Questions

1. Let ϕ be the scalar field $\phi(x, y, z) = 2(1 - x)$ and C the curve given by $\mathbf{r}(t) = -3\hat{\mathbf{i}} + t\hat{\mathbf{j}} + (t + 1)\hat{\mathbf{k}}$ for $0 \le t \le 1$. Calculate $\displaystyle\int_C \phi \, \mathrm{d}s$.