Questions

1. Let $\mathbf{F}$ be the vector field $\mathbf{F}(x, y, z) = -\hat{\mathbf{i}} + (-4xz + 4x - z + 1)\hat{\mathbf{j}} - 2\hat{\mathbf{k}}$ and C the curve given by $\mathbf{r}(t) = 3t\hat{\mathbf{i}} - \hat{\mathbf{j}} + \hat{\mathbf{k}}$ for $-2 \leq t \leq 3$. Calculate $\int_C \mathbf{F} \cdot d\mathbf{r}$.