

## Math 303, Exam #1 Review

Fall 2008

1. Find the distance between the points  $(2, -1, 1)$  and  $(1, 0, 3)$ .

2. match each of the functions below with its graph.

a.  $G(x, y) = \sin(x^2 + y^2)$

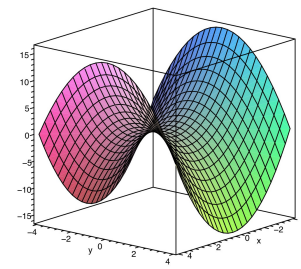
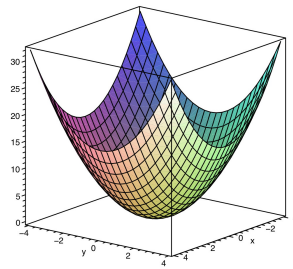
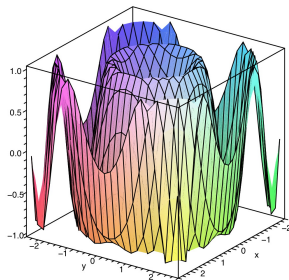
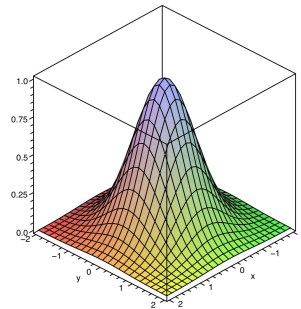
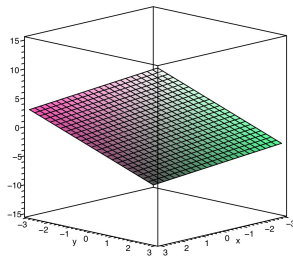
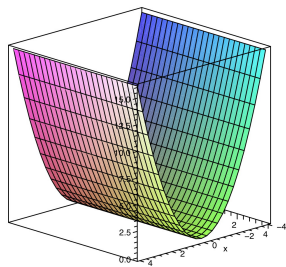
b.  $f(x, y) = x^2 + y^2$

c.  $g(x, y) = 3x + 2y$

d.  $h(x, y) = x^2 - y^2$

e.  $k(x, y) = x^2$

f.  $F(x, y) = \frac{1}{e^{x^2+y^2}}$

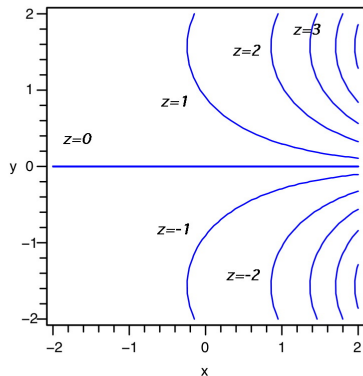


3. Make a contour diagram for each of the first three graphs above.

4. Make a contour diagram for  $f(x, y) = \sqrt{x^2 + y^2}$ .

5. Describe the level surfaces of the function  $f(x, y, z) = x^2 + y^2 + z$ .

6. Use the contour diagram for  $f(x, y)$  below to approximate  $f(0, 1)$ .



7. Let  $\vec{v} = 3\vec{i} - 2\vec{j} + \vec{k}$ ,  $\vec{w} = \vec{i} - 2\vec{k}$ ,  $\vec{u} = \vec{i} + \vec{j}$ . Compute each of the following.
- $\vec{v} - \vec{u}$ .
  - $\vec{v} \cdot \vec{w}$ .
  - $\vec{v} \times \vec{w}$ .
  - $\|\vec{v} - \vec{w}\|$ .
  - $\vec{v} \cdot (\vec{v} + 2\vec{w})$ .
  - $\vec{u} \cdot (\vec{v} \times \vec{w})$ .
  - Find the angle between  $\vec{v}$  and  $\vec{w}$ .
8. Find the equation for the plane with normal vector  $\vec{n} = \frac{1}{2}\vec{i} + \frac{1}{2}\vec{j} + \frac{1}{\sqrt{2}}\vec{k}$  containing the point  $(1, -2, 0)$ .