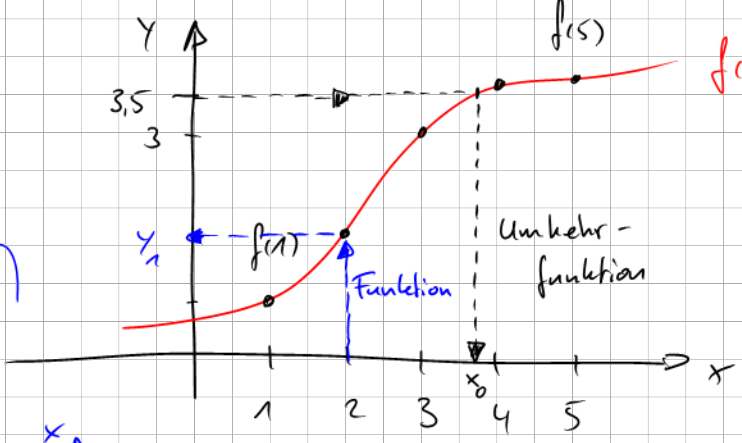
# Umkehrfunktionen



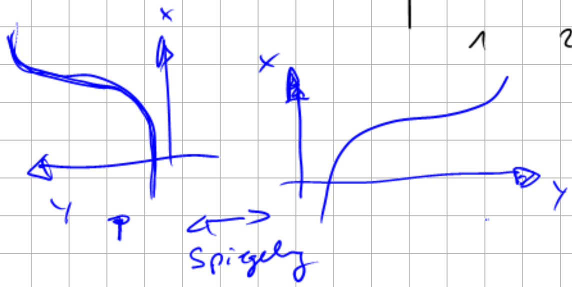

$x \longrightarrow f(x) = y$

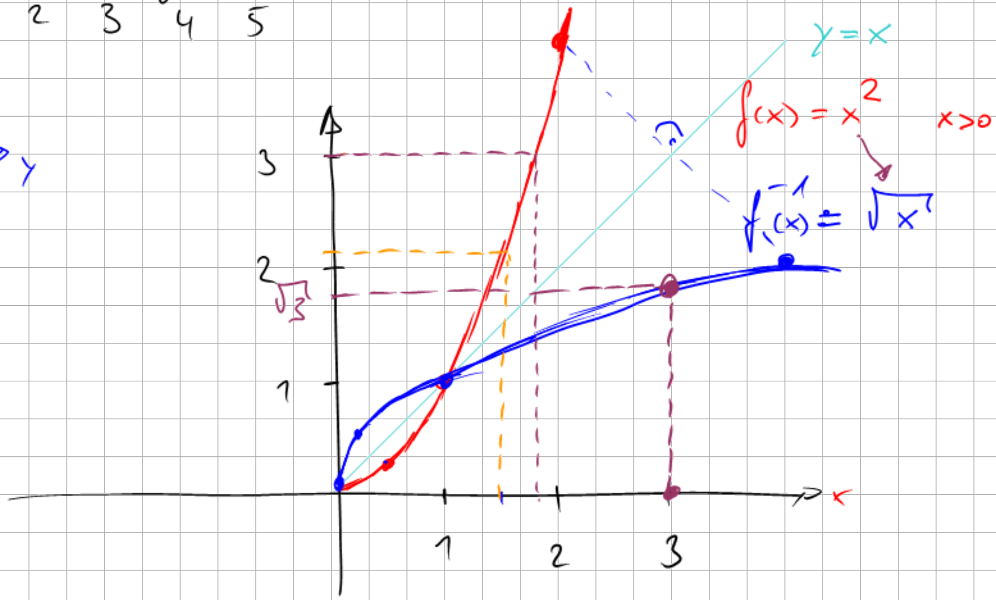
$f(x) = \ldots\ldots$

$3x^2 - 5x - 1 = 0$

auflösen nach

$x = \ldots\ldots$




$f(x): \quad y = 0{,}5 \cdot (x-1)^2$

$f^{-1}(x): \quad x = 0{,}5 \cdot (y-1)^2 \quad | \cdot 2$

formales Tauschen $x \longleftrightarrow y$

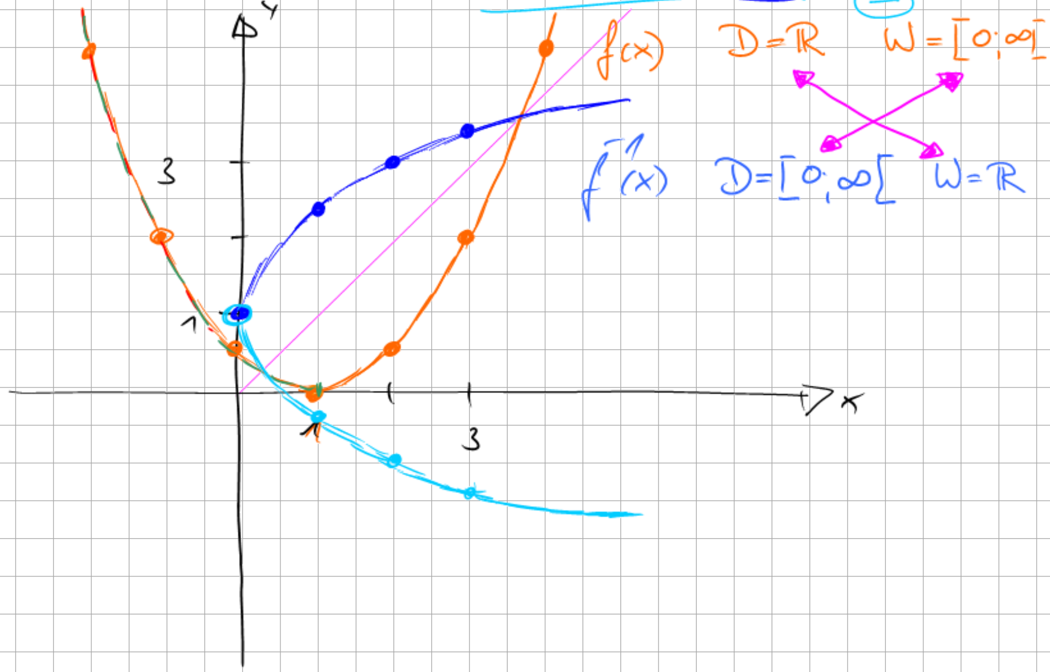
Nach y auflösen:

$f^{-1}(x): \quad 2x = (y-1)^2 \quad | \sqrt{\ }$

$\pm\sqrt{2x} = (y-1) \quad | +1$

$1 \pm \sqrt{2x} = y$

$f(x): \quad y = 0{,}5(x-1)^2 \qquad f^{-1}(x): \quad y = 1 \pm \sqrt{2x}$ (+) (−)




## Die Logrithmus - Funktion

$x^2 \rightsquigarrow x$ auflösen! $\pm\sqrt{x^2} = \pm x$

$5^x = 125 \qquad x = 3, \quad 5^3 = 125$

$5^x = 100$

$x = \log_5 100 \qquad 5^{\log_5 100} = 100 \qquad \boxed{\log_{\square} \square}$ „Ergebnis" Basis

$= 2{,}861 \ldots$

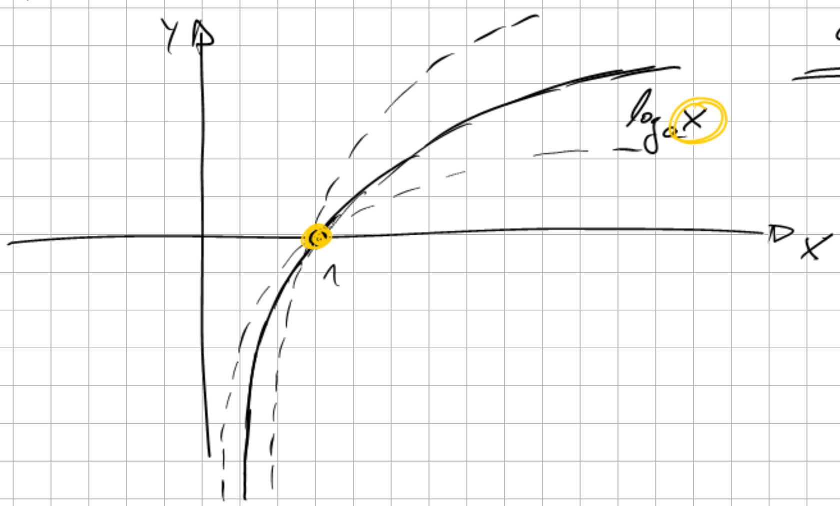
$$\boxed{\text{„Das } \log_b a \text{ ist die Zahl mit der man } b \text{ potenziert, um } a \text{ zu erhalten" } \quad b^{\log_b a} = a}$$

$\log_{10} 100 = 2$

$10^2 = 100$

$(-5)^x$

$a^{\log_a 100} = 100$



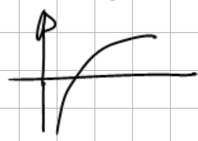

$\log_3(-5)$ ↯

$b^0 = 1$

$0 = \log_b 1$

# Die Exponentialfunktion

$a^x = b \rightsquigarrow x = \log_a b$ $\qquad f(x) = \log_a x$



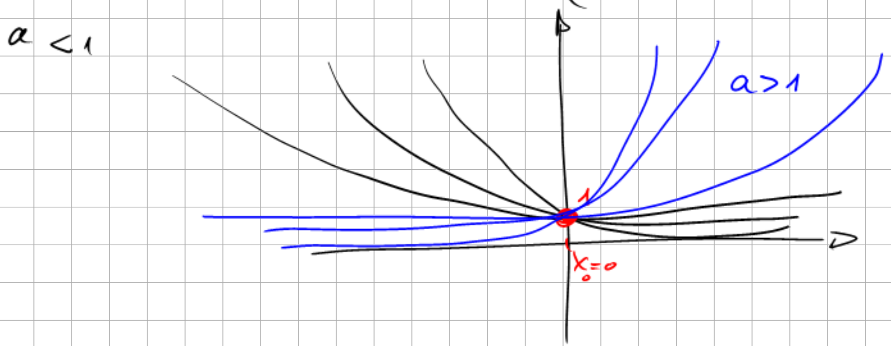
$a^n = x$

$f(x) = a^x$ allg. Exponentialfunktion

$f(x) = e^x$ natürl. e-Funktion

$\underline{\underline{a > 0}}$

$$a^{-x} = \left(\frac{1}{a}\right)^x = \frac{1}{a^x}$$




$a^0 = 1$