(a)  curl $\mathbf{F}$   $= \nabla \times \mathbf{F} = \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ \partial/\partial x & \partial/\partial y & \partial/\partial z \\ 1 & x + yz & xy - 5\sqrt{z} \end{vmatrix}$

$= (x - y)\,\mathbf{i} - (y - 0)\,\mathbf{j} + (1 - 0)\,\mathbf{k}$

$= (x - y)\,\mathbf{i} - y\,\mathbf{j} + \mathbf{k}$

(b)  div $\mathbf{F} = \nabla \cdot \mathbf{F} = \dfrac{\partial}{\partial x}\,(1) + \dfrac{\partial}{\partial y}\,(x + yz) + \dfrac{\partial}{\partial z}\,\left(xy - 5\sqrt{z}\right) = z - \dfrac{5}{2\sqrt{z}}$