

Name: Mean: 88.2 Median: 88 (2 hr exam)
good grade distribution

Math 6C - Calculus IIC
Midterm Exam: November 23, 2004

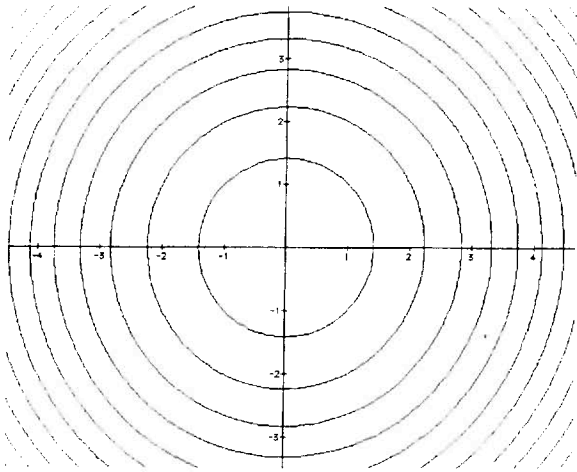
Please be sure to **show all of your work** and clearly label your answers.

1. (16pts) Please give the equation of the plane containing the points $(5, 2, 3)$, $(4, 1, 2)$, and $(6, 10, -1)$.

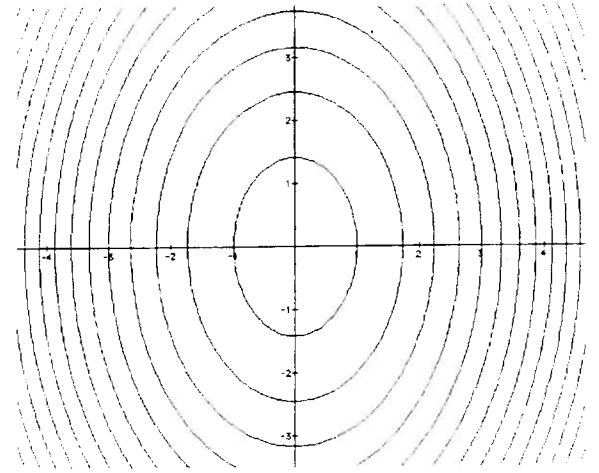
2. (12pts) Please give a vector pointing in the direction of the line of intersection of the two planes $3x + 4y = 5$ and $x + 2y + z = 2$.

3. (16pts) Suppose that $f(x, y) = y^2 e^{x^2 y}$. Use the differential of f to estimate $f(0.02, 2.95)$.

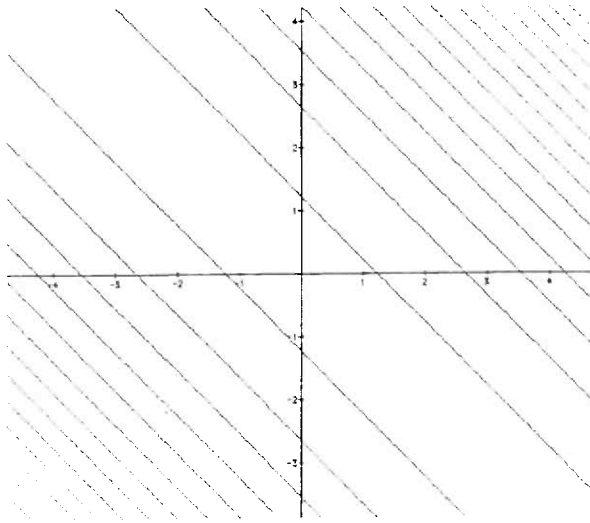
4. (12pts) Which of the following is a contour plot of the function $f(x, y) = (x + y)^2$. Please explain your reasoning.



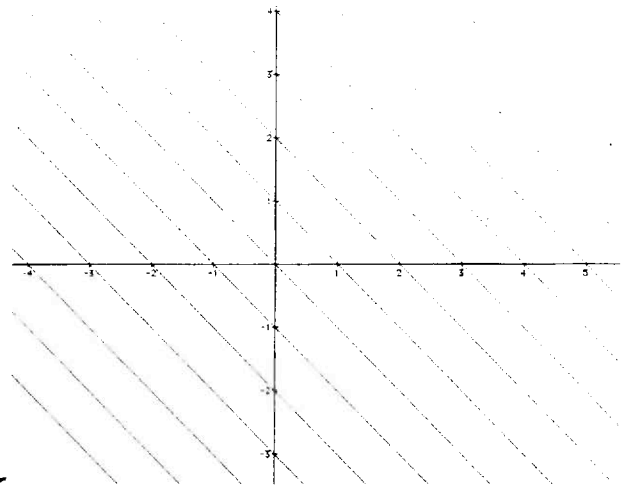
I



II



III



IV

5. (16pts) The surface of a nearby lake can be represented region in the xy -plane such that the lake's depth (in meters) at the point (x, y) is given by $f(x, y) = 400 - x^2y^2$. Donald Trump is in the lake at position $(1, -2)$. If Mr. Trump wants to swim back to his boat, located at $(0, 0)$, what is the rate of change of the depth of the water?

6. (28pts) True or false? For each, **please explain your reasoning**

(a) Two contours of $f(x, y)$ with different heights never intersect.

(b) There is exactly one linear function $f(x, y)$ whose $f = 0$ contour is $y = 2x + 1$.

(c) If \bar{v} and \bar{w} are any vectors, then $\|\bar{v}\| + \|\bar{w}\| = \|\bar{v} + \bar{w}\|$.

(d) The function $f(r, s) = rse^s$ is decreasing in the s -direction at the point $(r, s) = (-1, 2)$.