

# Limita funkce

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

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

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

Operace s nevlastními body:

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

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

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

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

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

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

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

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

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

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

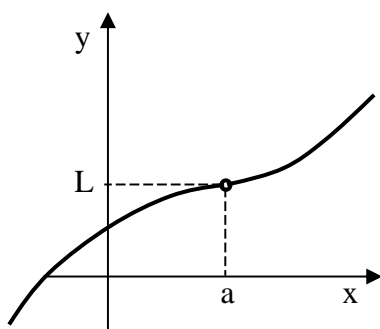
B)  $0 \cdot \infty$ ,  $+\infty - \infty$ ,  $0^0$ , ... lze převést algebraickými transformacemi na typy  $\frac{0}{0}$  nebo  $\frac{\infty}{\infty}$ .

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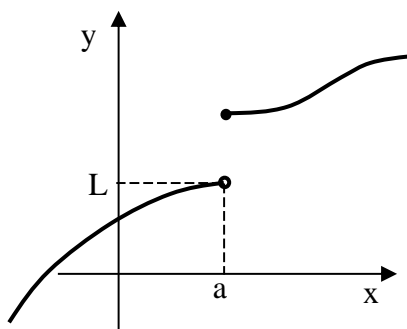
## Kompletní přehled limit:

### 1. Vlastní limita funkce ve vlastním bodě:

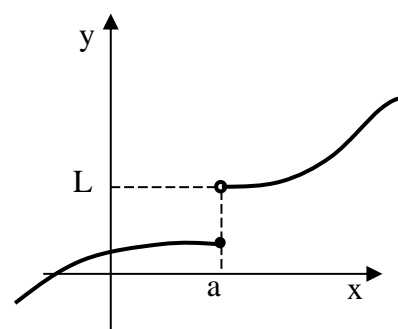
$$1. \lim_{x \rightarrow a} f(x) = L$$



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

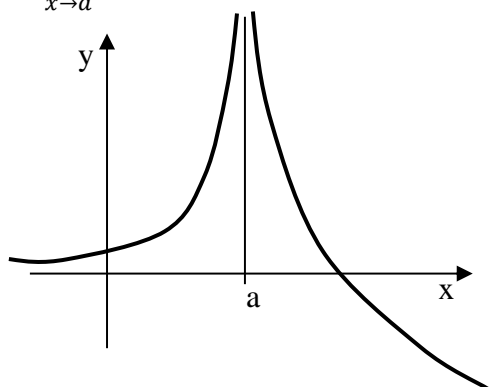


$$3. \lim_{x \rightarrow a^+} f(x) = L$$

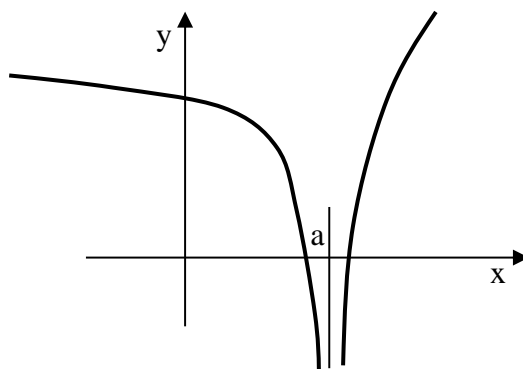


## 2. Nevlastní limita ve vlastním bodě:

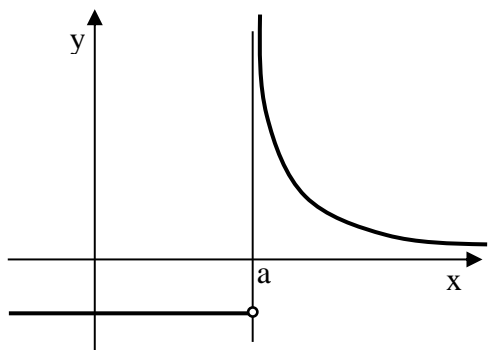
4.  $\lim_{x \rightarrow a} f(x) = +\infty$



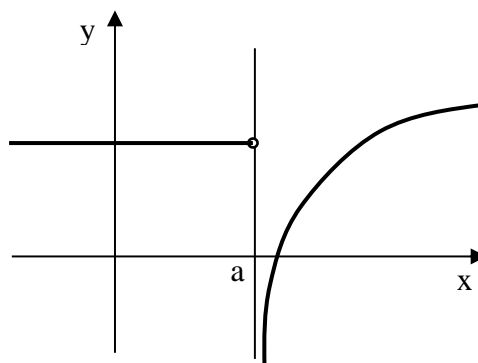
5.  $\lim_{x \rightarrow a} f(x) = -\infty$



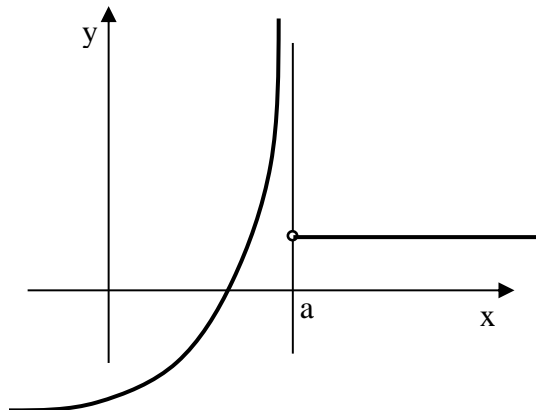
6.  $\lim_{x \rightarrow a^+} f(x) = +\infty$



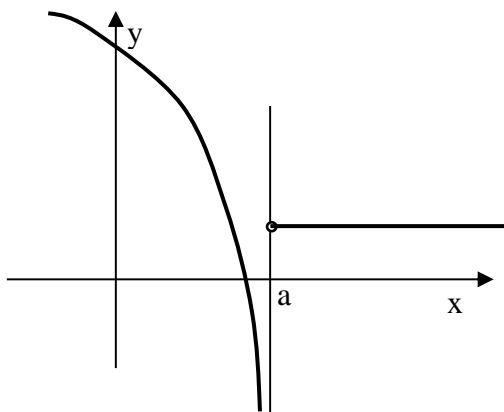
7.  $\lim_{x \rightarrow a^+} f(x) = -\infty$



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

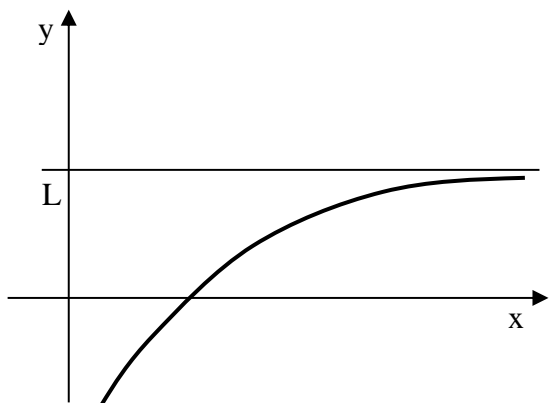


9.  $\lim_{x \rightarrow a^-} f(x) = -\infty$

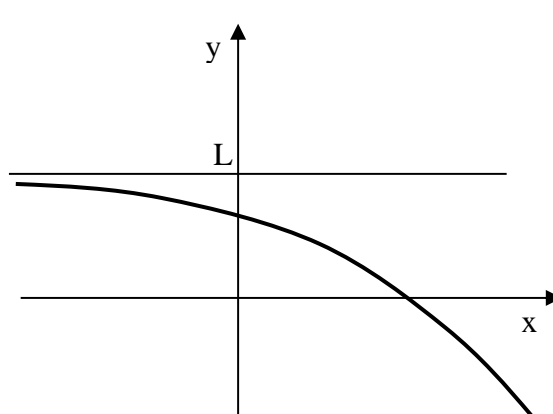


### 3. Vlastní limita v nevlastním bodě:

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

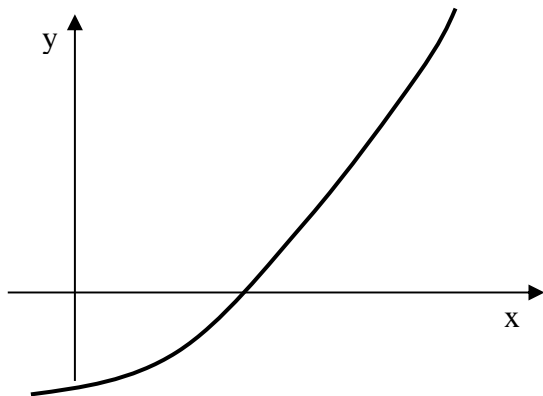


11.  $\lim_{x \rightarrow -\infty} f(x) = L$

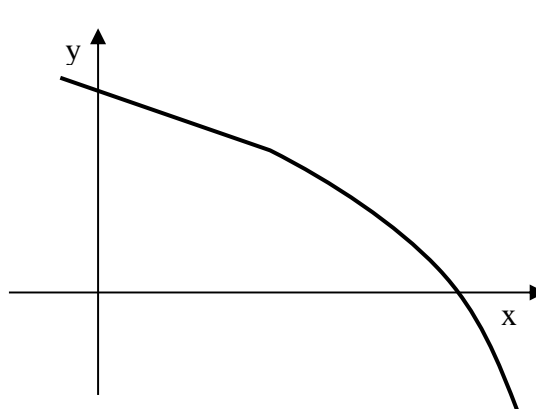


### 4. Nevlastní limita v nevlastním bodě:

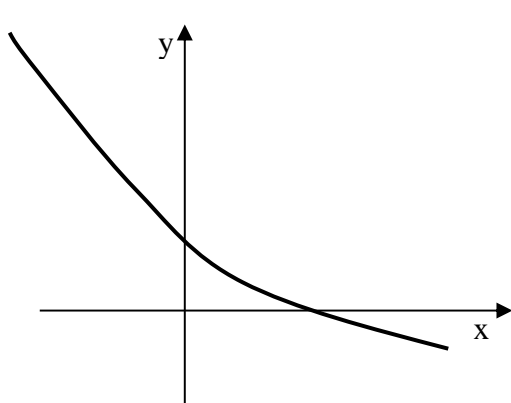
12.  $\lim_{x \rightarrow +\infty} f(x) = +\infty$



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



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



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

