

Formulas list

For a sphere of radius a , $S = 4\pi a^2$ and $V = 4\pi a^3/3$

$$A(x - x_0) + B(y - y_0) + C(z - z_0) = 0$$

$$\sin^2(\theta) = \frac{1}{2}(1 - \cos(2\theta)), \cos^2(\theta) = \frac{1}{2}(1 + \cos(2\theta))$$

$$D_{\vec{u}}f(x, y, z) = \nabla f(x, y, z) \cdot \vec{u}$$

$$dA = r dr d\theta$$

$$x = \rho \cos(\theta) \sin(\phi), y = \rho \sin(\theta) \sin(\phi), z = \rho \cos(\phi), dV = \rho^2 \sin(\phi) d\rho d\phi d\theta,$$

$$\vec{r}_\phi \times \vec{r}_\theta = a \sin(\phi)(x\vec{i} + y\vec{j} + z\vec{k}), \|\vec{r}_\phi \times \vec{r}_\theta\| = a^2 \sin(\phi)$$

$$dS = \sqrt{1 + g_x^2 + g_y^2} dR$$

$$dS = \|\vec{r}_u \times \vec{r}_v\| dR$$

$$\iint_S \vec{F} \cdot d\vec{S} = \iint_S \vec{F} \cdot \vec{n} dS$$

$$\iint_S (P\vec{i} + Q\vec{j} + R\vec{k}) \cdot d\vec{S} = \iint_D -P g_x - Q g_y + R dR$$

$$\iint_S \vec{F} \cdot d\vec{S} = \iint_D \vec{F} \cdot (\vec{r}_u \times \vec{r}_v) dR$$

$$\int_C \vec{F} \cdot d\vec{r} = \iint_S \text{curl}(\vec{F}) \cdot d\vec{S}$$

$$\iint_S \vec{F} \cdot d\vec{S} = \iiint_E \text{div}(\vec{F}) dV$$