

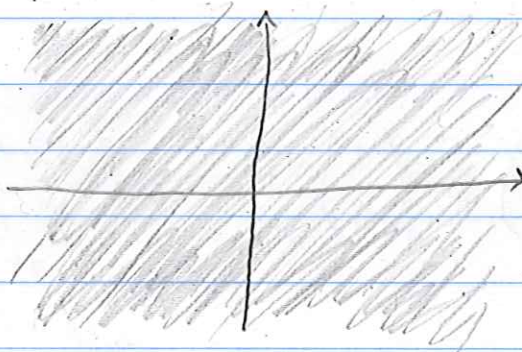
HW 14 Solutions:

1. Find the (i) domain and (ii) range. Graph both.

(a) $f(x, y) = x - y$

Domain: $D = \{(x, y) \mid x, y \in \mathbb{R}\}$

Graph



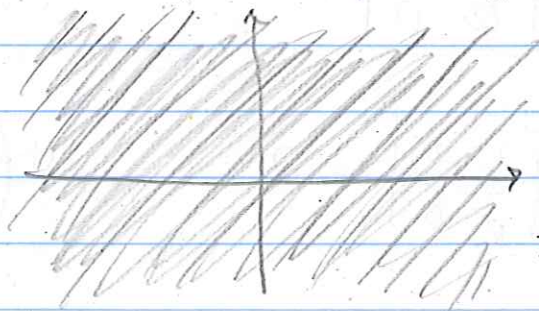
Range: $R = \{z \mid z \in \mathbb{R}\}$



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

Domain: $D = \{(x, y) \mid x, y \in \mathbb{R}\}$

x and y can be anything.

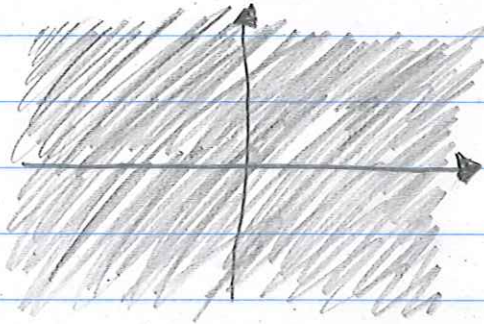


Range: $R = \{z \mid z \geq 1\}$



(c.) $f(x,y) = |xy|$

Domain: $D = \{(x,y) \mid x,y \in \mathbb{R}\}$



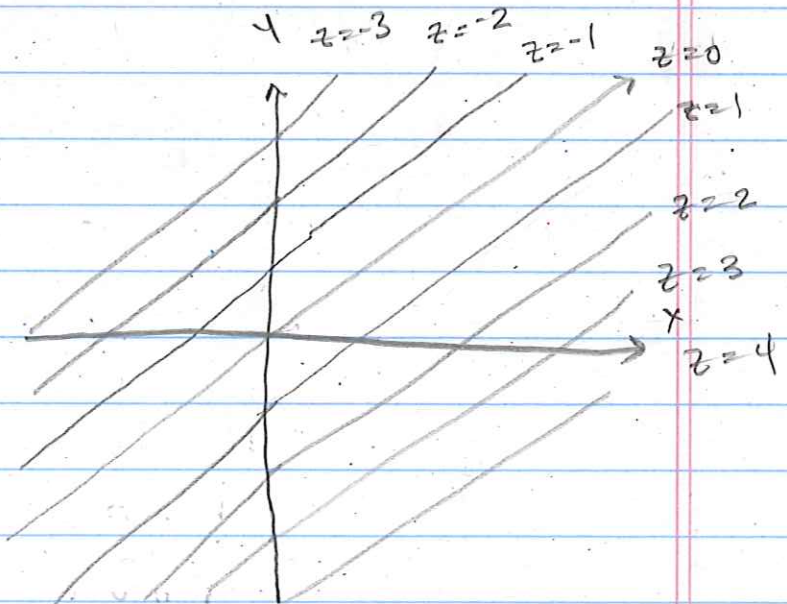
Range: $R = \{z \mid z \geq 0\}$



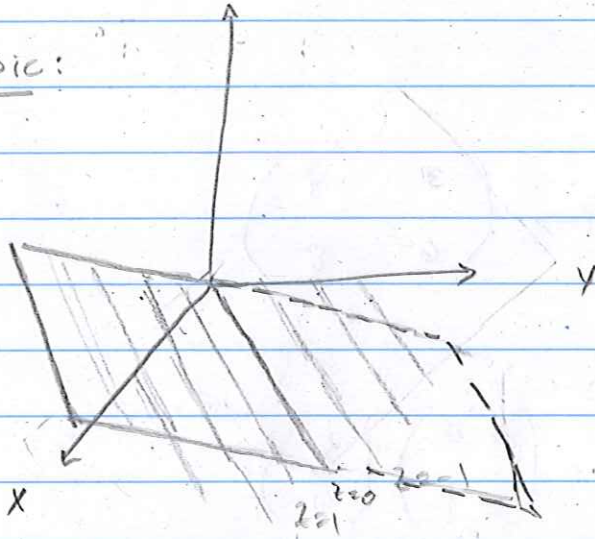
2.) Graph the level curves. Try to determine the 3 dimensional function.

(a.) $f(x,y) = x - y$

f	function
-2	$y = x + 2$
-1	$y = x + 1$
0	$y = x$
1	$y = x - 1$
2	$y = x - 2$
3	$y = x - 3$



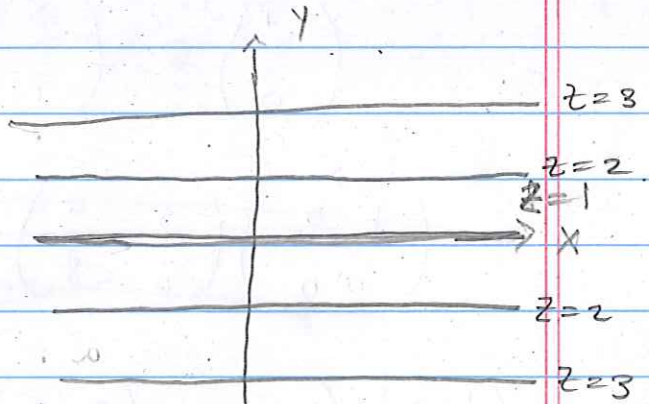
3D pic:



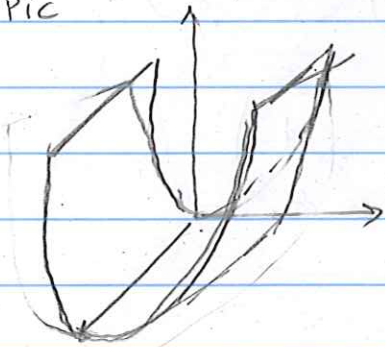
The 3-D image is a plane.

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

f	
1	$y^2 = 0 \Rightarrow y = 0$
2	$y^2 = 3 \Rightarrow y = \pm\sqrt{3}$
3	$y^2 = 8 \Rightarrow y = \pm\sqrt{8} = \pm 2\sqrt{2}$
4	$y^2 = 15 \Rightarrow y = \pm\sqrt{15}$



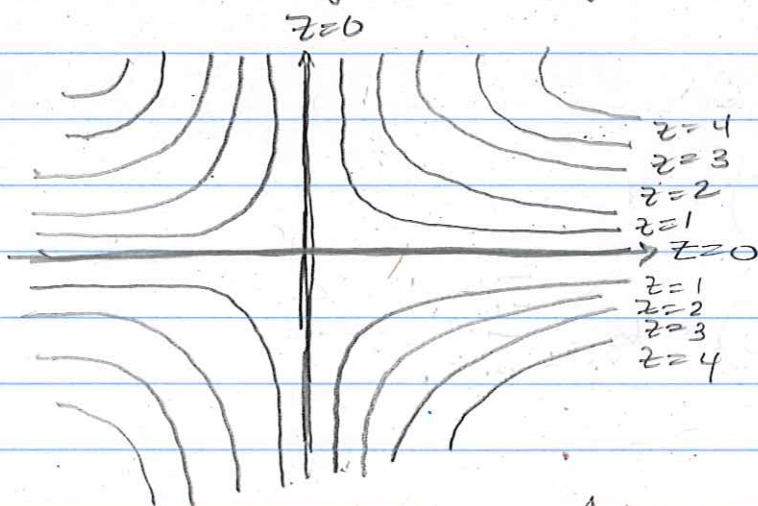
3D Pic



This is a cylinder shaped like a parabola.

(c) $f(x,y) = |xy|$

f	function
0	$ xy =0 \Rightarrow xy=0$
1	$ xy =1 \Rightarrow xy=1 \text{ and } xy=-1$
2	$ xy =2 \Rightarrow xy=2, xy=-2$
3	$ xy =3 \Rightarrow xy=3, xy=-3$
4	$ xy =4 \Rightarrow xy=4, xy=-4$



valleys along
x and y axis
grow further
away from the
axes.

3D sketches

