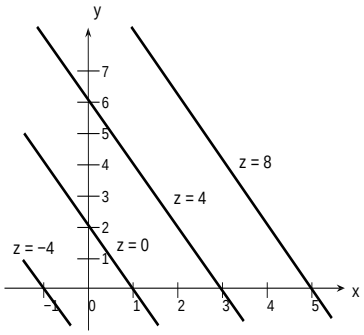
Math 208 Fall 2012 **Exam 1**

Name: _____ **Score:** _____

Instructions: You must show supporting work to receive full and partial credits. No text book, notes, formula sheets allowed.

1(10pts) A few level (contour) curves for a linear function are sketched in the figure below.

(a) Find the x-slope and the y-slope of the function.



(b) Find the expression for the function.

2(15pts) Let $z = f(x, y) = (x - 1)^2 + 2y$.

(a) Sketch the x-section curves at $x = 0, 1, 2$.

(b) Sketch the contour curves at $z = -2, 0, 2$.

(c) Sketch the graph of the function.

(*Page 1. Continue on Next Page ...*)

3(13pts) Three points in the space are given: $P(2,0,1), Q(0,1,2), R(1,-1,1)$.

(a) Find a normal vector to the plane containing these points.

(b) Find an equation of the plane containing the points.

4(15pts) A plane, $x+2y+3z=6$, and a point, $P(2,2,2)$, are given.

(a) Find a normal vector $\vec{n}$ to the plane.

(b) Find a point Q on the plane.

(c) Find the distance between the two point P and Q.

(d) Find the distance between the point P to the plane.

(*Page 2. Continue on Next Page ...*)

5(12pts) A force $\vec{F} =< 3, 0, 4 >$ is applied to an object which moves in the direction $\vec{d} =< -1, \sqrt{2}, 1 >$.

(a) Find the angle between the force and the object's motion.

(b) Find the component of the force in the direction of $\vec{d}$.

6(15pts) Find the limit if exists. If the limit does not exist, explain why not.

(a) $\lim_{(x,y)\to(0,0)} \dfrac{xy}{x^2+y^3}$

(b) $\lim_{(x,y)\to(1,1)} \dfrac{x^2y^2-1}{xy-1}$

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2 Bonus Points: Calculus was discovered in: (a) the 16th century, (b) the 17th century, (c) the 18th century, (d) the 19th century.

(*Page 3 ... The End*)