

1) Evaluate the following line integrals. Use the FTCLI whenever possible. If impossible, show how you know before using test #1 methods to find the line integral. (8 points)

1A) $\int_C \vec{F} \cdot d\vec{s}$ if $\vec{F} = \langle e^x y, e^x + 2y \rangle$ and C is the curve $\vec{r}(t) = \langle 1 + \cos t, 1 + \sin t \rangle$ for $0 \leq t \leq \pi$. (7 points)

1B) $I = \int_C (2x - 3y) dx + x dy$ and C is the curve oriented from $(-2, 4)$ to $(2, 4)$ on the path $y = x^2$. (6 points)

2) Evaluate $I = \int_0^1 \int_{z^2}^1 \int_{-z}^z \sin(y) + \sin(x^2) dy dx dz$. (6 points)

3) Use a **double integral** to find the volume of the solid in the first octant (x, y , and z are all nonnegative) bounded by $z = 0$, $x = 0$, $y = x$, and by $z = 1 - \sqrt{y}$. (6 points)