

1. (7 points) Use the FTCLI to find $\int_C \vec{F} \cdot d\vec{s}$ if $\vec{F}(x, y, z) = \langle e^x y + 3, e^x + 2yz, y^2 \rangle$ and $C : \vec{\alpha}(t) = \langle 1 + \cos(t), 1 + \sin(t), t \rangle$ for $0 \leq t \leq \pi$.

2. (6 points) Calculate $\int_{-1}^1 \int_0^y \int_{-xy}^{xy} 5y + \sin(z) \, dz dx dy$.

3. (6 points) Sketch the region of integration for $I = \int_{-1}^1 \int_{-x-1}^{x+1} f(x, y) dy dx$ and then write I as an integral expression with the order of integration switched.

4. (6 points) Use a double integral to find the volume of the solid in the first octant bounded by the coordinate planes and $x + y + 2z = 2$.