

Jak na limity

Polynomy, exponenciála a logaritmy

$$A^n - B^n = (A - B) \cdot (A^{n-1} + A^{n-2} \cdot B + A^{n-3} \cdot B^2 + \dots + A \cdot B^{n-2} + B^{n-1})$$

$$\lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1$$

$$\lim_{x \rightarrow 0} \frac{\ln(x+1)}{x} = 1$$

$$a^x = e^{x \cdot \ln a}$$

$$\ln a \cdot b = \ln a + \ln b$$

Goniometrické funkce

$$\lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1,$$

$$\lim_{x \rightarrow 0} \frac{\ln(1+x)}{x} = 1,$$

$$\lim_{x \rightarrow +\infty} \frac{\ln x}{x^n} = 0,$$

$$\lim_{x \rightarrow +\infty} \frac{x^n}{\ln x} = +\infty,$$

n přirozené,

n přirozené,

$$\lim_{x \rightarrow 0} \frac{\arcsin x}{x} = 1,$$

$$\lim_{x \rightarrow 0} \frac{\arctg x}{x} = 1,$$

$$\lim_{x \rightarrow 0+} x^n \ln x = 0,$$

n přirozené.

$$\lim_{x \rightarrow +\infty} \frac{e^x}{x^n} = +\infty,$$

$$\lim_{x \rightarrow +\infty} \frac{x^n}{e^x} = 0,$$

n přirozené,

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$$\sin(a+b) = \sin a \cdot \cos b + \cos a \cdot \sin b$$

$$\cos(a+b) = \cos a \cdot \cos b - \sin a \cdot \sin b$$

$$\sin(a-b) = \sin a \cdot \cos b - \cos a \cdot \sin b$$

$$\cos(a-b) = \cos a \cdot \cos b + \sin a \cdot \sin b$$

$$\sin a + \sin b = 2 \cdot \sin\left(\frac{a+b}{2}\right) \cdot \cos\left(\frac{a-b}{2}\right)$$

$$\sin a - \sin b = 2 \cdot \cos\left(\frac{a+b}{2}\right) \cdot \sin\left(\frac{a-b}{2}\right)$$

$$\cos a + \cos b = 2 \cdot \cos\left(\frac{a+b}{2}\right) \cdot \cos\left(\frac{a-b}{2}\right)$$

$$\cos a - \cos b = -2 \cdot \sin\left(\frac{a+b}{2}\right) \cdot \sin\left(\frac{a-b}{2}\right)$$

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$$

$$\lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2} = \frac{1}{2}$$

Derivace

- 1) $f(x) = C, x \in \mathbb{R}, C \in \mathbb{R}(\mathbb{C}), f'(x) = 0.$
- 2) $f(x) = x, x \in \mathbb{R}, f'(x) = 1.$
- 3) $(e^x)' = e^x, x \in \mathbb{R}.$
- 4) $(\ln|x|)' = 1/x, x \in \mathbb{R} \setminus \{0\}.$
- 5) $(a^x)' = a^x \ln a, x \in \mathbb{R}, a \in (0, \infty).$
- 6) $(\log_a x)' = 1/(x \ln a), x \in (0, \infty), a \in (0, 1) \cup (1, \infty).$
- 7) $(\sin x)' = \cos x, x \in \mathbb{R}.$
- 8) $(\cos x)' = -\sin x, x \in \mathbb{R}.$
- 9) $(\tg x)' = 1/\cos^2 x, x \in (-\pi/2 + k\pi, \pi/2 + k\pi), k \in \mathbb{Z}.$
- 10) $(\cotg x)' = -1/\sin^2 x, x \in (k\pi, (k+1)\pi), k \in \mathbb{Z}.$
- 11) $(\arcsin x)' = 1/\sqrt{1-x^2}, |x| < 1.$
- 12) $(\arccos x)' = -1/\sqrt{1-x^2}, |x| < 1.$
- 13) $(\arctg x)' = 1/(1+x^2), x \in \mathbb{R}.$
- 14) $(\operatorname{arccotg} x)' = -1/(1+x^2), x \in \mathbb{R}.$