

Quiz 10

Name: Super Student

USC ID: _____

Problem 1 (3 points)

Evaluate the given definite integral using integration by part

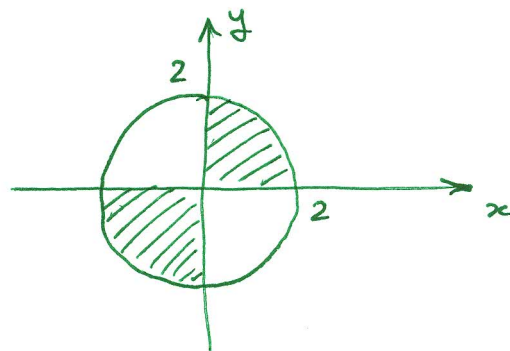
$$\begin{aligned}\int_0^1 \frac{x-1}{e^x} dx &= \int_0^1 (x-1)e^{-x} dx = -\int_0^1 (x-1) d e^{-x} = -(x-1)e^{-x} \Big|_0^1 + \int_0^1 e^{-x} d(x-1) \\ &= -[0 - (-1)] + \int_0^1 e^{-x} dx = -1 + (-e^{-x}) \Big|_0^1 = -1 + (-e^{-1} + 1) = \underline{\underline{-e^{-1}}}\end{aligned}$$

Problem 2 (3 points)

Find the domain of the given function and sketch this domain.

$$f(x, y) = \sqrt{4 - x^2 - y^2} \ln(xy)$$

$$\begin{cases} 4 - x^2 - y^2 \geq 0 \\ xy > 0 \end{cases} \quad \begin{cases} x^2 + y^2 \leq (2)^2 \\ xy > 0 \Rightarrow \begin{cases} \begin{cases} x > 0 \\ y > 0 \end{cases} \\ \begin{cases} x < 0 \\ y < 0 \end{cases} \end{cases}\end{cases}$$



Problem 3 (4 points)

Find the second partial derivatives (including the mixed ones)

$$f(x, y) = x^{100} + e^y$$

$$f_x = 100x^{99}, \quad f_y = e^y$$

$$f_{xx} = 9900x^{98}$$

$$f_{yy} = e^y$$

$$f_{xy} = 0$$