Questions

1. Let $\mathbf{F}$ be the vector field $\mathbf{F}(x, y, z) = -2z\hat{\mathbf{i}} - 2yz^2\hat{\mathbf{j}} - y^2\hat{\mathbf{k}}$ and C the curve given by $\mathbf{r}(t) = 2t\hat{\mathbf{i}} + \hat{\mathbf{j}} + (1 - t)\,\hat{\mathbf{k}}$ for $0 \leq t \leq 2$. Calculate $\displaystyle\int_C \mathbf{F} \cdot d\mathbf{r}$.