Some Possibly Useful Formulae.

$$\vec{\nabla} = \left\langle \frac{\partial}{\partial x}, \frac{\partial}{\partial y}, \frac{\partial}{\partial z} \right\rangle, \quad \mathrm{div}\vec{F} := \nabla \cdot \vec{F}, \quad \mathrm{curl}\vec{F} := \nabla \times \vec{F}.$$

$$dA(x,y) = dx\,dy = dy\,dx. \qquad dA(r,\theta) = r\,dr\,d\theta = r\,d\theta\,dr.$$

$$dV(x,y,z) = dx\,dy\,dz = dx\,dz\,dy = \cdots,$$

$$dV(r,\theta,z) = r\,dr\,d\theta\,dz = r\,d\theta\,dr\,dz = \cdots,$$

$$dV(\rho,\theta,\phi) = \rho^2 \sin(\phi)\,d\rho\,d\theta\,d\phi = \rho^2 \sin(\phi)\,d\theta\,d\phi\,d\rho = \cdots.$$

$$dS = \sqrt{1 + z_x^2 + z_y^2}\,dA(x,y) = \|\vec{r}_u(u,v) \times \vec{r}_v(u,v)\|\,dA(u,v).$$

$$\int_C \vec{\nabla}\phi \cdot d\vec{r} = \phi(\vec{r}(b)) - \phi(\vec{r}(a)).$$

$$\oint_C \vec{F} \cdot d\vec{r} = \iint_D (Q_x - P_y)\,dA.$$

$$\int \sin^2(u)\,du = \frac{1}{2}u - \frac{1}{2}\sin(u)\cos(u) + C$$

$$\int \sin^4(u)\,du = \frac{3}{8}u - \sin(u)\left[\frac{3}{8}\cos(u) + \frac{1}{4}\sin^2(u)\cos(u)\right] + C$$

$$\int \sin^6(u)\,du = \frac{5}{16}u - \sin(u)\left[\frac{5}{16}\cos(u) + \frac{5}{24}\sin^2(u)\cos(u) + \frac{1}{6}\sin^4(u)\cos(u)\right] + C$$

$$\int \sin^8(u)\,du = \frac{35}{128}u - \sin(u)\left[\frac{35}{128}\cos(u) + \frac{35}{192}\sin^2(u)\cos(u) + \frac{7}{48}\sin^4(u)\cos(u) + \frac{1}{8}\sin^6(u)\cos(u)\right] + C.$$