

# Math 324 Quiz 4

February 23, 2017

## Problem 1.

1. Write the definition of a vector field being conservative.
2. Write the definition of a vector field being non-rotational.
3. What is the relationship between torsion-free vector fields and non-rotational vector fields?

## Problem 2.

Consider the vector field

$$\vec{F}(x, y) = \langle 1 + \cos(x + y), \cos(x + y) - 2y \rangle.$$

Show that  $\vec{F}(x, y)$  is conservative.

**Problem 3.** Consider the vector field  $\vec{F}(x, y)$  of the previous problem. Evaluate the integral  $\int_C \vec{F} \cdot d\vec{s}$  where  $C$  is the curve defined by the parametric equation

$$\vec{r}(t) = \langle t^2, t \sin(t) \rangle, \quad 0 \leq t \leq 10\pi.$$