Math 2471 Calc 3 - Homework #3

Pg. 880, #21, 23, 25 and 31

Pg. 806, #15, 17,19, 21, 23 and 25

Pg. 892, #44, 45, 46, 51 and 52.

Pg. 880

Find the domain and range of the following functions. Sketch the domain in the xy plane.

$$\begin{aligned}
&\#21 \quad f(x,y) = 3x^2 - y \\
&\#23 \quad g(x,y) = x\sqrt{(y)} \\
&\#25 \quad z = \frac{x+y}{xy} \\
&\#31 \quad f(x,y) = \ln(5-x-y)
\end{aligned}$$

Pg. 806

Sketch and name the following quadratic surfaces

$$\begin{aligned}
&\#15 \quad 4x^2 - y^2 - z^2 = 1 \\
&\#17 \quad 16x^2 - y^2 + 16z^2 = 4 \\
&\#19 \quad x^2 + \frac{y^2}{4} + z^2 = 1 \\
&\#21 \quad z^2 = x^2 + \frac{y^2}{9} \\
&\#23 \quad x^2 - y^2 + z = 0 \\
&\#25 \quad x^2 - y + z^2 = 0
\end{aligned}$$

Pg. 892

Show, following two different paths, that the limit of the following do not exist.

$$\begin{aligned}
&\#44 \quad \lim_{(x,y)\to(0,0)} \frac{-xy^2}{x^2+y^4} \\
&\#45 \quad \lim_{(x,y)\to(0,0)} \frac{y}{x^2+y^2} \\
&\#46 \quad \lim_{(x,y)\to(0,0)} \frac{2x-y^2}{2x^2+y}
\end{aligned}$$

Pg. 892

Using the squeeze thm, prove the limit exists for the following

$$\begin{aligned}
&\#51 \quad \lim_{(x,y)\to(0,0)} \frac{xy^2}{x^2+y^2} \\
&\#52 \quad \lim_{(x,y)\to(0,0)} \frac{x^4+y^4}{x^2+y^2}
\end{aligned}$$

Due: Tuesday June 21, 2022.