

Name: _____

Math 253 Calculus III (Bueler)

Wednesday 21 February 2018

Quiz #4

In class. 25 minutes. No textbook or notes or calculator. 30 points total.

1. (5 pts) Use lines through the origin to show that the limit does not exist:

$$\lim_{(x,y) \rightarrow (0,0)} \frac{2xy}{x^2 + 2y^2}$$

2. (a) (5 pts) State the domain of the following function as a set (i.e. $D = \{(x, y) \mid \dots\}$).

$$f(x, y) = \sqrt{x} + y$$

- (b) (5 pts) Draw a contour map of $f(x, y)$ in part (a), showing at least 3 contours.

3. (10 pts) Suppose that $\mathbf{a}(t) = -g\mathbf{j}$ and that at time $t = 0$ a ball is thrown from the origin at angle α with speed v_0 . Show, *by clearly justified steps*, that $\mathbf{r}(t) = (v_0 \cos \alpha)t \mathbf{i} + ((v_0 \sin \alpha)t - \frac{1}{2}gt^2) \mathbf{j}$.

4. (5 pts) State and sketch the domain of the function:

$$g(x, y) = \frac{2}{1 - x^2 - y^2}$$