Brianna Patnaude
RUID: 196001752

Question #1:

$$F(x,y,z) = \langle \underbrace{\cos(\sqrt{1-x^7} + zy^9)}_{A}, \underbrace{\tan(x^7+y^2+\tfrac{1}{z})}_{B}, \underbrace{\tan^{-1}(e^{xyz} + \cos^6(x^8-y+3z))}_{C} \rangle$$

$\langle P, Q, R \rangle = \text{curl}\vec{F}$

$$\text{curl}\vec{F} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ \frac{d}{dx} & \frac{d}{dy} & \frac{d}{dz} \\ A & B & C \end{vmatrix}$$

$\text{div}(\text{curl}\vec{F}) = 0$ because from theorems we know that the divergence of a curl is 0.

Question #2:

$$F(x,y,z) = \langle 2x+y+z,\ x+2y+z,\ x+y+2z \rangle$$

$$\text{curl}\vec{F} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ \frac{d}{dx} & \frac{d}{dy} & \frac{d}{dz} \\ 2x+y+z & x+2y+z & x+y+2z \end{vmatrix} = (x+2z-\tfrac{3}{2}x-2y)\hat{i} - (y+2z-2x-y)\hat{j} + (1+2y+z-2x-1-z)\hat{k}$$

vector field is <u>not</u> conservative.