7. b.) $\text{div } F = \frac{\partial P}{\partial x} + \frac{\partial Q}{\partial y} + \frac{\partial R}{\partial z} =$ $\boxed{e^x \sin yz + e^y \sin z + e^z \sin x}$

9. a) $F = \langle P, Q, C \rangle$ $\text{div } F = \frac{\partial P}{\partial x} + \frac{\partial Q}{\partial y}$

$\frac{\partial P}{\partial x} = 0$ since x components of each vector is 0

$\frac{\partial Q}{\partial y}$ is negative since the y components of each vector is decreasing in length as $y \to \infty$.

Therefore $\text{div } F = 0 - \frac{\partial Q}{\partial y} = -\frac{\partial Q}{\partial y}$, $\boxed{\text{Divergence is negative}}$

b.) $\text{curl } F = \langle C, C, \left(\frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y}\right) \rangle =$

$\frac{\partial Q}{\partial x} = 0$ as x components $= 0$ $\frac{\partial P}{\partial y} = 0$ since x components are 0.

$\text{curl } F = \langle C, C, C - C \rangle = \langle C, C, C \rangle = \boxed{0}$

11. a) $F = \langle P, Q, C \rangle$ $\text{div } F = \frac{\partial P}{\partial x} + \frac{\partial Q}{\partial y}$

$\frac{\partial P}{\partial x} = 0$ as x components have same length as $x \to \infty$.

$\frac{\partial Q}{\partial y} = 0$ since y components of the vectors are 0.

$\text{div } F = 0 + 0 = \boxed{0}$