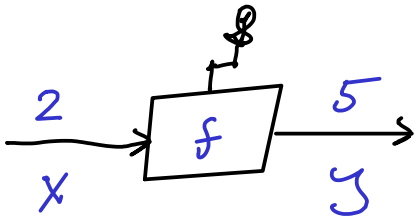
Uppgiftselektion

- Jag väljer uppgift
- Ingen inspelning
- Skrivplattan läggs ut
- Tid: idag 7/9 kl. 14.45–16.15

Funktioner



$f(2) = 5$

$y = f(x)$

$x \in D_f$ $\quad y \in V_f$

↑ växande ↓ avtagande

Ex: $f(x) = \frac{1}{(1-x)^2}$

$f(0) = \frac{1}{(1-0)^2} = 1$

$f(1) = \frac{1}{(1-1)^2} = \frac{1}{0}$ ej. def.

Ej ok att sätta $x = 1$

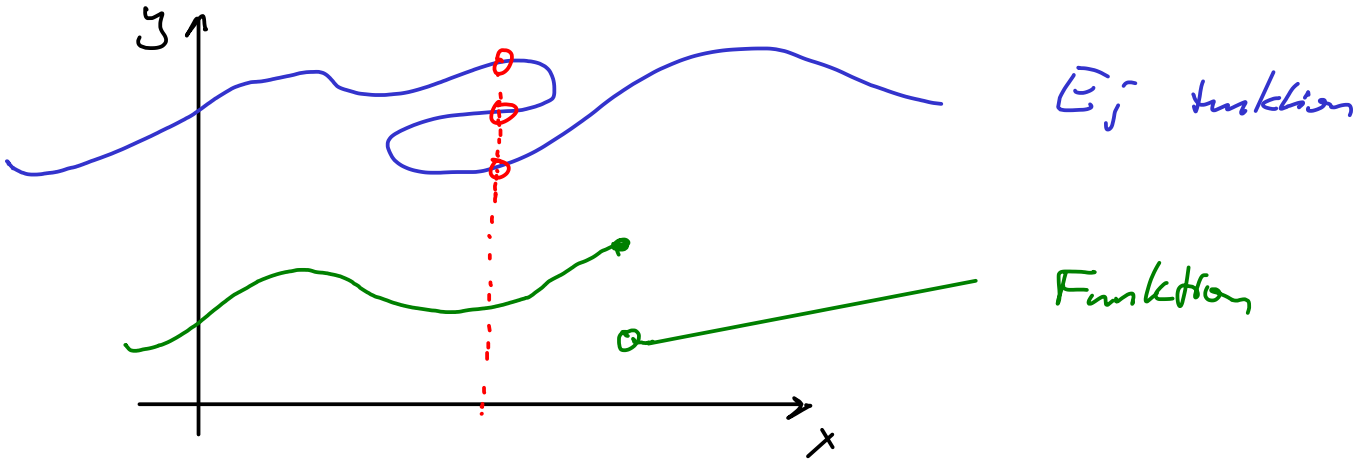
$f(1/x) = \frac{1}{(1-\frac{1}{x})^2} = \frac{1}{(\frac{x-1}{x})^2} = \frac{x^2}{(x-1)^2}$

$f(1-x) = \frac{1}{(1-(1-x))^2} = \frac{1}{(1-1+x)^2} = \frac{1}{x^2}$

$abs(x) = |x|$ $\quad D_{abs} = \mathbb{R}$

$V_{abs} = [0, \infty[$

Graf av funktion



$y^2 = x$ $\quad y = f(x)$

$y = \pm\sqrt{x}$ $\quad$ ej funktion

Ex: Def. mängd Värdemängd

$$f(x) = \frac{1}{\sqrt{x-4}}$$

$\sqrt{\cdot}$ ger $x - 4 \geq 0$

$\frac{1}{\sqrt{\cdot}}$ ger $\sqrt{x-4} \neq 0$

$x - 4 > 0$

$x > 4$

$$D_f =]4, \infty[$$

Värdemängd $V_f =]0, \infty[$

Ex: $(f \circ g)(x) = f(g(x))$

$= (g(x))^2 - 1 = (\sqrt{3-x})^2 - 1 = 3 - x - 1$

$= 2 - x$

$f(x) = x^2 - 1$ $\quad D_f = \mathbb{R}$ $\quad V_f = [-1, \infty[$

$g(x) = \sqrt{3-x}$ $\quad D_g =]-\infty, 3[$ $\quad V_g = [0, \infty[$

$D_{f \circ g} =]-\infty, 3[$ $\quad V_{f \circ g} = [-1, \infty[$

$y = 10^x \iff x = \lg y$

$y = 10^{\lg y}$

$x = \lg 10^x$

$\lg 10000 = \lg 10^4 = 4$

Ex: $\lg x = -2$

$10^{\lg x} = 10^{-2}$

$x = 10^{-2}$

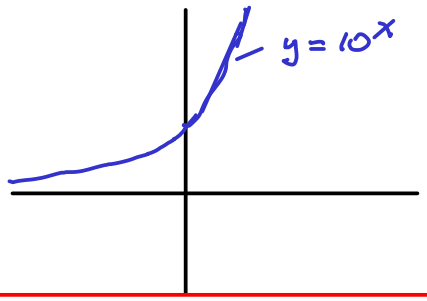
$\lg x = 2{,}74$

$10^{\lg x} = 10^{2{,}74}$

$x = 10^{2{,}74} = 549{,}541\ldots$

$\lg -3{,}47$ går inte

$D_{\lg x} =]0, \infty[$



Logaritmer

$\lg 1 = 0$

$\lg a \cdot b = \lg a + \lg b$

$\lg \frac{a}{b} = \lg a - \lg b$

$\lg a^t = t \lg a$

Ex:

- $\lg 4 + \lg 25 = \lg 4 \cdot 25 = \lg 100 = \lg 10^2 = 2$
- $\lg 20 - \lg 2 = \lg \frac{20}{2} = \lg 10^1 = 1$
- $3 \cdot \lg 3 = \lg 3^3 = \lg 27$
- $\lg (x+1) = 2 \lg x$

$\lg (x+1) = \lg x^2$

$x+1 = x^2$

$x^2 - x - 1 = 0$

$x = \frac{1}{2} \pm \sqrt{\frac{1}{4} + \frac{4}{4}} = \frac{1}{2} \pm \frac{\sqrt{5}}{2}$

$\boxed{x = \frac{1}{2} + \frac{\sqrt{5}}{2}}$ eller ~~$x = \frac{1}{2} - \frac{\sqrt{5}}{2} < 0$~~

så $\ln x$ i ursprungsproblemet kan ej förekomma.
Falsk rot!