

# Math 3113 - Multivariable Calculus

## Quiz #10 - 2006.03.27 Solutions

---

Consider the function

$$f(x, y) = \frac{1}{\sqrt{16 - x^2 - y^2}}.$$

1. What is the domain of  $f(x, y)$ ?

The domain is  $D = \{(x, y) \mid x^2 + y^2 < 4^2\}$ .

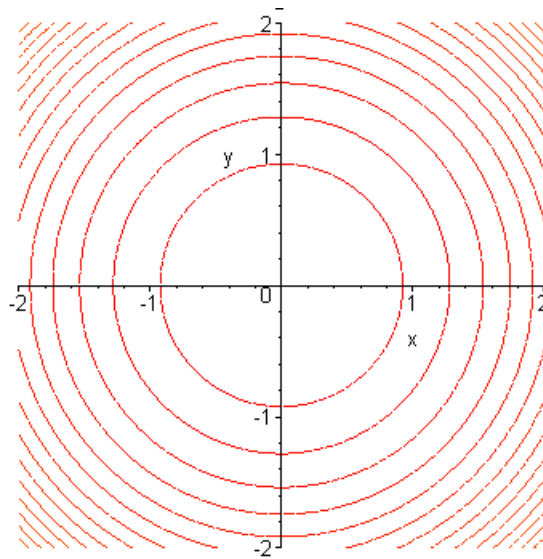
2. What is the range of  $f(x, y)$ ?

The range is  $[\frac{1}{4}, \infty)$ .

3. What do the level curves of  $f(x, y)$  look like?

The level curves are circles about the origin, getting closer and closer together as you approach the circle of radius 4.

4. Sketch several level curves of  $f(x, y)$ .



5. Convert  $f(x, y)$  to cylindrical coordinates  $f(r, \theta)$ .

$$f(r, \theta) = \frac{1}{\sqrt{16 - r^2}}.$$

5. Use all of the above information to sketch a graph of  $f(x, y)$ .

