RUTGERS
UNIVERSITY | NEWARK

Math 235
Calculus III

Spring 2018

Quiz #8

Monday, April 23 2018

Duration: 25 min

NAME: _____

Please write clearly and properly.

Explain your answers appropriately.

Problem	Grade
1	
2	
3	
Total	

Problem 1 (~ 7 points.)**.**

Consider the gradient field $\vec{V}(x, y) = \vec{\nabla}\varphi(x, y)$ for the potential function φ defined by:

$$\varphi(x, y) = x^2 + y^2 \ .$$

(1) Compute the vector field $\vec{V}(x, y)$.

(2) Is the function φ the only potential function for the vector field $\vec{V}(x, y)$?

(3) Draw the vector field $\vec{V}(x, y)$ (sketch a few vectors) and some of its equipotential curves in the xy-plane.

(4) Check that at the point $P(0,1)$, the vector $\vec{V}(P)$ is orthogonal to the equipotential curve through P. Explain why this is expected.

Problem 2 ($\sim$ 4 points.)**.**

Compute the average value of the function $f(x, y) = x - y$ along the line segment from $A(1, 0)$ to $B(-1, 1)$ in the xy-plane.

Problem 3 (~ 3 points.)**.**

Compute the circulation of the vector field $\vec{V}(x, y) = (y, x)$ along the unit circle in the xy-plane.

In case it comes of use, we recall that $\cos^2(t) - \sin^2(t) = \cos(2t)$.