

Inverse Functions

Inverse Function

Def. if f is a 1-1 function with domain D and range R .
Then the inverse function of f (denoted by f^{-1}) is the function with domain R and range D defined by:

$$f^{-1}(b) = a \text{ if and only if } f(a) = b$$

$$\text{where } a, b \in \mathbb{R}$$

Inverse Functions

Properties of the inverse function by relating it to its original function

Property 1:

$$D_f = R_{f^{-1}} \quad \text{and} \quad R_f = D_{f^{-1}}$$

"The range of the function is the domain of the inverse, and the range of the inverse is the domain of the function."

Property 2: Inverse Composition Rule

$$(f^{-1} \circ f)(x) = f^{-1}(f(x)) = x ; \text{ for every } x \text{ in the domain of } f$$
$$(f \circ f^{-1})(x) = f(f^{-1}(x)) = x ; \text{ for every } x \text{ in the domain of } f^{-1}$$