ennyi volt a differencialas eleg is volt

tipusok:

1. alapintegralok es ezekre vezetheto tipusok

lasd tablazat

pl:

- $\sin' x = \cos x (x \in \mathbb{R}) \Longrightarrow \int \cos x \,\mathrm{d}x = \sin x + C$
- $\arctan' x = \frac{1}{1+x^2}\,\mathrm{d}x \Longrightarrow \int \frac{1}{1+x^2}\,\mathrm{d}x = \arctan x + C$

stb

a tablazatot fejbol kene tudni mert anelkul nem fog menni semmi

$$\int (2x^4 - 3x^2 + x - 71)\,\mathrm{d}x = 2\int x^4\,\mathrm{d}x - 3\int x^2\,\mathrm{d}x + \int x\,\mathrm{d}x - 71\int 1\,\mathrm{d}x = 2\frac{x^5}{5} - 3\frac{x^3}{3} + \frac{x^2}{2} - 71x + C \quad (C \in \mathbb{R})$$

$$\int_{(x>0)} \sqrt{x\sqrt{x\sqrt{x}}}\,\mathrm{d}x = \int x^{\frac{1}{2}} \cdot x^{\frac{1}{4}} \cdot x^{\frac{1}{8}}\,\mathrm{d}x = \int x^{\frac{1}{2}+\frac{1}{4}+\frac{1}{8}}\,\mathrm{d}x = \int x^{\frac{7}{8}}\,\mathrm{d}x = \frac{x^{\frac{7}{8}+1}}{\frac{7}{8}+1} + C = \frac{8}{15} \cdot \sqrt[8]{x^{15}} + C \quad (C \in \mathbb{R}, x > 0)$$

$$\int_{(x>0)} \frac{(x+1)^2}{\sqrt{x}}\,\mathrm{d}x = \int \frac{x^2+2x+1}{x^{\frac{1}{2}}}\,\mathrm{d}x = \text{osszegre bontas} = \int x^{2-\frac{1}{2}}\,\mathrm{d}x + 2\int x^{1-\frac{1}{2}}\,\mathrm{d}x + \int x^{-\frac{1}{2}}\,\mathrm{d}x =$$

$$= \int x^{\frac{3}{2}}\,\mathrm{d}x + 2\int x^{\frac{1}{2}}\,\mathrm{d}x + \frac{x^{-\frac{1}{2}+1}}{-\frac{1}{2}+1} + C = \frac{x^{\frac{3}{2}+1}}{\frac{3}{2}+1} + 2\frac{x^{\frac{1}{2}+1}}{\frac{1}{2}+1} + 2\sqrt{x} + C = \frac{2}{5}\sqrt{x^5} + \frac{4}{3}\sqrt{x^3} + 2\sqrt{x} + C \quad (C \in \mathbb{R})$$

$$\int_{x\in\mathbb{R}} \frac{x^2}{1+x^2}\,\mathrm{d}x = \int \frac{x^2+1-1}{x^2+1}\,\mathrm{d}x = \int \left(1 - \frac{1}{x^2+1}\right)\mathrm{d}x = \int 1\,\mathrm{d}x - \int \frac{1}{1+x^2}\,\mathrm{d}x = x - \arctan x + C \quad (x \in \mathbb{R}, c \in \mathbb{R})$$

$$\int_{(-\frac{\pi}{2},\frac{\pi}{2})} \frac{\cos^2 x - 2}{1+\cos 2x} = \int \frac{\cos^2 - 2}{(\cos^2 x + \sin^2 x) + (\cos^2 x - \sin^2 x)}\,\mathrm{d}x = \int \frac{\cos^2 - 2}{2\cos^2 x}\,\mathrm{d}x =$$

$$= \frac{1}{2}\int 1 - \frac{2}{\cos^2 x}\,\mathrm{d}x = \frac{1}{2}\int 1\,\mathrm{d}x - \int \frac{1}{\cos^2 x}\,\mathrm{d}x = \frac{1}{2} \cdot x - \tan x + C \quad (C \in \mathbb{R})$$

2. linearis helyettesites

bemelegites:

$\int \sin x\,\mathrm{d}x = -\cos x + C \quad (x, c \in \mathbb{R})$
$\int \sin(3x)\,\mathrm{d}x = -\frac{\cos(3x)}{3} + C \quad (x, c \in \mathbb{R})$
$\int \sin(7x-8)\,\mathrm{d}x = -\frac{\cos(7x-8)}{7} + C (x, c \in \mathbb{R})$
$\int e^{3-5x}\,\mathrm{d}x = \frac{e^{3-5x}}{-5} + C (x, c \in \mathbb{R})$

tehat

$$\int_{x\in\mathbb{R}} \sin^2 x\,\mathrm{d}x = \int \frac{1-\cos 2x}{2}\,\mathrm{d}x = \frac{1}{2}\int 1\,\mathrm{d}x - \frac{1}{2}\int \cos 2x\,\mathrm{d}x = \frac{1}{2}x - \frac{1}{2} \cdot \frac{\sin 2x}{2} + C$$

3. $\int f'(x) \cdot f^{\alpha}(x)\,\mathrm{d}x$

ket dolgot hasznalhatunk ilyeknkor

$$\begin{cases} \frac{f^{\alpha+1}(x)}{\alpha+1} + c, & \text{ha } \alpha \neq 1 \\ \int \frac{f'(x)}{f(x)}\,\mathrm{d}x = \ln f(x) + C \end{cases}$$

pl:

$$\int_{x\in(0;+\infty)} \frac{1}{x}\,\mathrm{d}x = \ln x + C$$

$$\int_{x\in(-\infty;0)} \frac{1}{x}\,\mathrm{d}x = \ln(-x) + C$$

tehat

$$\int \frac{1}{x}\,\mathrm{d}x = \ln|x| + C \qquad (x > 0 \lor x < 0, C \in \mathbb{R})$$

$$\int_{x\in\mathbb{R}} \frac{x}{x^2+3}\,\mathrm{d}x = \int \frac{1}{2}\,\mathrm{d}x \int \frac{2x}{x^2+3}\,\mathrm{d}x = \frac{1}{2}\int \frac{\left(x^2+3\right)'}{x^2+3}\,\mathrm{d}x = \frac{1}{2}\ln\left|x^2+3\right| + C = \frac{1}{2}\ln\left(x^2+3\right) + C$$

$$\int_{x\in(0,1)\lor x\in(1,\infty)} \frac{\mathrm{d}x}{x\ln x} = \int \frac{1}{x\ln x}\,\mathrm{d}x = \int \frac{(\ln x)'}{\ln x}\,\mathrm{d}x = \ln|\ln x| + C = \begin{cases} \ln(\ln x) + C, & \text{ha} \ln x > 0 \Longleftrightarrow x \in (1,\infty) \\ \ln(-\ln x) + C, & \text{ha} \ln x < 0 \Longleftrightarrow x \in (0,1) \end{cases}$$

$$\int_{x\in\left(-\frac{\pi}{2},\frac{\pi}{2}\right)} \tan x\,\mathrm{d}x = \int \frac{\sin x}{\cos x}\,\mathrm{d}x = -\int \frac{(\cos x)'}{\cos x}\,\mathrm{d}x = -\ln|\cos x| + C = -\ln(\cos x) + C$$