Quiz # 5
Math 102-003 Calculus

Date: March 10, 2014 Monday STUDENT NAME:.....

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Q-1) Let $f(x,y) = 4x^2 + y^2 - 4x + 2y + 2$.

(a) Does this function have a global maximum? If *yes* find it, if *no* explain why.

(b) Does this function have a global minimum? If *yes* find it, if *no* explain why.

(Grading: 5+5=10 points.)

Answer:

$f_x = 8x - 4 = 0$ and $f_y = 2y - 2 = 0$ give $(\frac{1}{2}, -1)$ as the only critical point.

Since $\lim_{x\to 0} f(x,0) = \infty$, the function is unbounded from above and hence has no global maximum.

Also note that $f(x,y) = (x - \frac{1}{2})^2 + (y+1)^2 \geq 0$ and $f(\frac{1}{2}, -1) = 0$ so the point $(\frac{1}{2}, -1)$ gives the global minimum value.