

MATB42: Assignment #6

1. Let $\omega = \frac{-y}{x^2 + y^2} dx + \frac{x}{x^2 + y^2} dy$. Calculate $\int_{\gamma} \omega$ where

(a) γ is the boundary of the triangle with vertices (in order) (0,1), (2,3) and (2,1).

(b) γ is the boundary curve of the region $\left\{ (x, y) \in \mathbb{R}^2 \left| \frac{(x-2)^2}{9} + \frac{(y+1)^2}{4} \leq 1 \right. \right\}$ oriented in a counter clockwise direction

(c) γ is the graph of the polar equation $r = 3 + 2 \sin \theta$ oriented in the clockwise direction.

2. Let $\omega = (y^2 + z \ln 3) dx + (2xy + \sin z) dy + (y \cos z + (x+1) \ln 3) dz$