

Homework 7

Due March 9th in class or by 3:20 pm in MATH 602.

1. Evaluate

$$\int_C 2(y + x \sin y)dx + x^2 \cos y dy,$$

where C is the oriented outline of the parallelogram from $(1, 1)$ to $(1, 4)$ to $(2, 5)$ to $(2, 2)$ and back to $(1, 1)$.

2. Evaluate

$$\int_C 2y \sin^2 x dx - (x + \sin x \cos x) dy,$$

where C is the oriented parabolic curve from $(2, 2)$ to $(2, 0)$ given by $x = 2y^2 - 4y + 2$.

Hint: It may be helpful to use Green's Theorem for the region given by $0 \leq y \leq 2$ and $2y^2 - 4y + 2 \leq x \leq 2$.

3. The parametric curve

$$x(t) = 2 \sin t, \quad y(t) = 3 \sin t \cos t, \quad 0 \leq t \leq 2\pi,$$

is pictured on the next page. Find the area inside the curve.

Hint: It may be helpful to use Green's Theorem in the form

$$\iint_D dx dy = - \int_{\partial D} y dx,$$

with a carefully chosen region D . It may be easier to take D which is only part of the total region!

