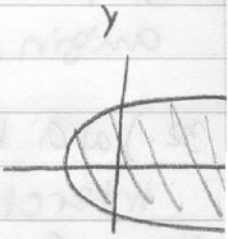
Homework Solutions

11.1

6.) $f(x,y) = \sqrt{1+x-y^2}$

$D = \{(x,y) \mid x - y^2 \geq -1,\ y \leq \pm\sqrt{x+1}\}$

Range $f(x,y) = [0, +\infty)$




8.) $g(x,y,z) = \ln(25 - x^2 - y^2 - z^2)$

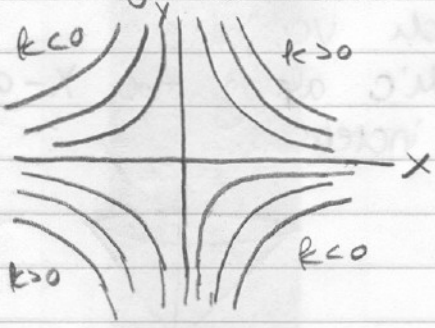
a) $g(2,-2,4) = \ln(25-4-4-16) = \ln 1 = 0$

b) $D = \{(x,y,z) \mid x^2+y^2+z^2 < 25\}$

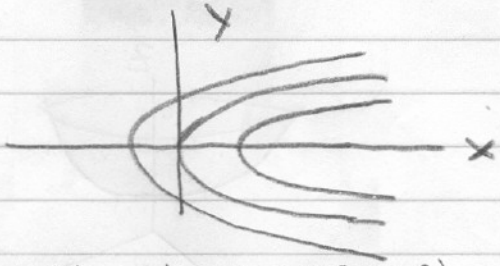
c) Range $\Rightarrow f(x,y,z) \Rightarrow (-\infty, \ln 25)$

15.) $f(x,y) = xy$

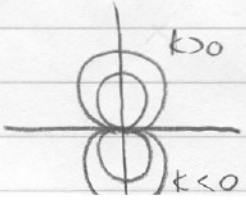
$xy = k$




21.) $f(x,y) = x - y^2$ $\quad x - y^2 = k$




22.) $f(x,y) = y/(x^2+y^2)$ $\quad y/(x^2+y^2) = k$



31.) a) B b) III Constant on any circle centered at the origin.

32.) a) C b) II This function is the same if x is interchanged with y, so its graph is symmetric the plane $x=y$. Also, $z(0,0)=0$ and the values z approach 0 as we use points farther from the origin

33. a) F b) V z increases without bound as we use points closer to the origin.

34.) a) A b) VI Along the lines $y = \pm \frac{1}{\sqrt{3}}x$ and $x=0$, this function is 0.

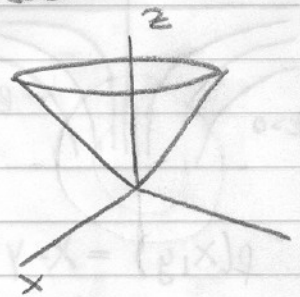
35.) a) D b) IV Periodic in both x and y, w/ period $2\pi$ in each variable

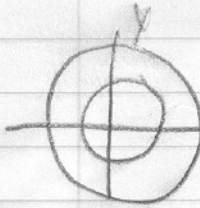
36.) a) E b) I Periodic along the x-axis, and increases as $|y|$ increases

44.) $f(x,y) = \sqrt{x^2+y^2}$

$\sqrt{x^2+y^2} = k$

$x^2+y^2 = k^2$



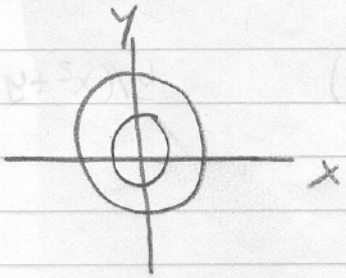



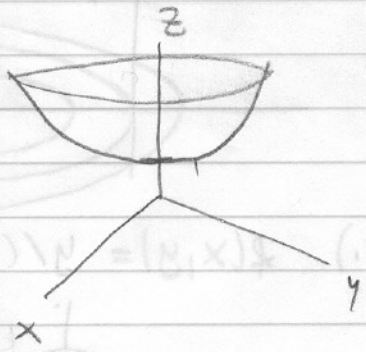

$f(x,y) = e^{\sqrt{x^2+y^2}}$

$k = e^{\sqrt{x^2+y^2}}$

$\ln k = \sqrt{x^2+y^2}$

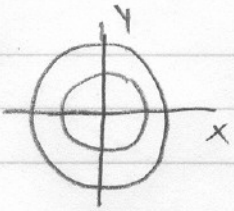
$(\ln k)^2 = x^2+y^2$

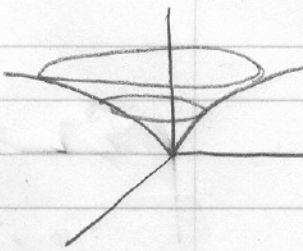


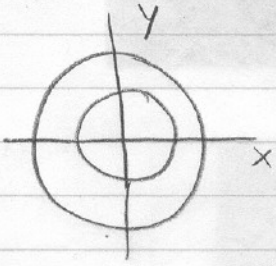
$f(x,y) = \ln\sqrt{x^2+y^2}$

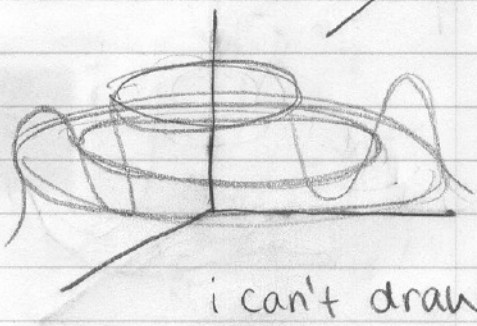
$\ln\sqrt{x^2+y^2} = k$



$f(x,y) = \sin\left(\sqrt{x^2+y^2}\right)$



i can't draw!

$f(x,y) = \dfrac{1}{\sqrt{x^2+y^2}}$