

5. EXPONENCIÁLNÍ FUNKCE

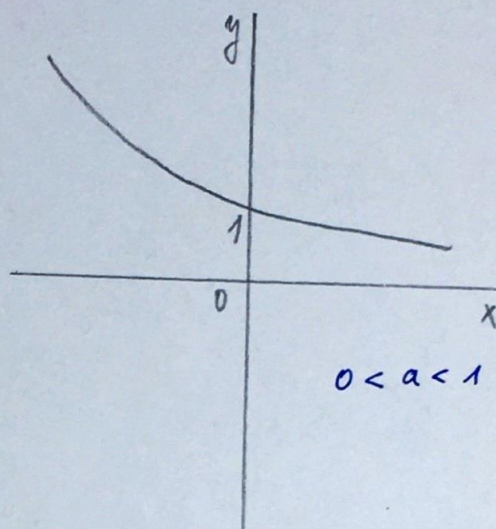
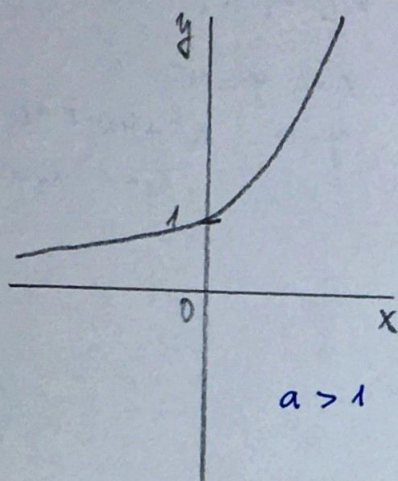
$$f: y = a^x$$

$$a > 0; a \neq 1$$

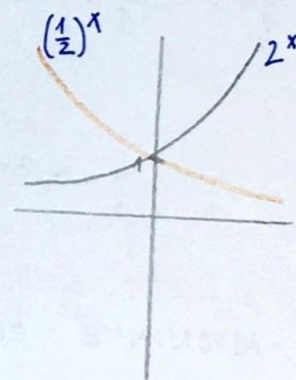
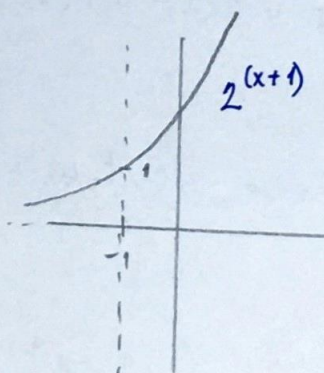
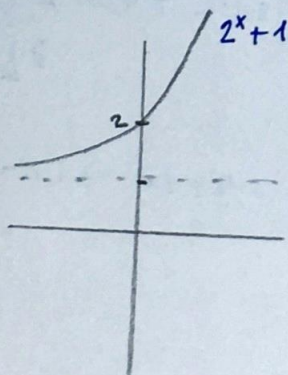
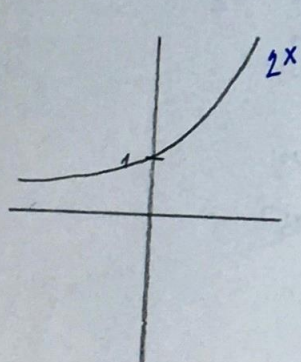
$$D = \mathbb{R}$$

$$H = (0; \infty)$$

grafy:



další grafy:

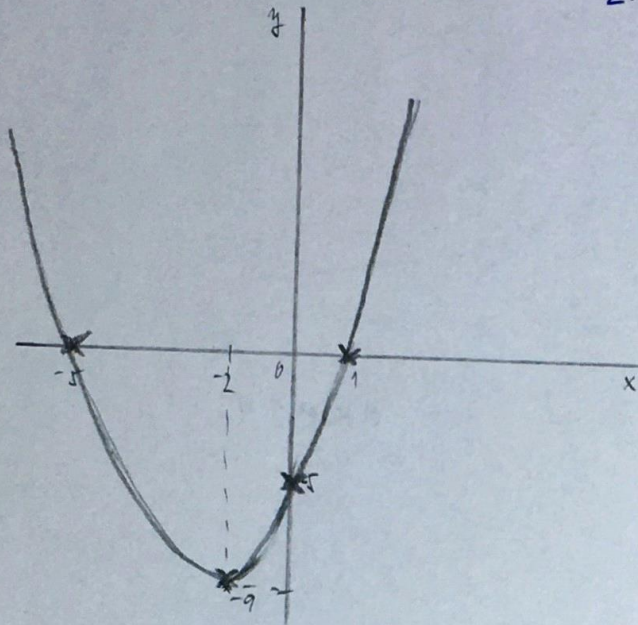


př: $y = x^2 + 4x - 5$

doplníme na čtverec: $y = x^2 + 4x + 4 - 4 - 5 = (x+2)^2 - 9$

$4:2=2$
 $2 \cdot 2 = 4$

V. - $V. - 9$
 $V. [-2; -9]$



P: $x=0 \quad y=-5$
 $y=0 \quad x^2 + 4x - 5 = 0$
 $x_1 = 1 \quad x_2 = -5$

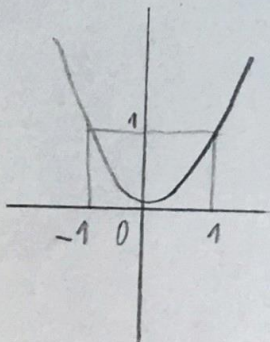
př: $y = 2x^2 - 6x + 5 = 2(x^2 - 3x + (\frac{3}{2})^2) - (\frac{3}{2})^2 \cdot 2 + 5 = 2 \cdot (x - \frac{3}{2})^2 + \frac{1}{2}$
Ayn V $V[\frac{3}{2}; \frac{1}{2}]$

$y = -3x^2 + 12x + 1 = -3(x^2 - 4x + 4) + 12 + 1 = -3(x-2)^2 + 13$
Ayn V $V[2; 13]$

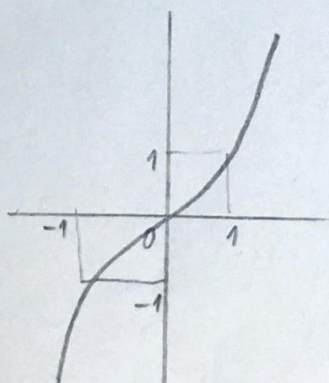
④ MOGNINNE' FUNKCE

$f: y = x^2$

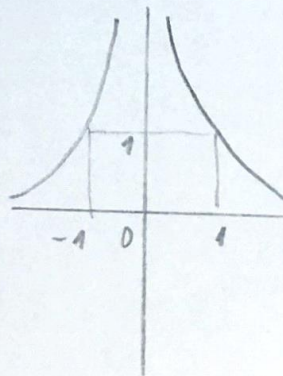
grafy:



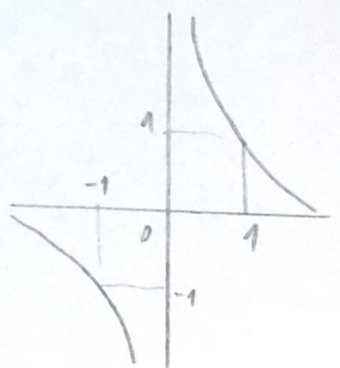
$x \in \mathbb{N}$
side'



$x \in \mathbb{N}$
liche'



$x \in \mathbb{Z}^-$
side'



$x \in \mathbb{Z}^-$
liche'

⑥ LOGARITMICKÁ FUNKCE

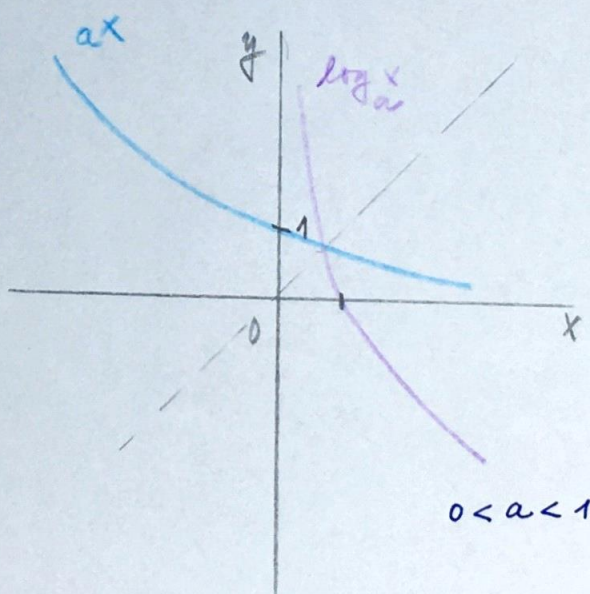
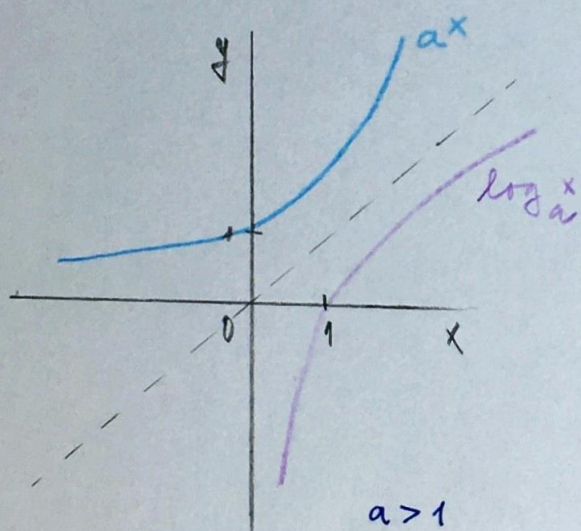
exponenciální funkce: $f: y = a^x \rightarrow$ při zvýšení x
 \rightarrow inverzní funkce
 $=$ funkce logaritmická

$$x = \log_a y$$

přezmenování x a y (aby vypadalo jako „normální“ funkce)

logaritmická funkce: $f: y = \log_a x$

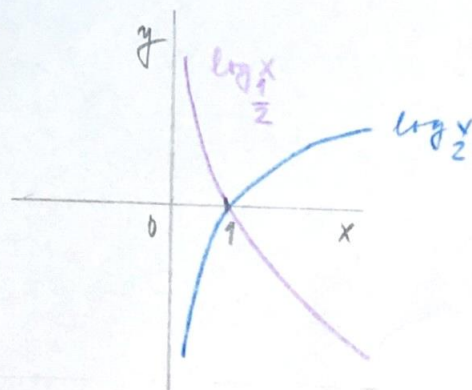
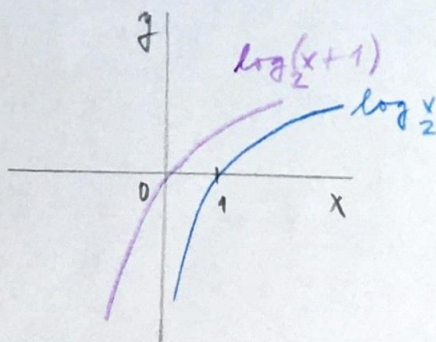
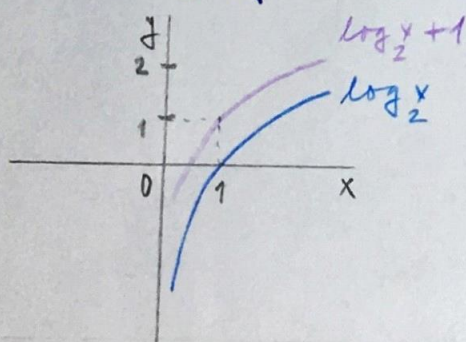
grafy: sestrojíme i grafem exponenciální funkce podle obz 1. a 3. kladného



exponenciální: $D = \mathbb{R}$ $\swarrow \searrow$ $H = (0; \infty)$

logaritmická: $D = (0; \infty)$ $\swarrow \searrow$ $H = \mathbb{R}$

další grafy:



počítání logaritmy:

$$\bullet \quad \log_a x = y \Leftrightarrow a^y = x$$

$\underbrace{\hspace{10em}}_{a^{\log_a x} = x}$

$$\bullet \quad \log_a (x \cdot y) = \log_a x + \log_a y \quad (\text{logaritmus součinu} = \text{součet logaritmu})$$

$$\bullet \quad \log_a \left(\frac{x}{y} \right) = \log_a x - \log_a y$$

$$\bullet \quad \log_a (x^n) = n \cdot \log_a x$$