

STS2006 (Analytic Geometry and Calculus II)

Quiz 7 Solutions

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1. (5 pts) Evaluate the line integral

$$\int_C \left(y + e^{x^2+2x+1} \right) dx + \left(ex + \cos y^2 + \sin(y+1) \right) dy$$

where C is positively oriented boundary curve of a region D that has area of 10. (*Hint: Use Green's theorem.*)

Solution.

$$\begin{aligned} & \int_C \left(y + e^{x^2+2x+1} \right) dx + \left(ex + \cos y^2 + \sin(y+1) \right) dy \\ &= \iint_D \frac{\partial}{\partial x} (ex + \cos y^2 + \sin(y+1)) - \frac{\partial}{\partial y} (y + e^{x^2+2x+1}) dA \\ &= \iint_D e - 1 dA = 10(e - 1) \end{aligned}$$

2. (5 pts) Find a parametric representation for the part of the cylinder $y^2 + z^2 = 16$ that lies between the planes $x = 0$ and $x = 5$.

Solution.

$$\begin{cases} x = x \\ y = 4 \cos \theta \\ z = 4 \sin \theta \end{cases} \quad \text{where } 0 < x < 5, 0 \leq \theta \leq 2\pi$$