$$\int (x^n)dx = \frac{x^{n+1}}{n+1} + c$$

$$\int (e^{ax})dx = \frac{e^{ax}}{a} + c$$

$$\int (a^x)dx = \frac{a^x}{\log a} + c$$

$$\int \left(\frac{1}{x}\right)dx = \log x + c$$

$$\int \left(\frac{1}{x-a}\right)dx = \log(x-a) + c$$

$$\int \left(\frac{1}{(x-a)^m}\right)dx = -\frac{\quad}{(m-1 \ldots}$$

$$\int \left(\frac{x}{(1+x^2)^m}\right)dx = -\frac{\quad}{2(\ldots}$$

$$\int \left(\frac{x}{(1+x^2)}\right)dx = \frac{1}{\ldots}$$

$$\int \left(\frac{1}{\cos^2 x}\right)dx = \int (1+\ldots$$

$$\int \left(\frac{1}{\sqrt{1-x^2}}\right)dx = \arcsin x + c$$

$$\int \left(\frac{1}{1+x^2}\right)dx = \arctan x + c$$

$$\int \left(\frac{1}{\sqrt{a^2-x^2}}\right)dx = \arcsin\frac{x}{a} + c$$

$$\ldots) = \cosh x + c$$

$$\int_0 \sin^2 x \, dx = \int_0 \cos^2 x \, dx = \pi$$

$$\ldots x + c$$

$$\int \frac{1}{x^2+y^2} dy = \frac{1}{x}\arctan\left(\frac{y}{x}\right)$$

$$\int \left(\frac{1}{\sqrt{1+x^2}}\right) = \operatorname{arcsinh} x + C = \log\left(x+\sqrt{1+x^2}\right)$$

$$\int \frac{1}{(e-1)^3} dz = \frac{1}{2(e-1)^2}$$

$$\int \sin x \, dx = -\cos x + c$$

$$\int \cos x \, dx = \sin x + c$$

$$\int \left(\frac{1}{x^2-1}\right) = \frac{1}{2}\log\left(\frac{x-1}{x+1}\right) + c$$

$$\sin' x = \cos x$$

$$\cos' x = -\sin x$$

$$\int \frac{f'(x)}{f(x)} dx = \log(f(x))$$

$$\ldots x \, dx = \frac{1}{2}\sin 2x$$

enačba tangentne ravnine na plo...

$$\sin^2 x = \frac{1}{2}(1-\cos 2x)$$

$$\sin^3 x = \sin^2 x \cdot \sin x = (1-\cos^2 x)\cdot \sin x \qquad \cos x = u$$

$$\cos^2 x = \frac{1}{2}(1+\cos 2x) \qquad -\sin x \cdot dx = du$$

$$\sin^4 x = \left(\frac{1}{2}(1+\cos 2x)\right)^2 = \frac{1}{4}(1-2\cos 2x + \cos^2 2x)$$

$$\cos^4 x = \frac{1}{4}(1+2\cos 2x + \cos^2 2x)$$

$$\cosh^2 x - \sinh^2 x = 1$$

$$\sinh x = \frac{e^x - e^{-x}}{2}$$

$$\cosh x = \frac{e^x + e^{-x}}{2}$$

$$(x^3+1) = (x+1)(x^2-x+1)$$

$$\sin 2x = 2\cdot \sin x \cdot \cos x$$

$$\cos 2x = \cos^2 x - \sin^2 x$$

$$\sin^2(\arccos x) = 1-\cos^2(\arccos x) = 1-x^2$$

$$\cos(\arccos x) = x$$

$$\cos^2(\arccos x) = [\cos(\arccos x)]^2 = x^2$$

POLARNE KOORDINATE: ko so zadeve v krogih

$$\int xy \cdot dxdy = \int d\varphi \int r^2 \cos\varphi \cdot \sin\varphi \cdot r \cdot dr$$

$$\Phi(r,\varphi) = (r\cos\varphi, r\sin\varphi)$$

$$x = r\cos\varphi$$

$$y = r\sin\varphi$$

$$J_\varphi = r$$

krog premaknjen in zredišča:

$$\Phi(r,\varphi) = (r\cos\varphi, r\sin\varphi)$$

$$x - 1 = r\cos\varphi$$

$$y - 1 = r\sin\varphi$$

$$J_\varphi = r$$

CILINDRIČNE KOORDINATE:

$$x = r\cos\varphi$$

$$y = r\sin\varphi$$

$$z = z$$

$$J_\varphi = r$$

KROGELJNE KOORDINATE:

$$x = r \cdot \sin\Theta \cdot \cos\varphi \qquad \Theta \in [0,\pi]$$

$$y = r \cdot \sin\Theta \cdot \sin\varphi \qquad \varphi \in [0,2\pi]$$

$$z = r \cdot \cos\Theta$$

$$J_\varphi = r^2 \cdot \sin\Theta$$

$$x^2 + y^2 = r^2 \cdot \sin^2\Theta \qquad x^2 + y^2 + z^2 = r^2$$

premaknjene koordinate:

$$\frac{x}{a} = r \cdot \sin\Theta \cdot \cos\varphi \qquad \Theta \in [0,\pi]$$

$$\frac{y}{b} = r \cdot \sin\Theta \cdot \sin\varphi \qquad \varphi \in [0,2\pi]$$

$$\frac{z}{c} = r \cdot \cos\Theta$$

$$J_\varphi = abc \cdot r^2 \cdot \sin\Theta$$

ENAČBE: $\text{valj}: x^2 + y^2 = R^2$ $\text{krogla}: x^2 + y^2 + z^2 = R^2$ $\text{stožec}: x^2 + y^2 = z^2$

PLOSKOVNI INTEGRAL:

$$F = \int_G \vec{F}(\varphi_u \times \varphi_v) \cdot dudv$$

$$a \times b = \begin{pmatrix} i & j & k \\ a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{pmatrix} = \begin{matrix} i(a_2b_3 - a_3b_2) \\ j(a_3b_1 - a_1b_3) \\ k(a_1b_2 - a_2b_1) \end{matrix}$$

normala na ploskev:

$$\vec{n} = \pm(-p, -q, 1) \;;\; p = \frac{\partial z}{\partial x} \;;\; q = \frac{\partial z}{\partial y}$$

normala na ravnino:

$$\vec{n} = \varphi_u \times \varphi_v$$

Gauss: zunanja normala, zaključena ploskev

$$\int_G \operatorname{div}(\vec{F}) \cdot dxdydz = \int_{\partial G} \vec{F} \cdot d\vec{S} = \int_{\partial G} \vec{F} \cdot \vec{n} \cdot dS$$

$$\operatorname{div}(\vec{F}) = \nabla\vec{F} = \frac{\partial F_1}{\partial x} + \frac{\partial F_2}{\partial y} + \frac{\partial F_3}{\partial z}$$

$$\operatorname{div}(\operatorname{rot}(\vec{F})) = 0$$

Stokes:

$$\int_S \operatorname{rot}(\vec{F}) dS = \int_S \operatorname{rot}(\vec{F}) \cdot \varphi_u \times \varphi_v \cdot dudv = \int_{\partial S} \vec{F} d\vec{r}$$

$$\operatorname{rot}(\vec{F}) = \nabla \times \vec{F} = \begin{pmatrix} \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ F_1 & F_2 & F_3 \end{pmatrix} = \begin{pmatrix} \frac{\partial F_3}{\partial y} - \frac{\partial F_2}{\partial z} \\ \frac{\partial F_1}{\partial z} - \frac{\partial F_3}{\partial x} \\ \frac{\partial F_2}{\partial x} - \frac{\partial F_1}{\partial y} \end{pmatrix}$$

potencialno polje je, če je: $\operatorname{rot}(\vec{F}) = 0$

gradient $\nabla u = \frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z}$

laplaceov operator $\Delta u = u_{xx} + u_{yy} + u_{zz}$

$$\operatorname{div}(\Delta u \cdot v) = \operatorname{div}\left(\frac{\partial u}{\partial x} v + \frac{\partial u}{\partial y} v + \frac{\partial u}{\partial z} v\right) = u_{xx}v + u_x v_x + u_{yy}v + u_y v_y + u_{zz}v + u_z v_z = \Delta u \cdot v + \nabla u \cdot \nabla v$$