ACTIVITY #3- FUNCTION: DOMAIN, RANGE, AND RULE OF CORRESPONDENCE

Name:___________________________________

1) Find the domain of each of the following functions and give your answer using set notation, the represent the domain in three-dimensional space. Recall that an ordered pair (x, y) in the domain of a function is represented in space as $(x, y, 0)$.

   a. $f(x,y)=\sqrt{x-y}$ b. $f(x,y)=\sqrt{1-y^2}$ c. $f(x,y)=x^2+y^2$ if $\begin{cases} -1 \le x \le 1 \\ -1 \le y \le 1 \end{cases}$

   d. $f(x,y)=\ln(xy)$ e. $f(x,y)=x$ si $x^2+y^2 \le 1$ f. $f(x,y)=\ln(|xy|+1)$ for $y \ge 0$

2) Find the range of the functions in the previous exercise. Give your answer using set notation.

3) Function *f* is defined by the following table. Represent its domain, first using set notation and then with a drawing in three-dimensional space. Recall that the domain of a function of two variables consists of ordered pairs (x, y). Also, find the range of *f*.

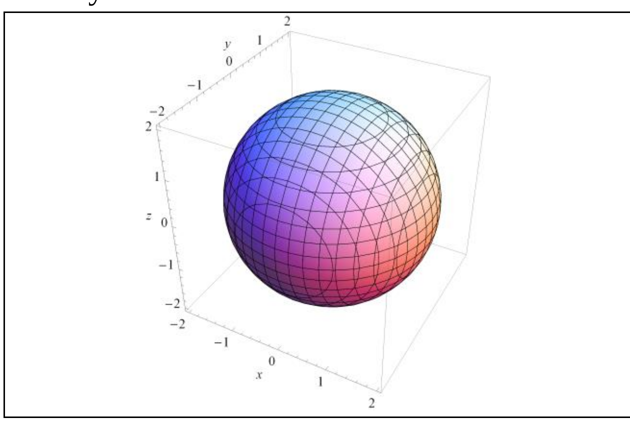
$x \mid y$	2	4	6
1	**5**	**2**	**3**
2	**2**	**5**	**3**
3	**2**	**2**	**2**

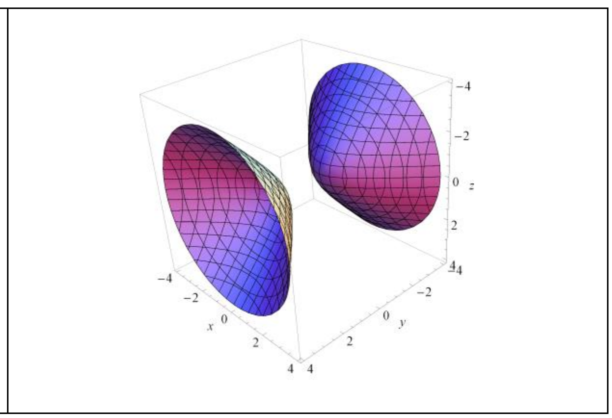
4) For each one of the following expressions, state if it defines *z* as a function of *x* and *y*. Justify your answer briefly.

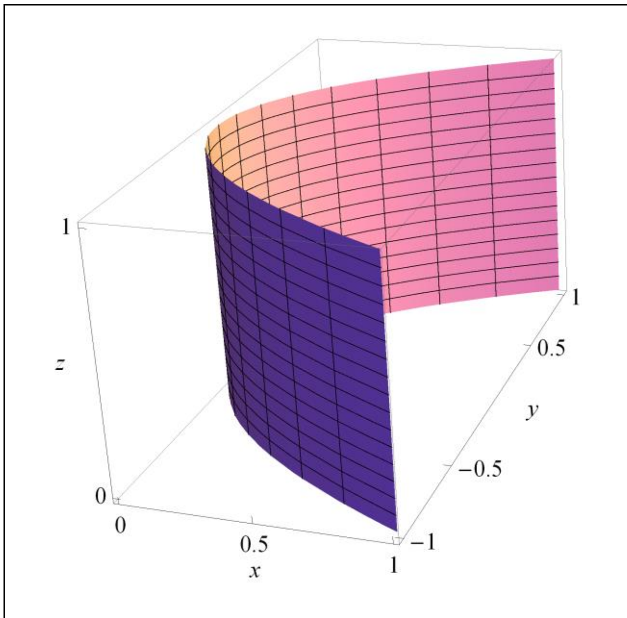
   a. $z^2=x^2+y^2$ b. $z=\sqrt{x^2y^2}$ c. $z=4$

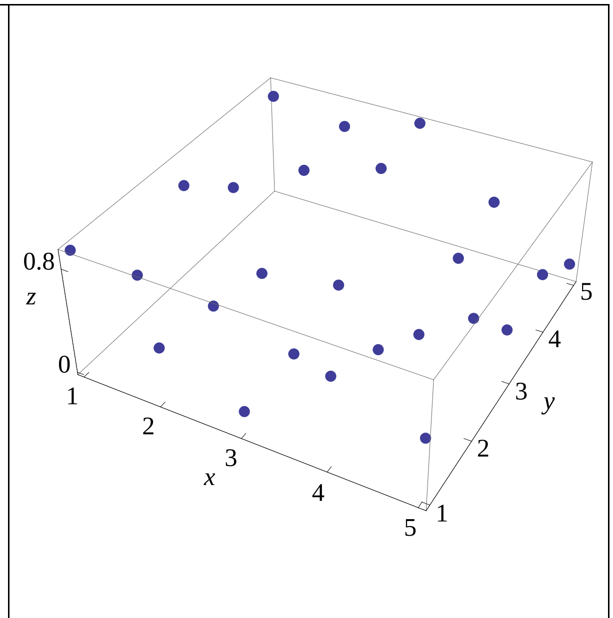
   d. $|z-x|=4$ e. $z=\begin{cases} x^2y & \text{si } y \ge 0 \\ xy^2 & \text{si } x \ge 0 \end{cases}$ f. $z=\begin{cases} xy^2 & \text{si } y \ge x+2 \\ x^2y & \text{si } y \le x-2 \end{cases}$

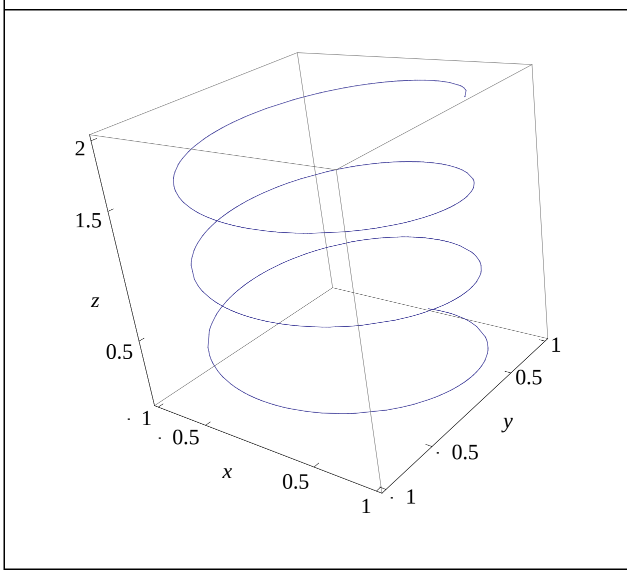
5) For each of the following graphs, state if *z* is a function of *x* and *y*. Justify your answer briefly.

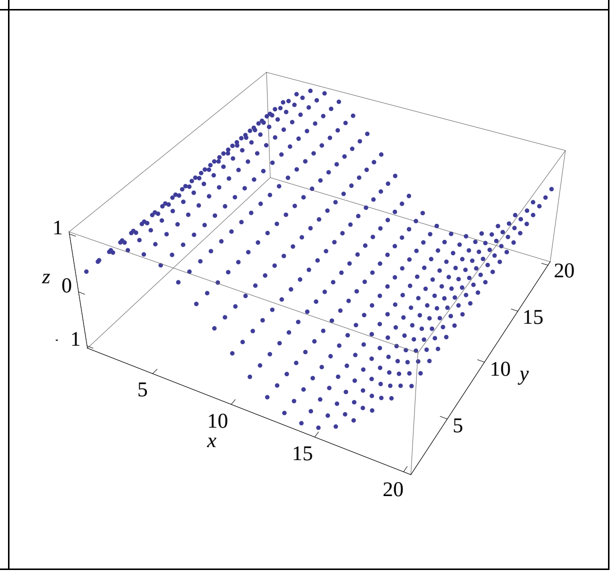





1
z
0
0
0.5
x
1
−1
−0.5
y
0.5
1


0.8
z
0
1
2
3
x
4
5
1
2
3
y
4
5


2
1.5
z
0.5
1
0.5
x
0.5
1
1
0.5
y
0.5
1


1
z
0
1
5
10
x
15
20
5
10
y
15
20