

7.1. Použitím l'Hospitalovo pravidla vypočítajte limity .

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

b) $\lim_{x \rightarrow 3} \frac{x^3 - 9x}{x^4 - 3x^3 - x + 3}$

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

d) $\lim_{x \rightarrow 1} \frac{\sqrt[3]{8x} - 2x}{\sqrt[4]{x} - x}$

e) $\lim_{x \rightarrow 1} \frac{\sqrt{x+1} - \sqrt{2}}{x^2 - 1}$

f) $\lim_{x \rightarrow 0} \frac{5^x - 1}{x}$

g) $\lim_{x \rightarrow 1} \frac{3x^3 - 3}{3^x - 3}$

h) $\lim_{x \rightarrow 0} \frac{e^x - e^{-x}}{x}$

i) $\lim_{x \rightarrow 0} \frac{e^x - 1}{x^2}$

j) $\lim_{x \rightarrow \frac{\pi}{3}} \frac{1 - 2 \cos x}{\pi - 3x}$

k) $\lim_{x \rightarrow 2} \frac{3 \operatorname{tg} \pi x}{2 - x}$

l) $\lim_{x \rightarrow 0} \frac{\sin x}{e^x - 1}$

m) $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\operatorname{arctg} \left(x - \frac{\pi}{2} \right)}{\pi - 2x}$

n) $\lim_{x \rightarrow 0} \frac{\operatorname{arctg} 3x}{\arcsin 2x}$

7.2. Použitím l'Hospitalovo pravidla vypočítajte limity .

a) $\lim_{x \rightarrow 0} \frac{e^x - e^{-x}}{2x - \sin x}$

b) $\lim_{x \rightarrow 0} \frac{x^3 + \pi x}{\sin 3x}$

c) $\lim_{x \rightarrow 0} \frac{\ln(1 + 4x)}{3^x - 1}$

d) $\lim_{x \rightarrow 0} \frac{\sin 4x}{\ln(1 + \sin x)}$

e) $\lim_{x \rightarrow 0} \frac{3 \ln(1 - 2x)}{2 \operatorname{arctg} 3x}$

f) $\lim_{x \rightarrow 0} \frac{\operatorname{arctg} x + x^2}{2^{3x} - 3^{2x}}$

g) $\lim_{x \rightarrow 0} \frac{e^{3x} - e^{-2x}}{2 \arcsin x - \sin x}$

h) $\lim_{x \rightarrow 0} \frac{\ln(\cos 3x)}{\operatorname{arctg} 4x}$

i) $\lim_{x \rightarrow 0} \frac{(1+x)^2 - (1+2x)}{x^2 + 4x^3}$

j) $\lim_{x \rightarrow -1} \frac{(x^2 + 3x + 2)^2}{x^3 - 3x - 2}$

k) $\lim_{x \rightarrow 0} \frac{1 - \cos^4 x}{4x^2}$

l) $\lim_{x \rightarrow 0} \frac{1 - \cos x}{2x \cdot \sin x}$

m) $\lim_{x \rightarrow \frac{\pi}{6}} \frac{\ln(\sin 3x)}{(6x - \pi)^2}$

n) $\lim_{x \rightarrow 0} \frac{x - \sin x}{e^x - e^{-x} - 2x}$

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

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

q) $\lim_{x \rightarrow 0} \frac{1 - \cos 2x}{e^{x^2} - 1}$

r) $\lim_{x \rightarrow 0} \frac{x^3}{x - \operatorname{arctg} x}$

(68) j) $f: y = \frac{e^x}{x}$; $D(f) = \mathbb{R} \setminus \{0\}$

$$y'' = \left(\frac{e^x \cdot x - e^x \cdot 1}{x^2} \right)' = \left(\frac{e^x \cdot (x-1)}{x^2} \right)' = \frac{[e^x \cdot (x-1) + e^x \cdot 1] \cdot x^2 - e^x \cdot (x-1) \cdot 2x}{x^4} = \frac{x^2 \cdot e^x \cdot (x-1+1) - 2x \cdot e^x \cdot (x-1)}{x^4} = \frac{x e^x \cdot (x^2 - 2(x-1))}{x^4} =$$

$$= \frac{e^x \cdot (x^2 - 2x + 2)}{x^3} = 0 \Leftrightarrow x^2 - 2x + 2 = 0$$

$$D = 4 - 4 \cdot 2 < 0 \rightarrow \text{obsadíme } 0: 0^2 - 2 \cdot 0 + 2 = 2 > 0 \Rightarrow x^2 - 2x + 2 > 0 \text{ vždy } (\forall x \in D(f))$$

$$y'' > 0 \Leftrightarrow \frac{\overset{0}{e^x}(\overset{x^2-2x+2}{\cancel{x^3}})}{\cancel{x^3}} > 0 \Leftrightarrow x^3 > 0 \Leftrightarrow x > 0 \Rightarrow$$

ib \nexists
konvexná na $(0; \infty)$
konkávná na $(-\infty; 0)$

L'Hospitalovo pravidlo:

Ak $\lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \frac{\lim_{x \rightarrow a} f(x)}{\lim_{x \rightarrow a} g(x)} = \frac{0}{0}$ alebo $\frac{\pm \infty}{\pm \infty}$, potom

$$\lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \lim_{x \rightarrow a} \frac{f'(x)}{g'(x)}$$

(69)

7.1

$$\lim_{x \rightarrow 1} \frac{x^3 - 2x^2 + x}{x^2 - 1} = \frac{1^3 - 2 \cdot 1^2 + 1}{1^2 - 1} = \frac{0}{0}; \text{ môžeme teda použiť L'Hospitalovo pravidlo}$$

[v ďalších príkladoch nebudem zistovať, či ide o limitu s výsledkom $\frac{0}{0}$, ale budem podľa zadania príkladov inu počítať limity použitím L'H pravidla]

$$\lim_{x \rightarrow 1} \frac{x^3 - 2x^2 + x}{x^2 - 1} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 1} \frac{(x^3 - 2x^2 + x)'}{(x^2 - 1)'} = \lim_{x \rightarrow 1} \frac{3x^2 - 4x + 1}{2x} = \frac{3 \cdot 1^2 - 4 \cdot 1 + 1}{2 \cdot 1} = \frac{0}{2} = 0$$

$$\text{b)} \lim_{x \rightarrow 3} \frac{x^3 - 9x}{x^4 - 3x^3 - x + 3} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 3} \frac{3x^2 - 9}{4x^3 - 9x^2 - 1} = \lim_{x \rightarrow 3} \frac{3 \cdot 3^2 - 9}{4 \cdot 3^3 - 9 \cdot 3^2 - 1} = \frac{27 - 9}{108 - 81 - 1} = \frac{18}{26} = \frac{9}{13}$$

$$\text{c)} \lim_{x \rightarrow -1} \frac{x^4 + x^3 - 2x^2 - 3x - 1}{x^4 + 4x^2 - 5} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow -1} \frac{4x^3 + 3x^2 - 4x - 3}{4x^3 + 8x} = \frac{4 \cdot (-1)^3 + 3 \cdot (-1)^2 - 4 \cdot (-1) - 3}{4 \cdot (-1)^3 + 8 \cdot (-1)} = \frac{-4 + 3 + 4 - 3}{-4 - 8} = \frac{0}{-12} = 0$$

$$\text{d)} \lim_{x \rightarrow 1} \frac{\sqrt[3]{8x} - 2x}{\sqrt[4]{x} - x} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 1} \frac{[(8x)^{\frac{1}{3}} - 2x]}{(x^{\frac{1}{4}} - x)} = \lim_{x \rightarrow 1} \frac{\frac{1}{3} \cdot (8x)^{\frac{-2}{3}} \cdot 8 - 2}{\frac{1}{4} x^{\frac{-3}{4}} - 1} = \lim_{x \rightarrow 1} \frac{\frac{8}{3 \cdot \sqrt[3]{(8x)^2}} - 2}{\frac{1}{4} \cdot \sqrt[4]{x^3} - 1} = \frac{\frac{2}{3} - 2}{\frac{1}{4} - 1} = \frac{-\frac{4}{3}}{-\frac{3}{4}} = \frac{16}{9}$$

$a^{\frac{x}{4}} = \sqrt[4]{a^x}$

$$\text{e)} \lim_{x \rightarrow 1} \frac{\sqrt{x+1} - \sqrt{2}}{x^2 - 1} = \lim_{x \rightarrow 1} \frac{(x+1)^{\frac{1}{2}} - \sqrt{2}}{x^2 - 1} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 1} \frac{\frac{1}{2}(x+1)^{-\frac{1}{2}}}{2x} = \lim_{x \rightarrow 1} \frac{\frac{1}{2\sqrt{x+1}}}{2x} = \lim_{x \rightarrow 1} \frac{1}{4x\sqrt{x+1}} = \frac{1}{4\sqrt{2}} = \frac{\sqrt{2}}{8}$$

(smeťme sa v menovateli nepísat „ $\sqrt[n]{m^n}$ “)

7.0

f) $\lim_{x \rightarrow 0} \frac{5^x - 1}{x} \stackrel{\text{LH}}{=} \lim_{x \rightarrow 0} \frac{5^x \cdot \ln 5}{1} = \frac{5^0 \cdot \ln 5}{1} = \underline{\underline{\ln 5}}$

g) $\lim_{x \rightarrow 1} \frac{3^x - 3}{3^x - 3} \stackrel{\text{LH}}{=} \lim_{x \rightarrow 1} \frac{9x^2}{3^x \cdot \ln 3} = \frac{9 \cdot 1^2}{3^1 \cdot \ln 3} = \frac{9}{3 \ln 3} = \underline{\underline{\frac{3}{\ln 3}}}$

h) $\lim_{x \rightarrow 0} \frac{e^x - e^{-x}}{x} \stackrel{\text{LH}}{=} \lim_{x \rightarrow 0} \frac{e^x + e^{-x}}{1} = \underline{\underline{e^0 + e^0}} = \underline{\underline{2}}$

i) $\lim_{x \rightarrow 0} \frac{e^x - 1}{x^2} \stackrel{\text{LH}}{=} \lim_{x \rightarrow 0} \frac{e^x}{2x} = \frac{1}{0} \quad \underline{\underline{\infty}}$

j) $\lim_{x \rightarrow \frac{\pi}{3}} \frac{1 - 2 \cos x}{\pi - 3x} \stackrel{\text{LH}}{=} \lim_{x \rightarrow \frac{\pi}{3}} \frac{-2 \cdot (-\sin x)}{-3} = \frac{2}{3} \cdot \left(-\sin \frac{\pi}{3}\right) = -\frac{2}{3} \cdot \frac{\sqrt{3}}{2} = \underline{\underline{-\frac{\sqrt{3}}{3}}}$

k) $\lim_{x \rightarrow 2} \frac{3 \log(\pi x)}{2-x} \stackrel{\text{LH}}{=} \lim_{x \rightarrow 2} \frac{3 \cdot \frac{1}{\cos^2(\pi x)} \cdot \pi}{-1} = \frac{3\pi}{-\cos^2(\pi \cdot 2)} = \frac{3\pi}{-1} = \underline{\underline{-3\pi}}$

l) $\lim_{x \rightarrow 0} \frac{\sin x}{e^x - 1} \stackrel{\text{LH}}{=} \lim_{x \rightarrow 0} \frac{\cos x}{e^x} = \frac{\cos 0}{e^0} = \frac{1}{1} = \underline{\underline{1}}$

m) $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\arctg\left(x - \frac{\pi}{2}\right)}{\pi - 2x} \stackrel{\text{LH}}{=} \lim_{x \rightarrow \frac{\pi}{2}} \frac{\frac{1}{1+(x-\frac{\pi}{2})^2}}{-2} = \frac{1}{-2 \cdot (1+0^2)} = \underline{\underline{-\frac{1}{2}}}$

n) $\lim_{x \rightarrow 0} \frac{\arctg 3x}{\arcsin 2x} \stackrel{\text{LH}}{=} \lim_{x \rightarrow 0} \frac{\frac{1}{1+(3x)^2} \cdot 3}{\frac{1}{\sqrt{1-(2x)^2}} \cdot 2} = \frac{3}{2} \cdot \frac{\sqrt{1-(2 \cdot 0)^2}}{1+(3 \cdot 0)^2} = \frac{3}{2} \cdot \frac{1}{1} = \underline{\underline{\frac{3}{2}}}$

(7.2)

$$a) \lim_{x \rightarrow 0} \frac{e^x - e^{-x}}{2x - \sin x} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 0} \frac{e^x + e^{-x}}{2 - \cos x} = \frac{e^0 + e^0}{2 - \cos 0} = \frac{1+1}{2-1} = \frac{2}{1} = \underline{\underline{2}}$$

(7.2)

$$b) \lim_{x \rightarrow 0} \frac{x^3 + \pi x}{\sin 3x} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 0} \frac{3x^2 + \pi}{\cos 3x \cdot 3} = \frac{3 \cdot 0^2 + \pi}{\cos 0 \cdot 3} = \frac{\pi}{3}$$

$$c) \lim_{x \rightarrow 0} \frac{\ln(1+4x)}{3^x - 1} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 0} \frac{\frac{1}{1+4x} \cdot 4}{3^x \cdot \ln 3} = \frac{\frac{4}{1+4 \cdot 0}}{3^0 \cdot \ln 3} = \frac{4}{1 \cdot 1 \cdot \ln 3} = \frac{4}{\ln 3}$$

$$d) \lim_{x \rightarrow 0} \frac{\sin 4x}{\ln(1+\sin x)} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 0} \frac{\cos 4x \cdot 4}{\frac{1}{1+\sin x} \cdot \cos x} = \frac{4 \cdot \cos(4 \cdot 0)}{\cos 0} = \frac{4}{1} = \underline{\underline{4}}$$

$$e) \lim_{x \rightarrow 0} \frac{3 \ln(1-2x)}{2 \operatorname{arctg} 3x} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 0} \frac{3 \cdot \frac{1}{1-2x} \cdot (-2)}{2 \cdot \frac{1}{1+(3x)^2} \cdot 3} = \frac{\frac{-6}{1-2 \cdot 0}}{\frac{6}{1+(3 \cdot 0)^2}} = \frac{-6 \cdot 1}{1 \cdot 6} = \underline{\underline{-1}}$$

$$f) \lim_{x \rightarrow 0} \frac{\operatorname{arctg} x + x^2}{2^{3x} - 3^{2x}} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 0} \frac{\frac{1}{1+x^2} + 2x}{2^{3x} \cdot \ln 2 \cdot 3 - 3^{2x} \cdot \ln 3 \cdot 2} = \lim_{x \rightarrow 0} \frac{\frac{1+2x \cdot (1+x^2)}{1+x^2}}{3 \cdot \ln 2 \cdot 2^{3x} - 2 \cdot \ln 3 \cdot 3^{2x}} = \frac{1+2 \cdot 0 \cdot (1+0^2)}{(1+0^2)(3 \cdot \ln 2 \cdot 2^0 - 2 \cdot \ln 3 \cdot 3^0)} =$$

$$= \frac{1}{3 \ln 2 - 2 \ln 3}$$

$$g) \lim_{x \rightarrow 0} \frac{e^{3x} - e^{-2x}}{2 \operatorname{arcsin} x - \sin x} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 0} \frac{\frac{e^{3x} - e^{-2x}}{2} \cdot 3 + e^{-2x} \cdot 2}{\frac{2}{\sqrt{1-x^2}} - \cos x} = \frac{\frac{e^0 \cdot 3 + e^0 \cdot 2}{2} - \cos 0}{\frac{2}{\sqrt{1-0^2}} - \cos 0} = \frac{5}{1} = \underline{\underline{5}}$$

$$h) \lim_{x \rightarrow 0} \frac{\ln(\cos 3x)}{\operatorname{arctg} 4x} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 0} \frac{\frac{1}{\cos 3x} \cdot (-\sin 3x) \cdot 3}{\frac{1}{1+(4x)^2} \cdot 4} = \lim_{x \rightarrow 0} \frac{\frac{-3 \sin 3x}{\cos 3x}}{\frac{4}{1+(4x)^2}} = \frac{\frac{-3 \cdot \sin 0 \cdot (1+0^2)}{4 \cdot \cos 0}}{4 \cdot \cos 0} = \frac{0}{4} = \underline{\underline{0}}$$

(73)

$$\textcircled{7.2} \text{ i) } \lim_{x \rightarrow 0} \frac{(1+x)^2 - (1+2x)}{x^2 + 4x^3} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 0} \frac{(x^2 + 2x + 1 - 1 - 2x)}{(x^2 + 4x^3)} = \lim_{x \rightarrow 0} \frac{(x^2)}{(x^2 + 4x^3)} = \lim_{x \rightarrow 0} \frac{2x}{2x + 12x^2} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 0} \frac{2}{2 + 24x} = \underline{\underline{1}}$$

→ L'H pravidlo můžeme použít
ají následně v 1 příkladu

$$\text{ii) } \lim_{x \rightarrow -1} \frac{(x^2 + 3x + 2)^2}{x^3 - 3x - 2} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow -1} \frac{2 \cdot (x^2 + 3x + 2) \cdot (2x + 3)}{3x^2 - 3} = \lim_{x \rightarrow -1} \frac{2 \cdot (2x^3 + 6x^2 + 4x + 3x^2 + 9x + 6)}{3x^2 - 3}$$

$$= \lim_{x \rightarrow -1} \frac{2(2x^3 + 9x^2 + 13x + 6)}{3x^2 - 3} = \frac{0}{0} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow -1} \frac{(4x^3 + 18x^2 + 26x + 12)}{(3x^2 - 3)} = \lim_{x \rightarrow -1} \frac{12x^2 + 36x + 26}{6x} = \frac{2}{-6} = \underline{\underline{-\frac{1}{3}}}$$

$$\text{b) } \lim_{x \rightarrow 0} \frac{1 - \cos^4 x}{4x^2} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 0} \frac{-4\cos^3 x \cdot (-\sin x)}{8x} = \lim_{x \rightarrow 0} \frac{4\sin x \cos^3 x}{8x} = \frac{0}{0} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 0} \frac{\cos x \cdot \cos^3 x + \sin x \cdot 3\cos^2 x \cdot (-\sin x)}{2} =$$

$$= \frac{1 \cdot 1^3 - 0 \cdot 3 \cdot 1^2}{2} = \underline{\underline{\frac{1}{2}}}$$

$$\text{b) } \lim_{x \rightarrow 0} \frac{1 - \cos x}{2x \sin x} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 0} \frac{\sin x}{2 \sin x + 2x \cos x} = \frac{0}{0} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow 0} \frac{\cos x}{2 \cos x + 2 \cos x - 2x \sin x} = \frac{1}{2 \cdot 1 + 2 \cdot 1 - 2 \cdot 0 \cdot 0} = \underline{\underline{\frac{1}{4}}}$$

$$\text{m) } \lim_{x \rightarrow \frac{\pi}{6}} \frac{\ln(\sin 3x)}{(6x - \pi)^2} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow \frac{\pi}{6}} \frac{\frac{1}{\sin 3x} \cdot \cos 3x \cdot 3}{2(6x - \pi) \cdot 6} = \lim_{x \rightarrow \frac{\pi}{6}} \frac{3 \cos 3x}{12(6x - \pi) \sin 3x} = \frac{0}{0} \stackrel{\text{L'H}}{=} \lim_{x \rightarrow \frac{\pi}{6}} \frac{(3 \cos 3x)}{[12(6x - \pi) \sin 3x]} =$$

$$= \lim_{x \rightarrow \frac{\pi}{6}} \frac{-3 \sin 3x \cdot 3}{12 \cdot [6 \sin 3x + (6x - \pi) \cdot \cos 3x \cdot 3]} = \left(\begin{matrix} \text{L'H} \\ \frac{0}{0} \end{matrix} \right) \frac{-3 \cdot 1 \cdot 3}{12 \cdot (6 \cdot 1 + 0)} = \frac{-9}{72} = \underline{\underline{-\frac{1}{8}}}$$

(7.2)

$$m) \lim_{x \rightarrow 0} \frac{x - \sin x}{e^x - e^{-x} - 2x} \stackrel{LH}{=} \lim_{x \rightarrow 0} \frac{1 - \cos x}{e^x + e^{-x} - 2} = \frac{0}{0} \stackrel{LH}{=} \lim_{x \rightarrow 0} \frac{\sin x}{e^x - e^{-x}} = \frac{0}{0} \stackrel{LH}{=} \lim_{x \rightarrow 0} \frac{\cos x}{e^x + e^{-x}} = \frac{1}{2}$$

(74)

$$o) \lim_{x \rightarrow 0} \frac{e^{3x} - 3x - 1}{\sin^2 x} \stackrel{LH}{=} \lim_{x \rightarrow 0} \frac{3e^{3x} - 3}{2\sin x \cdot \cos x} = \frac{0}{0} \stackrel{LH}{=} \lim_{x \rightarrow 0} \frac{3 \cdot 3e^{3x}}{2(\cos^2 x - \sin^2 x)} = \frac{9}{2}$$

$$p) \lim_{x \rightarrow 0} \frac{1 - \cos 3x}{\sin^2 x} \stackrel{LH}{=} \lim_{x \rightarrow 0} \frac{\sin 3x \cdot 3}{2 \sin x \cos x} = \frac{0}{0} \stackrel{LH}{=} \lim_{x \rightarrow 0} \frac{3 \cos 3x \cdot 3}{2(\cos^2 x - \sin^2 x)} = \frac{9}{2}$$

$$q) \lim_{x \rightarrow 0} \frac{1 - \cos 2x}{e^{x^2} - 1} \stackrel{LH}{=} \lim_{x \rightarrow 0} \frac{\sin 2x \cdot 2}{e^{x^2} \cdot 2x} = \lim_{x \rightarrow 0} \frac{\sin 2x}{x \cdot e^{x^2}} = \frac{0}{0} \stackrel{LH}{=} \lim_{x \rightarrow 0} \frac{\cos 2x \cdot 2}{e^{x^2} + x e^{x^2} \cdot 2x} = \lim_{x \rightarrow 0} \frac{2 \cos 2x}{e^{x^2}(1+2x^2)} = \frac{2}{1} = 2$$

$$r) \lim_{x \rightarrow 0} \frac{x^3}{x - \arctg x} \stackrel{LH}{=} \lim_{x \rightarrow 0} \frac{3x^2}{1 - \frac{1}{1+x^2}} = \lim_{x \rightarrow 0} \frac{3x^2}{\frac{1+x^2-1}{1+x^2}} = \lim_{x \rightarrow 0} \frac{3x^2(1+x^2)}{x^2} = \lim_{x \rightarrow 0} 3 \cdot (1+x^2) = 3$$

(8.1)

$$a) f: y = x^2 - 6x + 1$$

$y' = 2x - 6 = 0 \Rightarrow$ položime rovné 0 a zistíme,
pie ktoré x platí rovnosť

$$2x = 6$$

$$\boxed{x_0 = 3}$$

$y'' = 2 > 0 \Rightarrow$ v $x_0 = 3$ je stacionárny bod

a keďže 2. derivácia je > 0 ,

v bode $\boxed{x_0 = 3}$ má funkcia

lokálne minimum