}}{x}$.
   (b) $f(x,y) = \sqrt{\frac{x-2y}{x}}$.
   (c) $f(x,y) = \ln(16 - x^2 - y^2)$.
2. Find the limit of $f(x,y)$ as $(x,y) \to (0,0)$, if it exists; or state the reason if it does not exist:
   (a) $f(x,y) = \frac{x^3y - xy^3 - x}{1-xy}$.
   (b) $f(x,y) = \frac{2x^2-y^2}{x^2+2y^2}$.
   (c) $f(x,y) = \frac{\sin(3x^2+y^2)}{x^2+2y^2}$.
   (d) $f(x,y) = \frac{xy^3}{x^2+y^6}$.
   (e) * $f(x,y) = (2x^2 + y^2)e^{\frac{1}{-y^2-2x^2}}$.
   (f) * $f(x,y) = \frac{xy}{\sqrt{x^2+y^2}}$.
3. If $f(x,y,z) = (x - 2y, z + 3x)$ and $g(u,v) = (v, -u, \sqrt{u+v})$. Find $f \circ g$ and $g \circ f$, and state the domain for these two functions.