Lernpaket Umkehrfkt. II

Ha 1.6.06

$y = f(x) = \sin x$

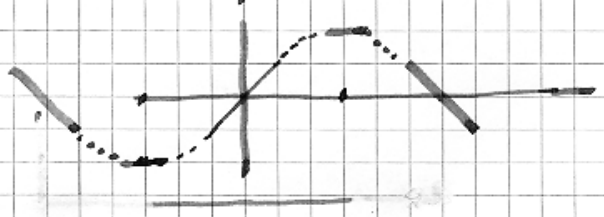
$D_f = \mathbb{R}$

$W_f = [-1, 1]$

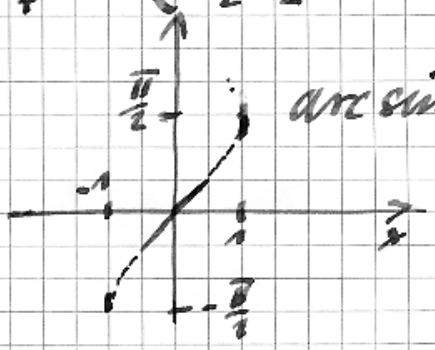
$y = f^{-1}(x) = \arcsin x$

$D_{f^{-1}} = [-1, 1]$

$W_{f^{-1}} = [-\frac{\pi}{2}, \frac{\pi}{2}]$ Hauptwerte

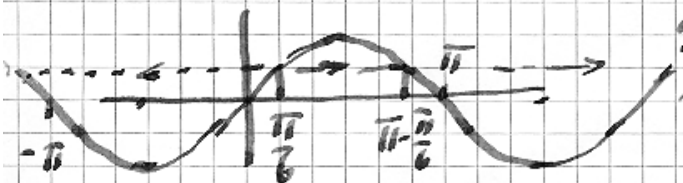


$W_{f^{-1}}$ Hauptwerte



$\sin x = \frac{1}{2}$

$x = \arcsin \frac{1}{2} = \frac{\pi}{6}$ Hauptwert



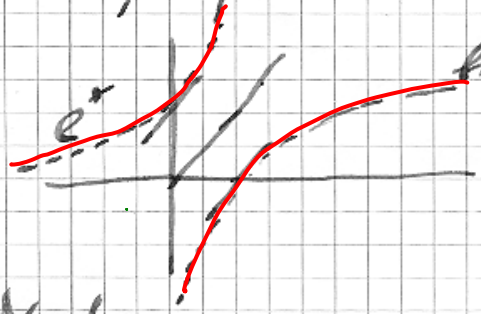
alle Lösungen

$x = \frac{\pi}{6} + 2k\pi \quad \vee \quad x = -\frac{\pi}{6} + (2k+1)\pi$

$k \in \mathbb{Z}$ $k \in \mathbb{Z}$

immer zeichnen ← Keine Formeln lernen !

$y = f(x) = e^x$ $y = f^{-1}(x) =: \ln x$



Definitionsmenge

Merke

$e^{\ln x} = x$

$\ln e^x = x$

Aufgabe:

$y = f(x) = 3e^{7x+5}$

Umkehrfkt.

$\ln y = \ln(3e^{7x+5})$

$\ln y = \ln 3 + \ln e^{7x+5}$

$\ln y = \ln 3 + 7x + 5$ hebt sich auf wegen Umkehrfkt - Log-Fkte

$7x + 5 = \ln y - \ln 3$

$7x = \ln y - \ln 3 - 5$

$x = \frac{1}{7}(\ldots)$

Umkehrfkt

$y = \frac{1}{7}(\ln y - \ln 3 - 5) = f^{-1}(x)$

evt. weiter $y = \frac{1}{7} \ln \frac{y}{3} - \frac{5}{7}$