

LIMITY

I. Výrazy typu $\left\| \frac{k}{0} \right\| :$

$$1) \lim_{x \rightarrow 3} \frac{2x-1}{9-x^2} \text{ neex.}$$

$$2) \lim_{x \rightarrow 2^+} \frac{x+1}{\ln(x-1)} = \infty$$

$$3) \lim_{x \rightarrow 1} \frac{3}{(x-1)^2} = \infty$$

$$4) \lim_{x \rightarrow 1} \frac{x}{1-x} \text{ neex.}$$

$$5) \lim_{x \rightarrow 1} \frac{3x-1}{\sin(x-1)} \text{ neex.}$$

$$6) \lim_{x \rightarrow -2} \frac{1+2x}{\left(\frac{x}{2}+1\right)^2} = -\infty$$

$$7) \lim_{x \rightarrow -1} \frac{1-x^3}{1+x^3} \text{ neex.}$$

$$8) \lim_{x \rightarrow 1} \frac{2-3x}{\ln x} \text{ neex.}$$

$$9) \lim_{x \rightarrow 0} \frac{x-1}{\sin^2 x} = -\infty$$

$$10) \lim_{x \rightarrow 0} \frac{2^{-x}}{\operatorname{arctg}^4 x} = \infty$$

II. Výrazy typu $\left\| \frac{0}{0} \right\| :$

$$1) \lim_{x \rightarrow 0^+} \frac{e^x - 1 - x}{x(e^x - 1)} = \frac{1}{2}$$

$$2) \lim_{x \rightarrow 0} \frac{x \cos x - \sin x}{x^3} = -\frac{1}{3}$$

$$3) \lim_{x \rightarrow \frac{\pi}{4}} \frac{\operatorname{tg} x - 1}{\sin 4x} = -\frac{1}{2}$$

$$4) \lim_{x \rightarrow \frac{\pi}{2}} \frac{\cos^2 x}{x - \frac{\pi}{2}} = 0$$

$$5) \lim_{x \rightarrow \frac{\pi}{4}} \frac{1 - \operatorname{tg} x}{\cos 2x} = 1$$

$$6) \lim_{x \rightarrow \frac{\pi}{6}} \frac{1 - 2 \sin x}{\cos 3x} = \frac{\sqrt{3}}{3}$$

$$7) \lim_{x \rightarrow 0} \frac{e^x - e^{-x}}{x} = 2$$

$$8) \lim_{x \rightarrow 0} \frac{e^x - e^{-x}}{\sin x \cos x} = 2$$

$$9) \lim_{x \rightarrow 0} \frac{e^{2x} - 1}{\ln(1+2x)} = 1$$

$$10) \lim_{x \rightarrow \frac{\pi}{2}} \frac{1 - \sin x + \cos x}{\sin 2x - \cos x} = 1$$

$$11) \lim_{x \rightarrow 0} \frac{x - \sin x}{1 - \cos x} = 0$$

$$12) \lim_{x \rightarrow 0} \frac{e^x - e^{-x} - 2x}{x^3} = \frac{1}{3}$$

$$13) \lim_{x \rightarrow 1} \frac{x \ln x - x + 1}{(x-1) \ln x} = \frac{1}{2}$$

$$14) \lim_{x \rightarrow 3} \frac{x^2 - 9}{x^2 - 2x - 3} = \frac{3}{2}$$

III. Výrazy typu $\left\| \frac{\infty}{\infty} \right\| :$

$$1) \lim_{x \rightarrow \infty} \frac{x^2 + x + 4}{2x^2 + x - 1} = \frac{1}{2}$$

$$2) \lim_{x \rightarrow \infty} \frac{3x^4 - x + 2}{x^4 + x^2 + 1} = 3$$

$$3) \lim_{x \rightarrow \infty} \frac{3x^3 + x + 1}{2x^3 + x^2 - x} = \frac{3}{2}$$

$$4) \lim_{x \rightarrow \infty} \frac{15x^3 + x^2 - 2x + 4}{3x^3 + x + 5} = 5$$

$$5) \lim_{x \rightarrow -\infty} \frac{2x^2 + x + 3}{8x^2 - x - 1} = \frac{1}{4}$$

$$6) \lim_{x \rightarrow \infty} \frac{x^2 - x - 1}{x^3 - x - 1} = 0$$

$$7) \lim_{x \rightarrow -\infty} \frac{x^3 - x^2 + 3}{2x^4 - x + 1} = 0$$

$$8) \lim_{x \rightarrow -\infty} \frac{x - 5}{x^3 + x + 2} = 0$$

$$9) \lim_{x \rightarrow \infty} \frac{2x^3 + x}{3x^4 - x^2 - 1} = 0$$

$$10) \lim_{x \rightarrow \infty} \frac{5x^2 - 3x + 1}{x^3 + 2x^2 + 8} = 0$$

$$11) \lim_{x \rightarrow \infty} \frac{x^3 + 2x + 4}{x^2 - x + 1} = \infty$$

$$12) \lim_{x \rightarrow \infty} \frac{x^4 + x^3 + 12}{x^2 + 2x + 1} = \infty$$

$$13) \lim_{x \rightarrow -\infty} \frac{x^4 - x - 1}{x^3 - x - 1} = -\infty$$

$$14) \lim_{x \rightarrow \infty} \frac{2x^2 - x + 5}{x + 28} = \infty$$

$$15) \lim_{x \rightarrow \infty} \frac{2x^3 + x^2 - 7}{3x^2 + x - 2} = \infty$$

$$16) \lim_{x \rightarrow 0^+} \frac{\ln x}{\cotg x} = 0$$

$$17) \lim_{x \rightarrow 0^+} \frac{\ln x}{\ln \sin x} = 1$$

$$18) \lim_{x \rightarrow \infty} \frac{x^2 + 5}{e^{2x}} = 0$$

$$19) \lim_{x \rightarrow \infty} (3x^4 - 2x^3 + 5x - 3) = \infty$$

$$20) \lim_{x \rightarrow -\infty} (1 - 3x + 3x^2 + 5x^3) = -\infty$$