$$\boldsymbol{a} \bullet \boldsymbol{b} = |\boldsymbol{a}||\boldsymbol{b}| \cos\theta$$

$$|\boldsymbol{a} \times \boldsymbol{b}| = |\boldsymbol{a}||\boldsymbol{b}| \sin\theta$$

$$z - z_0 = f_x(x_0, y_0)(x - x_0) + f_y(x_0, y_0)(y - y_0)$$

$$comp_{\boldsymbol{b}}(\boldsymbol{a}) = \tfrac{\boldsymbol{a} \bullet \boldsymbol{b}}{|\boldsymbol{b}|}$$

$$proj_{\boldsymbol{b}}(\boldsymbol{a}) = \tfrac{\boldsymbol{a} \bullet \boldsymbol{b}}{\boldsymbol{b} \bullet \boldsymbol{b}} \boldsymbol{b}$$

$$\kappa = \frac{|\boldsymbol{r}'(t) \times \boldsymbol{r}''(t)|}{v^3} = \frac{|\boldsymbol{r}'(t) \times \boldsymbol{r}''(t)|}{|\boldsymbol{r}'(t)|^3} = \left| \frac{d\boldsymbol{T}}{ds} \right| = \frac{\left| \frac{d\boldsymbol{T}}{dt} \right|}{v}$$

$$\frac{ds}{dt} = v = |\boldsymbol{r}'(t)|$$

$$\left| \frac{\partial(x, y)}{\partial(r, \theta)} \right| = r$$

$$\left| \frac{\partial(x, y, z)}{\partial(r, \theta, z)} \right| = r$$

$$\left| \frac{\partial(x, y, z)}{\partial(\rho, \phi, \theta)} \right| = \rho^2 \sin\phi$$

$$\iint\limits_R f(x, y)\, dx\, dy = \iint\limits_{R'} f\big(x(u, v), y(u, v)\big) \left| \frac{\partial(x, y)}{\partial(u, v)} \right| du\, dv$$

$$x = \rho \sin\phi \cos\theta,\ y = \rho \sin\phi \sin\theta,\ z = \rho \cos\phi$$

$$D_{\boldsymbol{u}} f(x_0, y_0) = \nabla f(x_0, y_0) \bullet \boldsymbol{u}$$

$$\iint\limits_\Sigma f(x, y, z)\, dS = \iint\limits_R f(x(u, v), y(u, v), z(u, v)) |\boldsymbol{r}_u \times \boldsymbol{r}_v|\, du\, dv$$

$$\iint\limits_\Sigma \boldsymbol{F} \bullet \boldsymbol{n}\, dS = \pm \iint\limits_R \boldsymbol{F}(x(u, v), y(u, v), z(u, v)) \bullet (\boldsymbol{r}_u \times \boldsymbol{r}_v)\, du\, dv$$

$$\iint\limits_\Sigma \boldsymbol{F} \bullet \boldsymbol{n}\, dS = \iiint\limits_E \operatorname{div} \boldsymbol{F}\, dV$$

$$\oint_C \boldsymbol{F} \bullet d\boldsymbol{r} = \iint\limits_\Sigma \operatorname{curl} \boldsymbol{F} \bullet \boldsymbol{n}\, dS$$