Algebraické rovnice

$$(A\pm B)^2 = A^2 \pm 2\cdot A\cdot B + B^2$$
$$(A+B+C)^2 = A^2+B^2+C^2+2\cdot A\cdot B+2\cdot A\cdot C+2\cdot B\cdot C$$
$$(A\pm B)^3 = A^3 \pm 3\cdot A^2\cdot B + 3\cdot A\cdot B^2 \pm B^3$$
$$A^3 \pm B^3 = (A\pm B)\cdot(A^2 \mp A\cdot B + B^2)$$
$$A^2 - B^2 = (A+B)\cdot(A-B)$$

Mocniny

$$a^r\cdot a^s = a^{r+s}$$
$$(a^r)^s = a^{r\cdot s}$$
$$\frac{a^r}{a^s} = a^{r-s}$$
$$(a\cdot b)^r = a^r\cdot b^r$$
$$\left(\frac{a}{b}\right)^r = \frac{a^r}{b^r}$$

Odmocniny

$$\sqrt[n]{a}\cdot\sqrt[n]{b} = \sqrt[n]{a\cdot b}$$
$$\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$$
$$(\sqrt[n]{a})^s = \sqrt[n]{a^s}$$
$$(\sqrt[n]{a})^n = \sqrt[n]{a^n} = a$$
$$\sqrt[m]{\sqrt[n]{a}} = \sqrt[n]{\sqrt[m]{a}} = \sqrt[m.n]{a}$$
$$\sqrt[n.p]{\sqrt[m.p]{a}} = \sqrt[n]{a^m}$$

Aritmetická postupnosť

$$a_n = a_1 + (n-1)\cdot d$$
$$a_r = a_s + (r-s)\cdot d$$
$$s_n = \frac{n}{2}\cdot(a_1+a_n)$$
$$a_n = \frac{a_{n-1}+a_{n+1}}{2}$$

Limita postupnosti

$$\lim_{n\to\infty}\frac{1}{n} = 0$$
$$\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n = e$$
$$\lim_{n\to\infty}\sqrt[n]{n} = 1$$
$$\lim_{n\to\infty} a_n^r = (\lim_{n\to\infty} a_n)^r$$
$$\lim_{n\to\infty} r^{a_n} = r^{\lim_{n\to\infty} a_n}$$

Geometrická postupnosť

$$a_n = a_1\cdot q^{n-1}$$
$$a_r = a_s\cdot q^{r-s}$$
$$s_n = \frac{a_1\cdot q^n - 1}{q-1},\ q\neq 1$$
$$s_n = a_1\cdot n,\ q=1$$
$$|a_n| = \sqrt{a_{n-1}\,.\,a_{n+1}}$$
$$a_n = a_0\,.\,\left(1\pm\frac{p}{100}\right)^n$$
$$s = \frac{a_1}{1-q}$$

Limita funkcie

$$\lim_{x\to a} c\cdot f(x) = c\cdot\lim_{x\to a} f(x)$$
$$\lim_{x\to\infty}\frac{1}{x} = 0$$
$$\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x = e$$
$$\lim_{x\to 0}(1+x)^{\frac{1}{x}} = e$$
$$\lim_{x\to 0}\frac{\sin(x)}{x} = 1$$

Logaritmické rovnice

$$\log_a(r\cdot s) = \log_a(r) + \log_a(s)$$
$$\log_a\left(\frac{r}{s}\right) = \log_a(r) - \log_a(s)$$
$$\log_a(r^s) = s\cdot\log_a(r)$$
$$r = a^{\log_a(r)}$$
$$\log_a(x) = y \Rightarrow a^y = x$$
$$\log_a(a) = 1,\ \log_a(1) = 0$$

Goniometrické rovnice

$$\sin^2(x)+\cos^2(x) = 1$$
$$\tan(x) = \frac{\sin(x)}{\cos(x)}$$
$$\sin(x\pm y) = \sin(x)\cdot\cos(y)\pm\cos(x)\cdot\sin(y)$$
$$\cos(x\pm y) = \cos(x)\cdot\cos(y)\mp\sin(x)\cdot\sin(y)$$
$$\tan(x\pm y) = \frac{\tan(x)\pm\tan(y)}{1\mp\tan(x)\cdot\tan(y)}$$
$$\sin(2x) = 2\cdot\sin(x)\cdot\cos(x)$$
$$\cos(2x) = \cos^2(x) - \sin^2(x)$$
$$\tan(2x) = \frac{2\cdot\tan(x)}{1-\tan^2(x)},\ x\neq k\cdot\frac{\pi}{4}$$
$$|\sin(\frac{x}{2})| = \sqrt{\frac{1-\cos(x)}{2}}$$
$$|\cos(\frac{x}{2})| = \sqrt{\frac{1+\cos(x)}{2}}$$
$$|\tan(\frac{x}{2})| = \sqrt{\frac{1-\cos(x)}{1+\cos(x)}},\ x\notin k.\pi$$
$$\sin(x)+\sin(y) = 2\cdot\sin\left(\frac{x+y}{2}\right)\cdot\cos\left(\frac{x-y}{2}\right)$$
$$\sin(x)-\sin(y) = 2\cdot\cos\left(\frac{x+y}{2}\right)\cdot\sin\left(\frac{x-y}{2}\right)$$
$$\cos(x)+\cos(y) = 2\cdot\cos\left(\frac{x+y}{2}\right)\cdot\cos\left(\frac{x-y}{2}\right)$$
$$\cos(x)-\cos(y) = -2\cdot\sin\left(\frac{x+y}{2}\right)\cdot\sin\left(\frac{x-y}{2}\right)$$

Vlastnosti funkcií

$$\sin(-x) = -\sin(x)$$
$$\cos(-x) = \cos(x)$$
$$\tan(-x) = -\tan(x)$$
$$\cot(-x) = -\cot(x)$$

Kvadratické rovnice

$$a\cdot x^2 + b\cdot x + c = 0$$
$$a\cdot(x-x_1)\cdot(x-x_2) = 0$$
$$x_1+x_2 = -\frac{b}{a},\quad x_1\,.\,x_2 = \frac{c}{a}$$

Parabola

$$y = a\cdot x^2 + b\cdot x + c$$
$$V = \left[-\frac{b}{2a};\ c-\frac{b^2}{4a}\right]$$

Hyperbola

$$y = \frac{a\cdot x+b}{c\cdot x+d}$$
$$y = \frac{a}{c},\quad x = -\frac{d}{c}$$

Kombinatorika

$$P(n) = n!$$
$$P'_{n_1,n_2,n_3,\dots n_k} = \frac{n!}{n_1!\cdot n_2!\cdot\ldots\cdot n_k!}$$
$$V(k,n) = \frac{n!}{(n-k)!}$$
$$V' = n^k$$
$$C(k,n) = \frac{n!}{(n-k)!\cdot k!}$$
$$C' = \binom{n-k+1}{k}$$
$$A_k = \binom{n}{k-1}\cdot a^{n-k+1}\cdot b^{k-1}$$

Derivácia funkcie

$y=c\cdot f(x),\ \ y'=c\cdot f'(x)$

$y=f(x)\pm g(x),\ \ y'=f'(x)\pm g'(x)$

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

$y=\dfrac{f(x)}{g(x)},\ \ y'=\dfrac{f'(x)\cdot g(x)-f(x)\cdot g'(x)}{g^2(x)}$

$[f^{-1}(x)]'(b)=\dfrac{1}{f'(a)}$

$[f(g(x))]'=f'(g(x))\cdot g'(x)$

$y=x^n,\ \ y'=n.x^{n-1}, x\in\mathbb{R}$

$y=\sin(x),\ \ y'=\cos(x), x\in\mathbb{R}$

$y=\cos(x),\ \ y'=-\sin(x), x\in\mathbb{R}$

$y=\tan(x),\ \ y'=\dfrac{1}{\cos^2(x)}, x\neq\dfrac{\Pi}{2}+k\Pi$

$y=\cot(x),\ \ y'=-\dfrac{1}{\sin^2(x)}, x\neq k\Pi$

$y=e^x,\ \ y'=e^x, x\in\mathbb{R}$

$y=a^x,\ \ y'=a^x\cdot\ln(a), x\in\mathbb{R}, a>0,\ a\neq 1$

$y=\ln(x),\ \ y'=\dfrac{1}{x}, x>0$

$y=\log_a(x),\ \ y'=\dfrac{1}{x\cdot\ln(a)}, x>0$

$y=\arcsin(x),\ \ y'=\dfrac{1}{\sqrt{1-x^2}}$

$y=\arccos(x),\ \ y'=-\dfrac{1}{\sqrt{1-x^2}}$

$y=\arctan(x),\ \ y'=\dfrac{1}{1+x^2}$

$y=\operatorname{arccot}(x),\ \ y'=-\dfrac{1}{1+x^2}$

Neurčitý integrál

$\int dx=x+c,\ x\in\mathbb{R}$

$\int \dfrac{1}{x}\,dx=\ln|x|+c,\ x\in\mathbb{R}$

$\int x^n\,dx=\dfrac{x^{n+1}}{n+1}+c,\ n\in\mathbb{N},\ x\in\mathbb{R}$

$\int e^x\,dx=e^x+c,\ x\in\mathbb{R}$

$\int a^x\,dx=\dfrac{a^x}{\ln(a)}+c,\ a>0,\ a\neq 1,\ x\in\mathbb{R}$

$\int \dfrac{1}{x}\,dx=\ln(x)+c,\ x>0$

$\int \ln(x)\,dx=x\cdot\ln(x)-x+c,\ x\in\mathbb{R}$

$\int \sin(x)\,dx=-\cos(x)+c,\ x\in\mathbb{R}$

$\int \cos(x)\,dx=\sin(x)+c,\ x\in\mathbb{R}$

$\int \dfrac{1}{\cos^2(x)}\,dx=\tan(x)+c,\ x\neq\dfrac{\Pi}{2}+k\Pi$

$\int \dfrac{1}{\sin^2(x)}\,dx=-\cot(x)+c,\ x\neq k\Pi$

$\int \dfrac{1}{1+x^2}\,dx=\begin{matrix}\arctan(x)+c\\ -\operatorname{arccot}(x)+c\end{matrix}$

$\int \dfrac{1}{1-x^2}\,dx=\dfrac{1}{2}\cdot\ln\left|\dfrac{1+x}{1-x}\right|+c$

$\int \dfrac{1}{\sqrt{1-x^2}}\,dx=\begin{matrix}\arcsin(x)+c\\ -\arccos(x)+c\end{matrix}$

$\int \dfrac{1}{\sqrt{x^2+a^2}}\,dx=\ln\left|x+\sqrt{x^2+a}\right|+c,\ s\in\mathbb{R}$

$\int \dfrac{1}{x+a}\,dx=\ln|x+a|+c,\ s\in\mathbb{R}$

$\int \dfrac{f'(x)}{f(x)}\,dx=\ln|f(x)|+c$

Určitý integrál

Newton-Leibnitzova formula

$$\int_a^b f(x)\,dx=[F(x)]_a^b=F(b)-F(a)$$

Dĺžka krivky

$$d(K)=\int_a^b \sqrt{1+(f'(x))^2}\,dx$$

Objem rotačného telesa

$$V(A)=\pi\cdot\int_a^b f^2(x)\,dx$$

$$V(T)=\pi\cdot\int_a^b (f^2(x)-g^2(x))\,dx$$

Povrch rotačnej plochy

$$S(P)=2\cdot\pi\cdot\int_a^b f(x)\cdot\sqrt{1+(f'(x))^2}\,dx$$