

Instructions: Show all work. Use exact answers unless otherwise asked to round.

1. Evaluate the line integrals on the indicated paths.

a. $\int_C xyz ds$, $C: x = 2 \sin t, y = t, z = -2 \cos t, 0 \leq t \leq 2\pi$

b. $\int_C \vec{F} \cdot d\vec{r}$, $\vec{F}(x, y) = xy\hat{i} - 3y^2\hat{j}$, $\vec{r}(t) = 11t^2\hat{i} + t\hat{j}, 0 \leq t \leq 1$

2. Consider the function $f(x, y) = \ln(x + 2y^2) - \cos xy$. Find f_x, f_y, f_{xy} .

3. Calculate the total differential of $f(x, y, z) = xe^{yz}$, and then use the values of the function at $(1, 4, 0)$ to estimate the value of the function at the point $(0.95, 4.1, 0.01)$.