Chapter 7 :- Transcendental functions

- logarithmic
- exponential
- inverse trigonometric

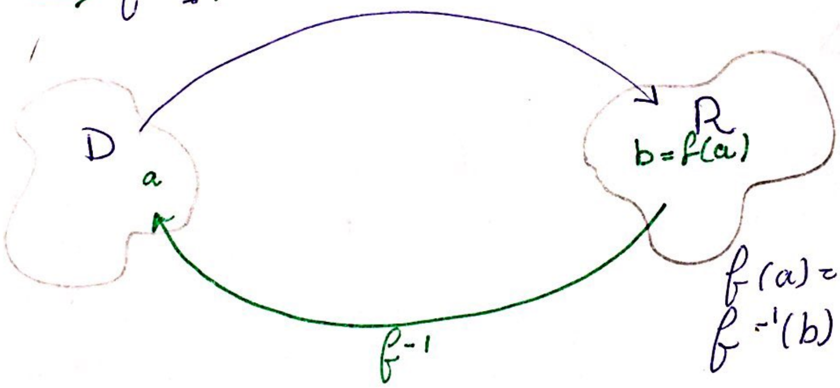
* 7.1 Inverse functions and their derivatives

Def :- a function $f(x)$ is one to one function on the Domain if $f(x_1) \neq f(x_2)$ whenever $x_1 \neq x_2$ where $x_1, x_2 \in D$

- to know if $f(x)$ ~~is~~ is 1-1 function or not we use the horizontal line test
$\Rightarrow$ 1-1 functions intersects 1-1 functions in at most once

Inverse functions

- $D \rightarrow R$ is 1-1 function, The inverse function of f is defined by :-
$\Rightarrow f^{-1} : R \rightarrow D$ s.t $f^{-1}(b) = a$



$f(a) = b$
$f^{-1}(b) = a$

- To check if the inverse function That you found is right :-

$f^{-1}(f(x)) = x \quad \forall \; x \in D(f)$

↳ if it's Not راحت عليك يا كبير

Alaa Etaiwi

- How to find $f^{-1}(x)$?

a- Solve for x : اجعل x موضوع القانون

b- inter change x by y and y by x

c- Replace y by $f^{-1}(x)$

- Theorem :- Given a 1-1 function :

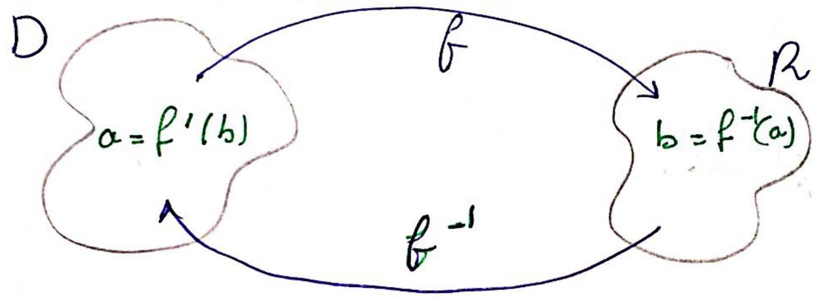
$$f : D \to R$$

with f' exists and never zero on $D(f)$

Then $f^{-1} : R \to D$ is diff s.t on R

where :- $(f^{-1})'(b) = \dfrac{1}{f'(f^{-1}(b))}$

$$\left.\frac{df^{-1}}{dx}\right|_{x=b} = \frac{1}{\left.\frac{df}{dx}\right|_{x=f^{-1}(b)}}$$



$f : D \to R$ $\qquad$ $f^{-1} : R \to D$

$f' : \overline{D} \to \overline{R}$ $\qquad$ $(f^{-1})' = R \to D$

Alaa Etaiwi