Skills Test 8

1) $\iint_S \vec{E} \cdot d\vec{S} = \iiint_V (\nabla \cdot \vec{E})\, dV = \iiint_V \frac{\rho(x,y,z)}{\varepsilon_0}\, dV = \frac{1}{\varepsilon_0} \iiint_V \rho(x,y,z)\, dV = \frac{5}{\varepsilon_0}$

2) $V: \quad -\nabla V = \vec{E} \qquad -\nabla V = \vec{E} = \begin{pmatrix} 0 \\ cx^2 \\ 0 \end{pmatrix} \qquad \nabla V = -\vec{E} = \begin{pmatrix} 0 \\ -cx^2 \\ 0 \end{pmatrix}$

$\nabla \times \vec{E} = \begin{pmatrix} 0 \\ 0 \\ -2cx \end{pmatrix} \Rightarrow$ There exists no such potential function.