MATH2850 - Elementary Multivariable Calculus, Spring 2014
Quiz 3 — Solution
Jan 28, 2014

Printed NAME

- You have 10 min to complete your quiz

- Please show all your work neatly and indicate your final answers clearly. If you simply write down the final answer without appropriate intermediate steps, you may not get full credit for that problem.

- The quiz is closed book and notes. **Calculators are not allowed.**

GOOD LUCK :)

1. Determine the equation for the level surface of the function

$$f(x,y,z) = \ln(x^2 + y + z^2)$$

through the point $(-1, 2, -1)$.

level surface $\quad f(x,y,z) = c$

To compute c substitute the Point $(-1,2,-1)$ into the function:

$c = f(-1,2,-1) = \ln(1 + 2 + 1) = \ln 4$

Now level surface through the point:

$\ln(x^2 + y + z^2) = \ln 4 \implies x^2 + y + z^2 = 4$

2. Compute the following limit

$$\lim_{\substack{(x,y)\to(2,2) \\ x+y\neq4}} \frac{x+y-4}{\sqrt{x+y}-2}$$

If you plug $(2,2)$ into the function you obtain

$\dfrac{2+2-4}{\sqrt{2+2}-2} = \dfrac{0}{0}$. Thus, you need to try other method to find the limit.

$\lim_{\substack{(x,y)\to(2,2) \\ x+y\neq4}} \dfrac{x+y-4}{\sqrt{x+y}-2} = \lim_{\substack{(x,y)\to(2,2) \\ x+y\neq4}} \dfrac{(\sqrt{x+y}-2)(\sqrt{x+y}+2)}{\sqrt{x+y}-2}$

$= \lim_{\substack{(x,y)\to(2,2) \\ x+y\neq4}} \sqrt{x+y}+2 = \sqrt{2+2}+2 = 4$