

**Activity 2:** Quadric surfaces, cylindrical and spherical coordinates, and vectors

Names: \_\_\_\_\_ Date: September 17, 2009 Score: \_\_\_\_\_

Show your work for each of the following. You should submit one copy for your group. Feel free to ask your instructor for advice if you need it.

1. (3 pts) Write the equation  $x^2 + y^2 + z^2 = 9$

(a) in spherical coordinates.

(b) in cylindrical coordinates.

2. (1 pt) Are the vectors  $(1, 2, 3)$  and  $(-4, 5, -6)$  linearly dependent or linearly independent?

3. (4 pts) Consider the equation  $8x^2 + 32y^2 - 2z^2 = 0$ .

(a) For what values of  $c$  are there solutions to this equation with  $z = c$ ?

(b) For what values of  $c$  are there solutions to this equation with  $x = c$ ?

(c) Graph the solutions to this equation.

(d) Is the graph in part (c) the graph of a function  $f(x, y)$ ?

4. (4 pts) Consider the equation  $8x^2 + 32y^2 - 2z^2 = 1$ .

(a) For what values of  $c$  are there solutions to this equation with  $z = c$ ?

(b) For what values of  $c$  are there solutions to this equation with  $x = c$ ?

(c) Graph the solutions to this equation.

(d) Is the graph in part (c) the graph of a function  $f(x, y)$ ?

5. (4 pts) Consider the equation  $8x^2 + 32y^2 - 2z = 0$ .

(a) For what values of  $c$  are there solutions to this equation with  $z = c$ ?

(b) For what values of  $c$  are there solutions to this equation with  $x = c$ ?

(c) Graph the solutions to this equation.

(d) Is the graph in part (c) the graph of a function  $f(x, y)$ ?

6. (4 pts) Consider the equation  $8xy = 0$ .

(a) For what values of  $c$  are there solutions to this equation with  $z = c$ ?

(b) For what values of  $c$  are there solutions to this equation with  $x = c$ ?

(c) Graph the solutions to this equation.

(d) Is the graph in part (c) the graph of a function  $f(x, y)$ ?