Student: Phong Vo **Date:** 02/23/18	**Instructor:** Chuck Ormsby **Course:** Multi-Variable and Vector Calculus -- Calculus III Spring 2018	**Assignment:** Section 13.2 Homework

1. Describe in words the level curves of the paraboloid $z = x^2 + y^2$.

Choose the correct answer below.

- **A.** The level curves are lines of the form $x + y = z_0$.
- **B.** The level curves are parabolas of the form $x^2 = z_0$.
- **C.** The level curves are parabolas of the form $y^2 = z_0$.
- **D.** The level curves are circles of the form $x^2 + y^2 = z_0$.

2. The domain of $Q = f(u,v,w,x,y,z)$ lies in $\mathbf{R}^n$ for what value of n? Explain.

Select the correct choice below and fill in any answer boxes within your choice.

- **A.** The value of n is _____ because the domain is $\mathbf{R}^3$.
- **B.** The value of n is _____ because there are _____ dependent variables.
(Type integers or decimals.)
- **C.** The value of n is _____ because there are _____ variables.
(Type integers or decimals.)
- **D.** The value of n is 6 because there are 6 independent variables.
(Type integers or decimals.)

3. Find the domain of the following function.

$$f(x,y) = \sin\left(\frac{x-4}{y-8}\right)$$

Select the correct choice below and fill in any answer boxes within your choice.

- **A.** $\{(x,y): y \neq 8\}$
(Use a comma to separate answers as needed.)
- **B.** $\{(x,y): x \neq$ _____ and $y \neq$ _____ $\}$
(Use a comma to separate answers as needed.)
- **C.** $\{(x,y): x \neq$ _____ $\}$
(Use a comma to separate answers as needed.)
- **D.** $\mathbf{R}^2$

4. Find the domain of the following function.

$g(x,y) = \ln\left(x^8 - y\right)$

Select the correct choice below and fill in any answer boxes in your choice.

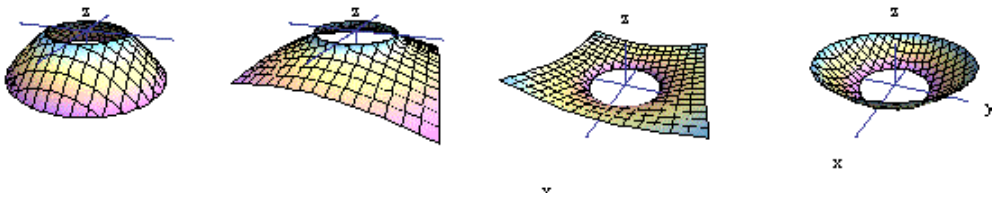
- **A.** {(x,y): y ≠ ____ }
- **B.** {(x,y): y > ____ }
- **C.** {(x,y): y < x^8 } ✔
- **D.** {(x,y): x ≠ ____ and y ≠ ____ } (Use a comma to separate answers as needed.)
- **E.** $\mathbf{R}^2$

5. Use what you have learned about surfaces to sketch a graph of the following function. Identify the surface, and state the domain and range of the function.

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

Sketch a graph of the function. Choose the correct graph below. All of the graphs below have the scale $[-2,2] \times [-2,2] \times [0,3]$.

A. **B.** **C.** ✔ **D.**



Identify the surface.

The surface is the upper half of a hyperboloid of one sheet.

State the domain of the function. Select the correct choice below and , if necessary, fill in the answer box to complete your choice.

- **A.** {(x,y): $x^2 + y^2 \neq$ ____ }
- **B.** {(x,y): $x^2 + y^2 \geq$ 1 } ✔
- **C.** {(x,y): $x^2 + y^2 \leq$ ____ }
- **D.** {(x,y): x ≠ ____ and y ≠ ____ } (Use a comma to separate answers as needed.)
- **E.** $\mathbf{R}^2$

State the range of the function.

[0,∞) (Type your answer in interval notation.)

6. Match functions a through d with their surfaces below.

a. $f(x,y) = \cos xy$

b. $g(x,y) = \ln\left(x^2 + y^2\right)$

c. $h(x,y) = \dfrac{1}{x - y}$

d. $p(x,y) = \dfrac{1}{1 + x^2 + y^2}$

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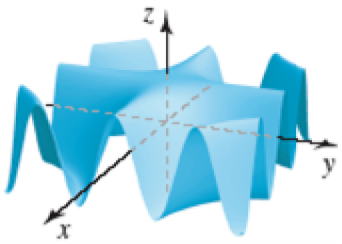
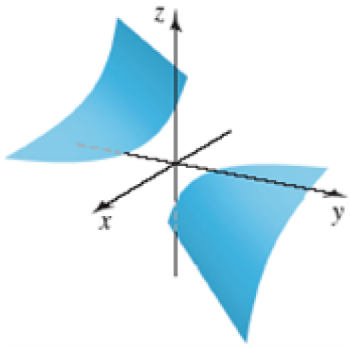
a. Determine the graph of $f(x,y) = \cos xy$. Choose the correct graph below.

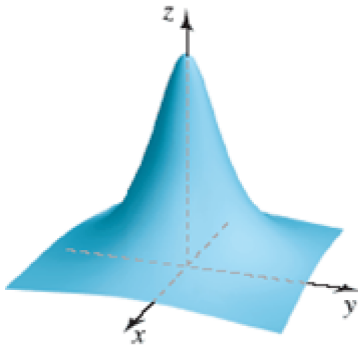
A.



B.

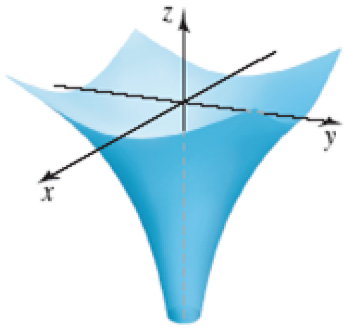


C.

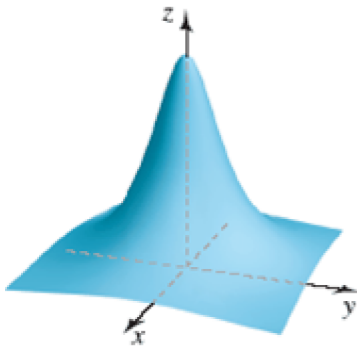


b. Determine the graph of $g(x,y) = \ln\left(x^2 + y^2\right)$. Choose the correct graph below.

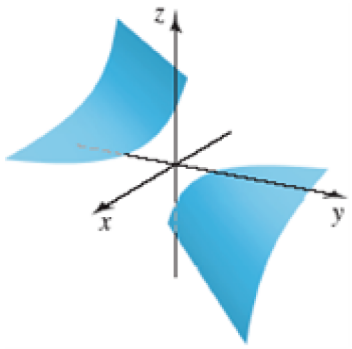
A.



B.

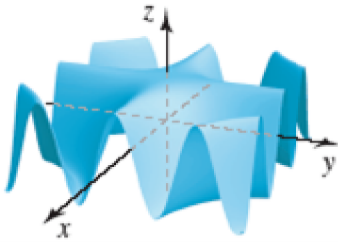


C.

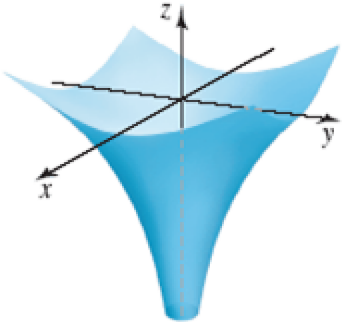


c. Determine the graph of $h(x,y) = \dfrac{1}{x - y}$. Choose the correct graph below.

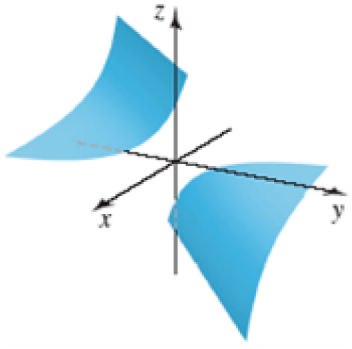
A.



B.

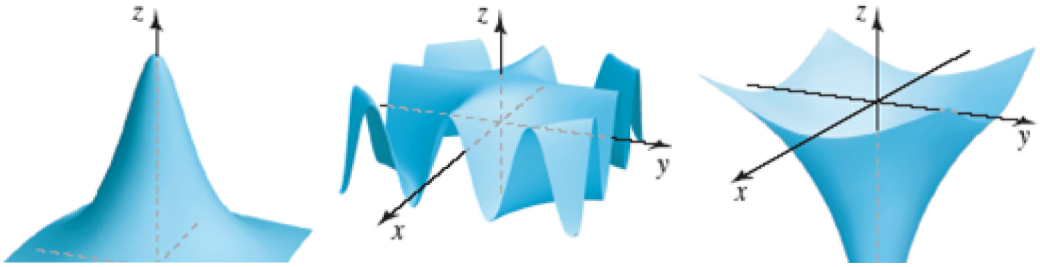


C.



d. Determine the graph of $p(x,y) = \dfrac{1}{1 + x^2 + y^2}$. Choose the correct graph below.

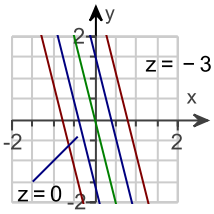
A. **B.** **C.**

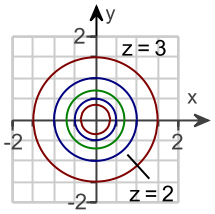


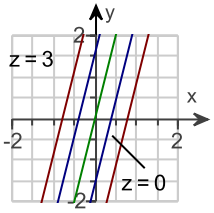
7. Graph several level curves of the following function using the given window. Label at least two level curves with their z-values.

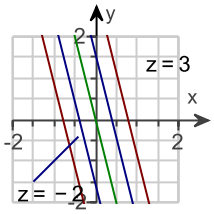
$z = 3\cos(4x + y);\ [-2,2] \times [-2,2]$

Choose the correct graph below.

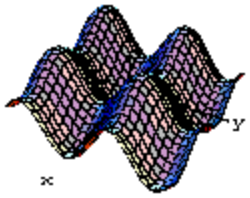
A. 

B. 

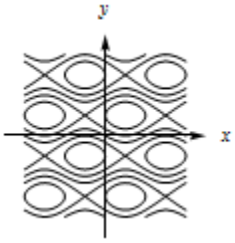
C. 

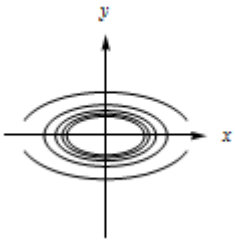
D. 

8. Match the graph of the function $z = \sin x + 2\sin y$ to the system of the level curves.



Which of the following level curves matches the given surface graph?

A. 

B. 

C.