Képletgyűjtemény

a Matematika A1 tantárgy számonkéréseihez
a BME-GTK nemzetközi gazdálkodás és pénzügy és számvitel alapszakos hallgatóinak

Trigonometrikus azonosságok:

$$\sin^2(x) + \cos^2(x) = 1$$

$$\sin(x \pm y) = \sin(x)\cos(y) \pm \cos(x)\sin(y)$$

$$\cos(x \pm y) = \cos(x)\cos(y) \mp \sin(x)\sin(y)$$

$$\sin(2x) = 2\sin(x)\cos(x)$$

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

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

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

Hiperbolikus függvények:

$$\mathrm{sh}(x) = \frac{e^x - e^{-x}}{2}$$

$$\mathrm{ch}(x) = \frac{e^x + e^{-x}}{2}$$

$$\mathrm{th}(x) = \frac{\mathrm{sh}(x)}{\mathrm{ch}(x)}$$

$$\mathrm{ch}^2(x) - \mathrm{sh}^2(x) = 1$$

Deriválási szabályok:

$$(c\,f(x))' = c\,f'(x), \qquad \text{(c konstans)}$$

$$(f(x)+g(x))' = f'(x) + g'(x)$$

$$(f(x)\,g(x))' = f'(x)\,g(x) + f(x)\,g'(x)$$

$$\left(\frac{f(x)}{g(x)}\right)' = \frac{f'(x)g(x) - f(x)g'(x)}{g^2(x)}$$

$$(f \circ g)'(x) = f'(g(x))\,g'(x)$$

$$(x^n)' = n\,x^{n-1},\ (n \neq 0)$$

$$(e^x)' = e^x \qquad (a^x)' = a^x\ \ln(a)$$

$$(\sin(x))' = \cos(x) \qquad (\cos(x))' = -\sin(x)$$

$$(\mathrm{tg}(x))' = \frac{1}{\cos^2(x)} \qquad (\mathrm{ctg}(x))' = -\frac{1}{\sin^2(x)}$$

$$(\mathrm{sh}(x))' = \mathrm{ch}(x) \qquad (\mathrm{ch}(x))' = \mathrm{sh}(x)$$

$$(\ln(x))' = \frac{1}{x} \qquad (\log_a(x))' = \frac{1}{x\ \ln(a)}$$

$$(\arcsin(x))' = \frac{1}{\sqrt{1-x^2}} \qquad (\arccos(x))' = -\frac{1}{\sqrt{1-x^2}}$$

$$(\mathrm{arctg}(x))' = \frac{1}{1+x^2} \qquad (\mathrm{arcctg}(x))' = -\frac{1}{1+x^2}$$

$$(\mathrm{arsh}(x))' = \frac{1}{\sqrt{1+x^2}} \qquad (\mathrm{arch}(x))' = \frac{1}{\sqrt{x^2-1}}$$

$$(\mathrm{arth}(x))' = \frac{1}{1-x^2},\ |x|<1 \qquad (\mathrm{arcth}(x))' = \frac{1}{1-x^2},\ |x|>1$$

Integrálási szabályok:

$$\int c\,f(x)\,\mathrm{d}x = c\int f(x)\,\mathrm{d}x, \qquad \text{(c konstans)}$$

$$\int f(x)+g(x)\,\mathrm{d}x = \int f(x)\,\mathrm{d}x + \int g(x)\,\mathrm{d}x$$

$$\int f(x)\,g'(x)\,\mathrm{d}x = f(x)\,g(x) - \int f'(x)\,g(x)\,\mathrm{d}x$$

$$\int f(ax+b)\,\mathrm{d}x = \frac{1}{a}F(ax+b) + c, \quad a,b \in \mathbb{R}, a \neq 0, F'(x) = f(x)$$

$$\int x^n\,\mathrm{d}x = \frac{x^{n+1}}{n+1} + c,\ (n \neq -1) \qquad \int \frac{1}{x}\,\mathrm{d}x = \ln|x| + c$$

$$\int e^x\,\mathrm{d}x = e^x + c \qquad \int a^x\,\mathrm{d}x = \frac{a^x}{\ln(a)} + c$$

$$\int \sin(x)\,\mathrm{d}x = -\cos(x) + c \qquad \int \cos(x)\,\mathrm{d}x = \sin(x) + c$$

$$\int \mathrm{tg}(x)\,\mathrm{d}x = -\ln|\cos(x)| + c \qquad \int \ln(x)\,\mathrm{d}x = x\ln(x) - x + c$$

Taylor-sorok:

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n = 1 + x + x^2 + \ldots, \qquad |x| < 1$$

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!} = 1 + x + \frac{x^2}{2} + \ldots, \qquad x \in \mathbb{R}$$

$$\sin(x) = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!} = x - \frac{x^3}{6} + \frac{x^5}{120} - \ldots, \qquad x \in \mathbb{R}$$

$$\cos(x) = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!} = 1 - \frac{x^2}{2} + \frac{x^4}{24} - \ldots, \qquad x \in \mathbb{R}$$