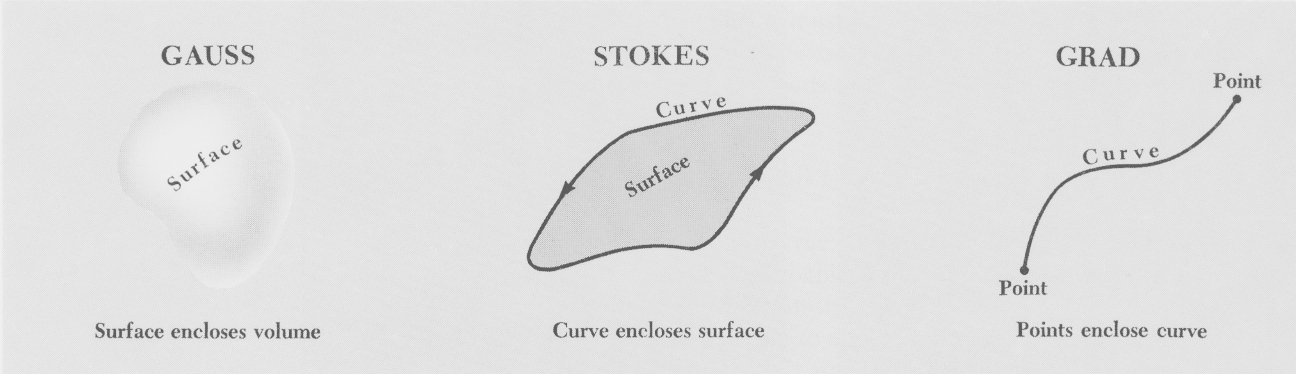

$$\int_{\text{surface}} \mathbf{F}\cdot d\mathbf{a} = \int_{\text{volume}} \operatorname{div}\mathbf{F}\, dv \qquad \int_{\text{curve}} \mathbf{A}\cdot d\mathbf{s} = \int_{\text{surface}} \operatorname{curl}\mathbf{A}\cdot d\mathbf{a} \qquad \varphi_2 - \varphi_1 = \int_{\text{curve}} \operatorname{grad}\varphi\cdot d\mathbf{s}$$

IN CARTESIAN COORDINATES

$$\operatorname{div}\mathbf{F} = \frac{\partial F_x}{\partial x} + \frac{\partial F_y}{\partial y} + \frac{\partial F_z}{\partial z} = \nabla\cdot\mathbf{F}$$

$$\operatorname{curl}\mathbf{A} = \hat{\mathrm{x}}\left(\frac{\partial A_z}{\partial y} - \frac{\partial A_y}{\partial z}\right) + \hat{\mathrm{y}}\left(\frac{\partial A_x}{\partial z} - \frac{\partial A_z}{\partial x}\right) + \hat{\mathrm{z}}\left(\frac{\partial A_y}{\partial x} - \frac{\partial A_x}{\partial y}\right) = \nabla\times\mathbf{A}$$

$$\operatorname{grad}\varphi = \hat{\mathrm{x}}\,\frac{\partial\varphi}{\partial x} + \hat{\mathrm{y}}\,\frac{\partial\varphi}{\partial y} + \hat{\mathrm{z}}\,\frac{\partial\varphi}{\partial z} = \nabla\varphi$$

$$\nabla = \hat{\mathrm{x}}\,\frac{\partial}{\partial x} + \hat{\mathrm{y}}\,\frac{\partial}{\partial y} + \hat{\mathrm{z}}\,\frac{\partial}{\partial z}$$