

Quiz 3, Calculus III

Fall 2012

Name: _____

1. (4 points) Dominic has decided to be a mountain climber and he is climbing a hill given by the equation $z = 500 - \left(\frac{x}{4} - 10\right)^2 - \left(\frac{y}{3} - 20\right)^2$. He is standing at the point with (x, y) coordinates of $(0,0)$. Answer the following:
 - (a) If Dominic wants to walk in the steepest direction, which direction should he go? Write your answer as vector with 2 entries.
 - (b) Baby Eva is at the point on the mountain with (x, y) coordinates of $(20,15)$. She is holding Dominic's "Mo math, no problems" shirt and threatening to drool on it. What will the slope be if Dominic walks straight toward Eva?

2. (3 points) Calculate $\lim_{(x,y) \rightarrow (0,0)} \frac{\sin(x^2 + y^2)}{x^2 + y^2}$.

3. (3 points) Calculate $\frac{\partial w}{\partial t}$ and $\frac{\partial w}{\partial s}$ if $w = \ln(x^2 + y)$, $x = 2ts$, and $y = 4 - t$. Simplify your answer if possible.