1. Find $\int_C \underline{F} \cdot d\underline{r}$ for $\underline{F} = \langle x^2, y^2, 1 \rangle$ and C the line from the point $(0, 0, 4)$ to the point $(3, 4, 6)$.

2. Let $f = xy + x$ and $\underline{F} = \nabla f$. Let C be a path connecting $(1, 0)$ to $(2, 3)$. Use the ftcli to find $\int_C \underline{F} \cdot d\underline{r}$.

3. Find the scalar curl for $\underline{F} = \langle x + y, xy^2 \rangle$. Then identify whether $\underline{F}$ is an irrotational vector field, or not.