$$\frac{\partial^2 A_3}{\partial y\,\partial x} - \frac{\partial^2 A_2}{\partial z\,\partial x} - \frac{\partial^2 A_3}{\partial y\,\partial x} + \frac{\partial^2 A_1}{\partial z\,\partial y} + \frac{\partial^2 A_2}{\partial y\,\partial z} - \frac{\partial^2 A_1}{\partial z\,\partial y} = 0$$

$$\frac{\partial}{\partial x}\left[\frac{\partial A_3}{\partial y} - \frac{\partial A_2}{\partial z}\right] - \frac{\partial}{\partial y}\left[\frac{\partial A_3}{\partial x} - \frac{\partial A_1}{\partial z}\right] + \frac{\partial}{\partial z}\left[\frac{\partial A_2}{\partial x} - \frac{\partial A_1}{\partial y}\right]$$

$$\nabla \cdot (\nabla \times A)$$

$$(\nabla \times A) = \begin{vmatrix} i & j & k \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ A_1 & A_2 & A_3 \end{vmatrix} = \left[\frac{\partial A_3}{\partial y} - \frac{\partial A_2}{\partial z}\right] i - \left[\frac{\partial A_3}{\partial x} - \frac{\partial A_1}{\partial z}\right] j + \cdots$$

$$\cdots \left[\frac{\partial A_2}{\partial x} - \frac{\partial A_1}{\partial y}\right] \hat{k}$$

$$\nabla \cdot (\nabla \times A)$$

$$\psi \nabla \phi + \phi \nabla \psi = \nabla \phi \psi$$

$$\left[i\frac{\partial \psi}{\partial x} + j\frac{\partial \psi}{\partial y} + k\frac{\partial \psi}{\partial z}\right]\phi + \left[i\frac{\partial \phi}{\partial x} + j\frac{\partial \phi}{\partial y} + k\frac{\partial \phi}{\partial z}\right]\psi$$

$$i\left[\frac{\partial \psi}{\partial x}\phi + \frac{\partial \phi}{\partial x}\psi\right] + j\left[\frac{\partial \psi}{\partial y}\phi + \frac{\partial \psi}{\partial y}\phi\right] + k\left[\frac{\partial \psi}{\partial z}\phi + \frac{\partial \phi}{\partial z}\psi\right]$$

$$i\frac{\partial \phi\psi}{\partial x} + j\frac{\partial \phi\psi}{\partial y} + k\frac{\partial \phi\psi}{\partial z}$$

$$\leftarrow \phi\psi\Delta$$