

Math 241

Quiz 6 Sample

April 25, 2008

1. The vector field $\mathbf{F}(x, y) = (2x + y, 2y + x)$ is a gradient vector field.
 - (a) Find a potential function $z = f(x, y)$ for \mathbf{F} . That is, find an f so that $\nabla f(x, y) = \mathbf{F}(x, y)$.
 - (b) Use part (a) to evaluate $\int_C \mathbf{F} \cdot \mathbf{T} \, ds$, where C is a curve with initial point $(1, 1)$ and final point $(-2, 3)$.
2. Consider the curve \mathcal{C} in the plane consisting of the sides of the triangle with vertices $(2, 0)$, $(0, 2)$ and $(-2, 0)$.
 - (a) Choose parametrizations for each side of the triangle so that the triangle is parametrized counterclockwise.
 - (b) Use your parametrizations to write the line integral of $\mathbf{F}(x, y) = (u(x, y), v(x, y))$ around \mathcal{C} as a sum of single variable integrals with respect to t . Simplify by expanding dot products, but do not evaluate the integrals.