Worksheet #12; date: 02/27/2018
MATH 53 Multivariable Calculus

1. *(Stewart 14.2.8)* Find the limit, if it exists, or show that the limit does not exist.
$$\lim_{(x,y)\to(3,2)} e^{\sqrt{2x-y}}$$

2. *(Stewart 14.2.15)* Find the limit, if it exists, or show that the limit does not exist.
$$\lim_{(x,y)\to(0,0)} \frac{xy^2\cos y}{x^2+y^4}$$

3. *(Stewart 14.2.37)* Determine the set of points at which the function is continuous.
$$f(x,y)=\begin{cases}\frac{x^2y^3}{2x^2+y^2} & \text{if } (x,y)\neq(0,0)\\ 1 & \text{if } (x,y)=(0,0)\end{cases}$$

4. *(Stewart 14.2.39)* Use polar coordinates to find the limit. [If (r,θ) are polar coordinates of the point (x,y) with $r\geq 0$, note that $r\to 0^+$ as $(x,y)\to(0,0)$.]
$$\lim_{(x,y)\to(0,0)} \frac{x^3+y^3}{x^3+y^2}$$

5. *(Stewart 14.2.17; challenge problem from HW)* Find the limit, if it exists, or show that the limit does not exist.
$$\frac{x^2+y^2}{\sqrt{x^2+y^2+1}-1}.$$

6. Any T/F from HW15 for discussion?

7. *(Stewart 14.2.61)* Verify that the conclusion of Clairaut's Theorem holds, that is, $u_{xy}=u_{yx}$.
$$\cos(x^2y)$$

8. *(Stewart 14.2.71)* If
$$f(x,y,z)=xy^2z^3+\arcsin(x\sqrt{z}),$$
find f_{xzy}. [Hint: Which order of differentiation is easiest?]