

Limita funkce

Rozšíření množiny reálných čísel o nevlastní body $+\infty, -\infty$:

$$-\infty \dots \forall x \in \mathbf{R} \text{ platí: } x > -\infty$$

$$+\infty \dots \forall x \in \mathbf{R} \text{ platí: } x < +\infty$$

Operace s nevlastními body:

$$1) +\infty + \infty = +\infty$$

$$3) +\infty \cdot (+\infty) = +\infty$$

$$2) -\infty - \infty = -\infty$$

$$4) -\infty \cdot (-\infty) = +\infty$$

$$5) +\infty \cdot (-\infty) = -\infty$$

$$6) +\infty \pm c = +\infty \quad c \in \mathbf{R}$$

$$7) -\infty \pm c = -\infty \quad c \in \mathbf{R}$$

pro $c > 0$: 8) $c \cdot (+\infty) = +\infty$

pro $c < 0$: 12) $c \cdot (+\infty) = -\infty$

$$9) c \cdot (-\infty) = -\infty$$

$$13) c \cdot (-\infty) = +\infty$$

$$10) \frac{c}{0^-} = -\infty$$

$$14) \frac{c}{0^-} = +\infty$$

$$11) \frac{c}{0^+} = +\infty$$

$$15) \frac{c}{0^+} = -\infty$$

$$16) \frac{c}{\pm \infty} = 0$$

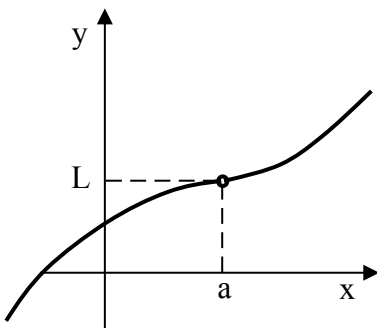
Neurčité výrazy typu: A) $\frac{0}{0}$ nebo $\frac{\infty}{\infty}$ lze řešit užitím L'Hospitalova pravidla

B) $0 \cdot \infty$, $+\infty - \infty$, 0^0 , ... lze převést algebraickými transformacemi na typy $\frac{0}{0}$ nebo $\frac{\infty}{\infty}$.

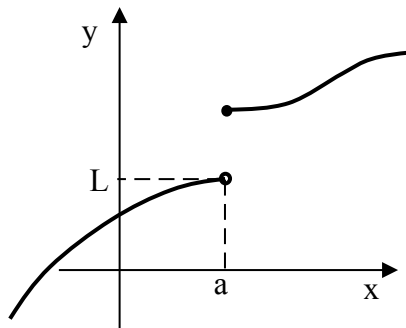
Kompletní přehled limit:

1. Vlastní limita funkce ve vlastním bodě:

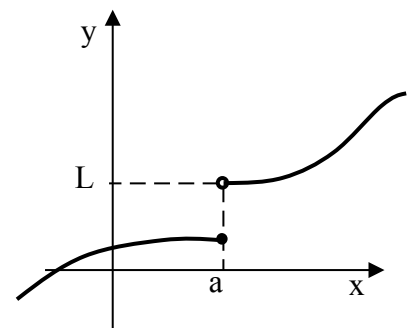
$$1. \lim_{x \rightarrow a} f(x) = L$$



$$2. \lim_{x \rightarrow a^-} f(x) = L$$

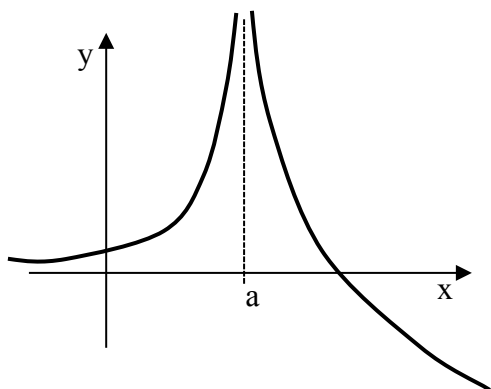


$$3. \lim_{x \rightarrow a^+} f(x) = L$$



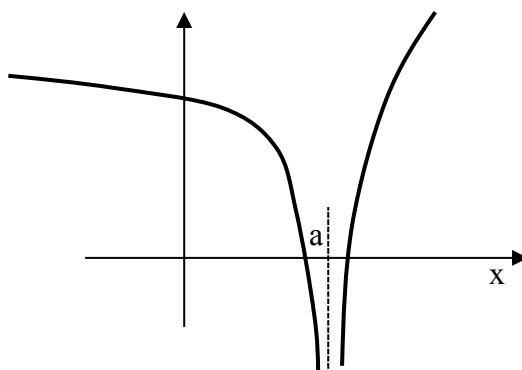
2. Nevlastní limita ve vlastním bodě:

4. $\lim_{x \rightarrow a} f(x) = +\infty$

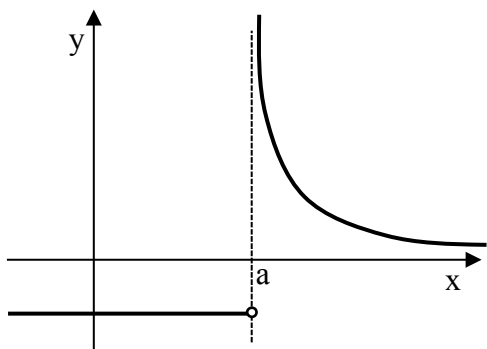


5. $\lim_{x \rightarrow a} f(x) = -\infty$

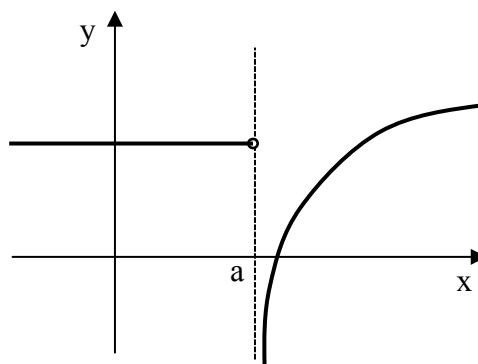
y



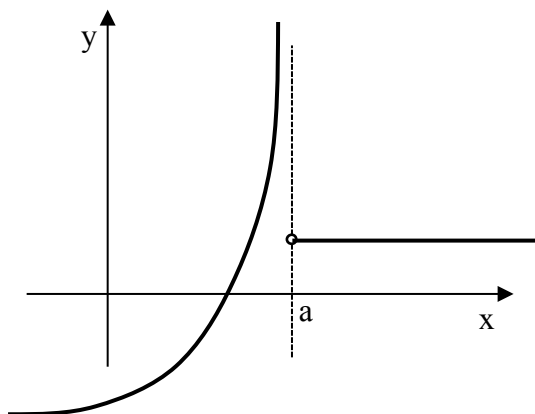
6. $\lim_{x \rightarrow a^+} f(x) = +\infty$



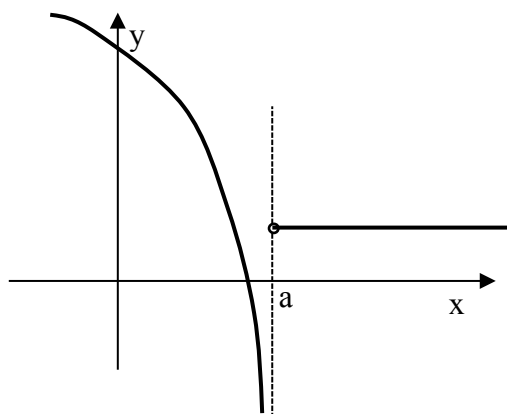
7. $\lim_{x \rightarrow a^+} f(x) = -\infty$



8. $\lim_{x \rightarrow a} f(x) = +\infty$

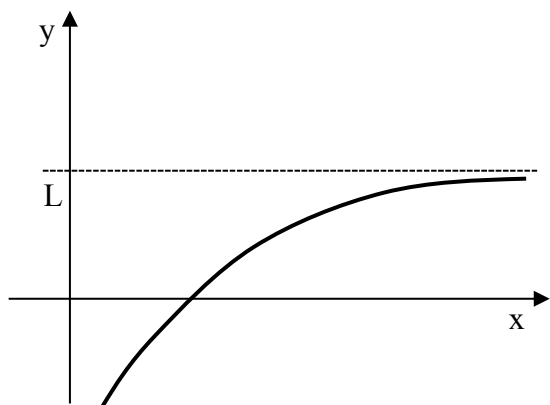


9. $\lim_{x \rightarrow a} f(x) = -\infty$

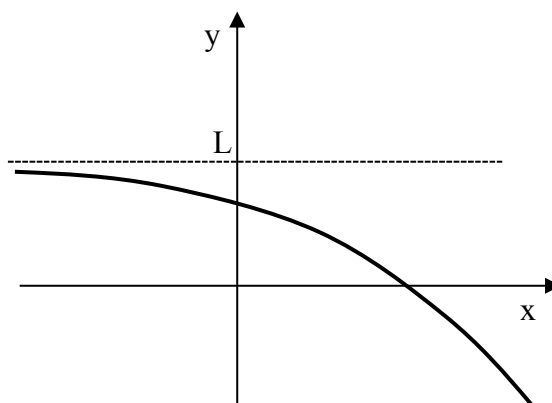


3. Vlastní limita v nevlastním bodě:

10. $\lim_{x \rightarrow +\infty} f(x) = L$

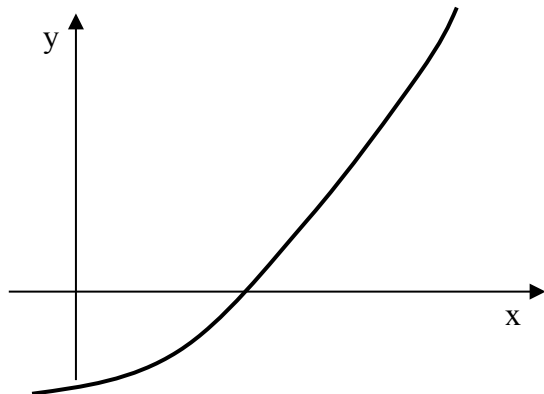


11. $\lim_{x \rightarrow -\infty} f(x) = L$

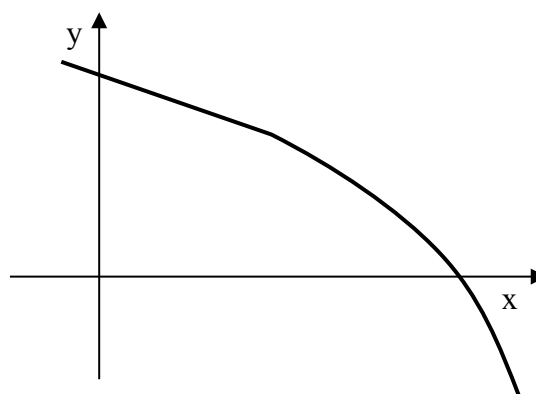


4. Nevlastní limita v nevlastním bodě:

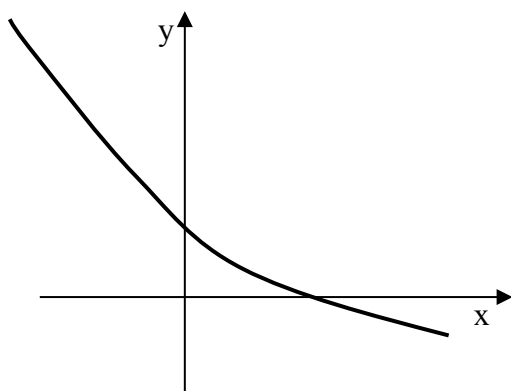
12. $\lim_{x \rightarrow +\infty} f(x) = +\infty$



13. $\lim_{x \rightarrow +\infty} f(x) = -\infty$



14. $\lim_{x \rightarrow -\infty} f(x) = +\infty$



15. $\lim_{x \rightarrow -\infty} f(x) = -\infty$

