Ma 1024 Exam #1 (print neatly)**Name**:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**section**: B15 B16 (cir le one)

no notes, calculators, cell phones, talking, looking . . . .

1. For the function *f*(x,y) = 
2. describe (draw) the level curves for k = 3, and 4.
3. having done that, sketch  on the same graph

1. Graph the function *f(*x,y) = 100 - 4x2 - 25y2
2. For the function 
3. if we are at the point ( 1 ,3 ) and move in the  direction, what will the rate of change of *f*  be ?
4. what direction should we move in for  *f* to decrease the fastest?
5. how fast will *f* decrease if we move in that direction?
6. referring to the graph of  *f*, find an equation for the tangent plane at the point on the surface (1,3,3)
7. Show that *f*(x,y) = ln(x 2 + y2) satisfies Laplace’s  in R2

4) Suppose C(x,y) is the concentration of lead in the soil (x,y) (miles) at time t (yrs) and

further is has been computed that *C*(1,5) = 300 ppm

 

1. how would you interpret this information?
2. If you were at (1,5) where would you want to go?
3. What can you say about the level curve through the point (1,5) ?
4. If I move 5 miles in the + x direction from (1,5) what do you estimate the lead concentration will be there?