연산의 object

ex) + , ×

ex) · $10+3 = 3+10$ [$10-3 \neq 3-10$ / $10\div3 \neq 3\div10$] → Commutative Property 성립 X
· $10\times3 = 3\times10$

ex) $(10+3)+2 = 10+(3+2)$

(X) $(10-3)-2 \neq 10-(3-2)$

ex) $a+e=a$
$e=0$

ex) $a*e=a$
$e=\frac{a}{a}=1$

ex) $a+x=e=0$ ← 덧셈에 대한 항등원 "0"
$a+x=0$
$x=-a$

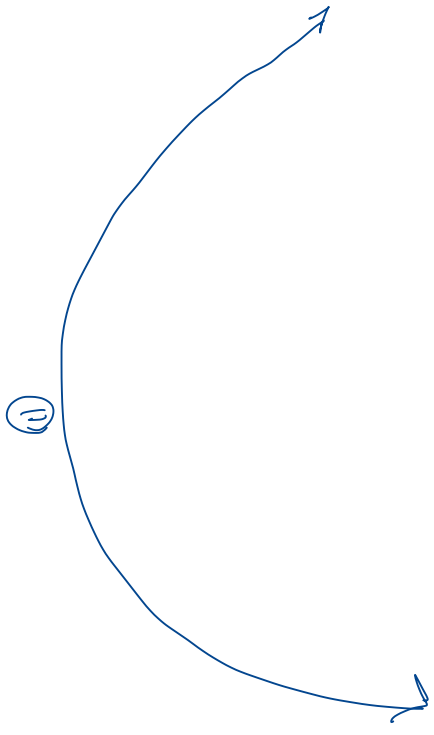
ex) $a*x=e=1$
$a*x=1$
$x=\frac{1}{a}=a^{-1}$

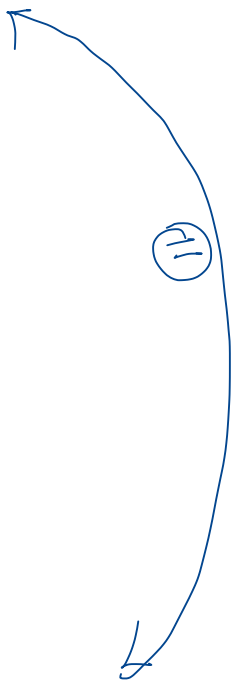
: 집합

↳ 사람이 따라 기준이 달라지지X

↳ ex). 숫자 $\{\frac{1}{3}, 1, 4, 7, 0.5 \cdots\}$
. 특징 txt , image …
. 다양한 dataset이 들어올 수 있음.

: 원소나열법

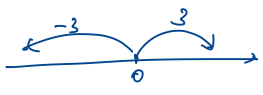




: 원소들의 개수 표현

$|3| = 3$

$|-3| = 3$



ex) $A = \{2, 3^2\} \Rightarrow |A| = 2$

$A = \{1, 2\}$

subset(A) = $\emptyset$, $\{1\}$ $\{2\}$ $\{1,2\}$

$\Rightarrow 4$개

Commutative law 가 성립하지 않는다.

→ |A| = m

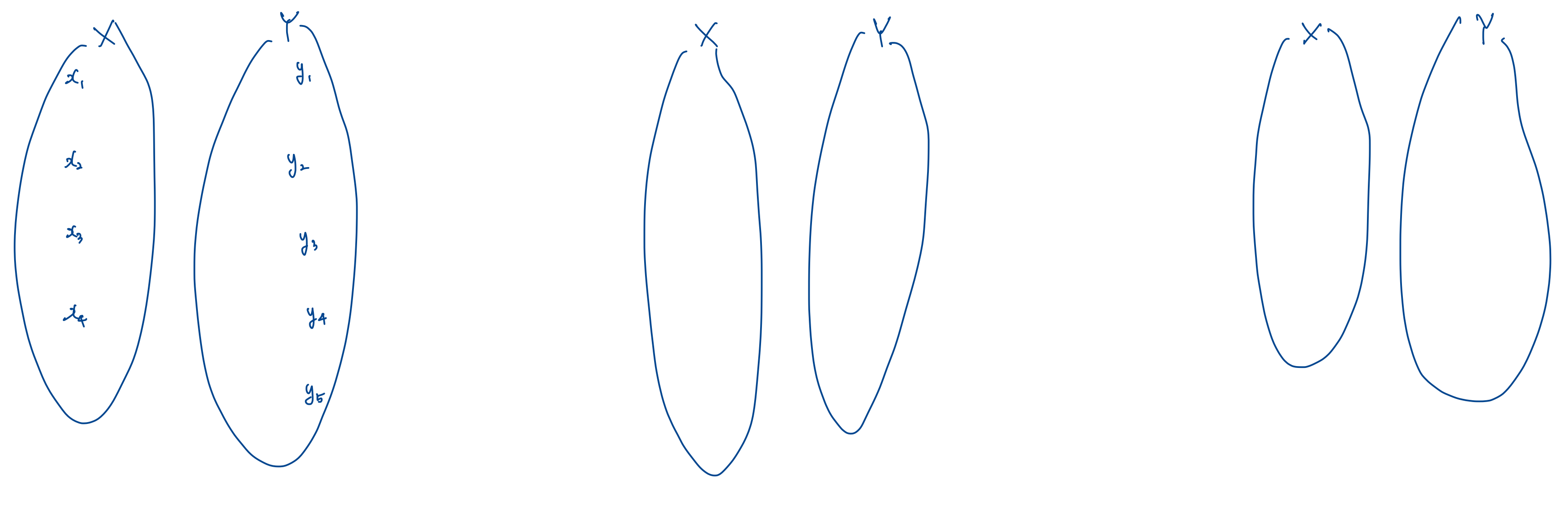
→ |B| = n

Cartesian product 의 결과

★ A . B 가 상호배타적으로
일어나서 ∩이 없음.

$A \cap B = \emptyset$, $A \cup B = U$

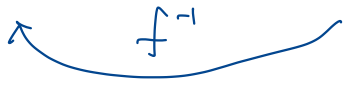
오로지



∴ 합성함수

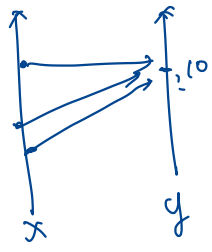
★ Deep learning은 합성함수와 비슷하다.

: 역함수 → Bijective 조건을 만족해야 역함수를 생각할 수 있다.

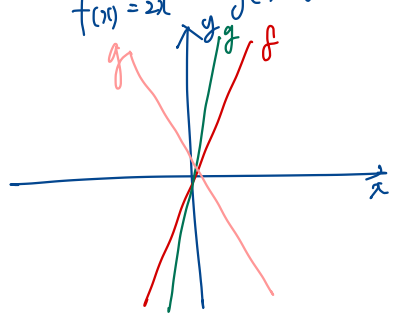


: 대수함수 : 함수끼리 사칙연산을 통해 새로운 함수를 만들 수 있음

$f(x) = 10$

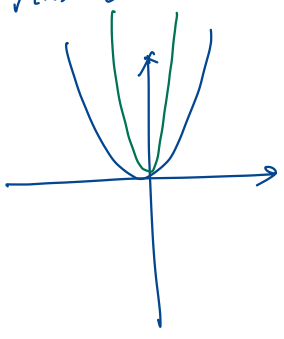


$f(x) = 2x$ $g(x) = 10x$ $h(x) = -2x$ ⇒ $g(x)$랑 $f(x)$가 더 큼 (y축 기준으로)



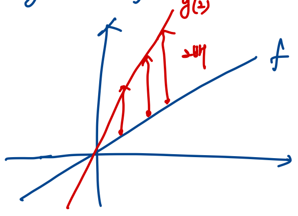
$|a| = 0$ = (x축)
$|a| = \infty$ = (y축)

$f(x) = x^2$ $f(x)' = x'$ 가

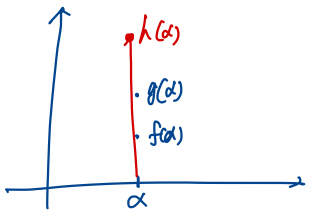


$g(x) = x^3$

$g(x) = \alpha \cdot f(x)$



$h(\alpha) = f(\alpha) + g(\alpha)$

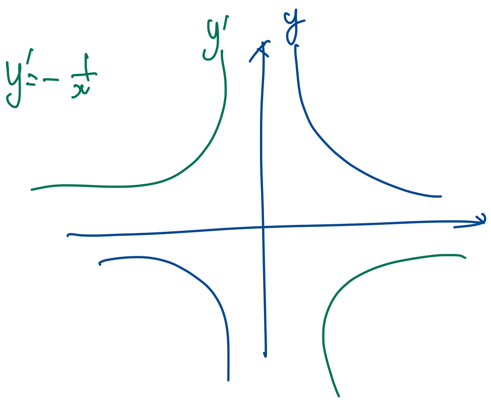


↳ 2차 함수 ↳ 3차함수

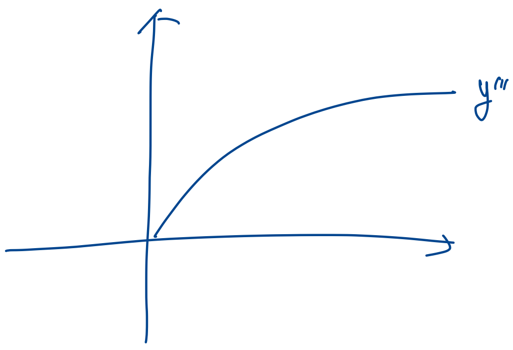
: n차 다항함수

유리함수 무리함수

: x·y축은 점근선을 가진다. '''

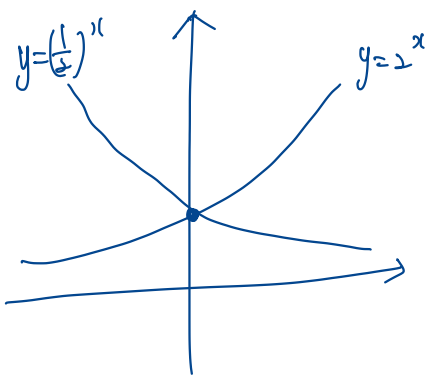


0을 포함한 양수를 가질수 있다.

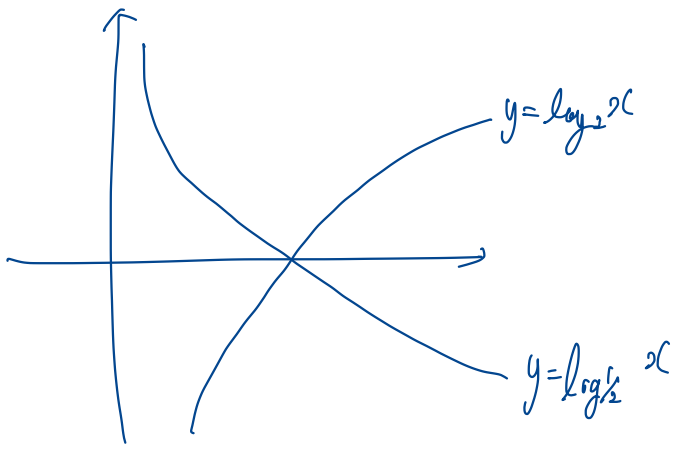


: 지수함수

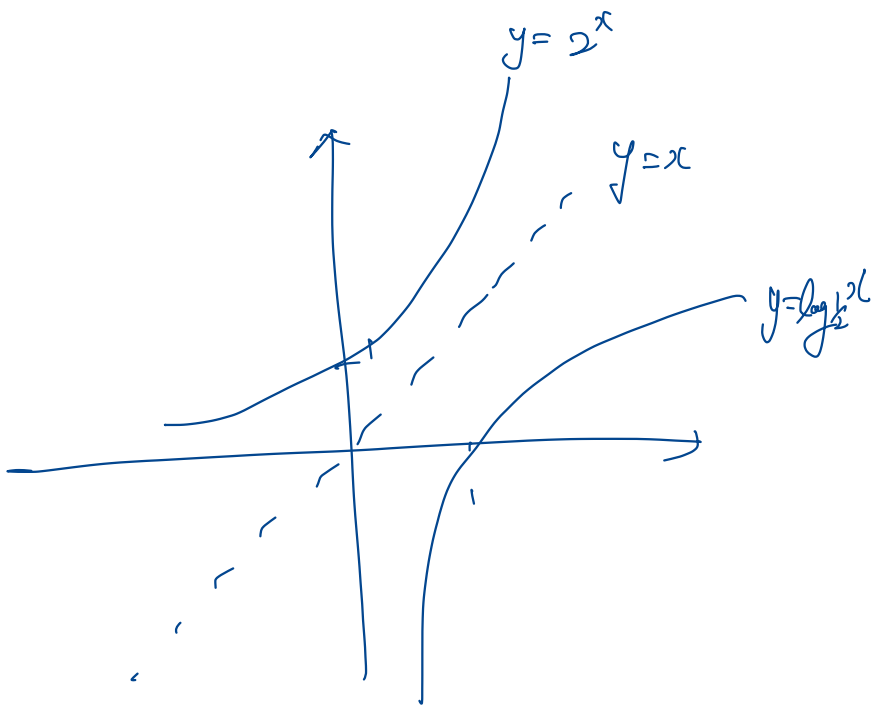
$y=2^x$. 3^x 4^x ....



: 로그함수



: 역함수



$\frac{1}{\sin(x)} = \operatorname{cosec}(x)$

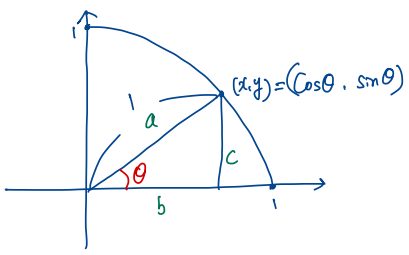
$\frac{1}{\cos(x)} = \sec(x)$

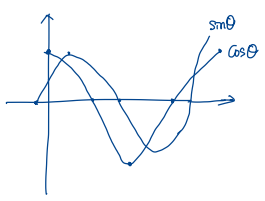
$\frac{1}{\tan(x)} = \cot(x)$

$= \frac{\cos(x)}{\sin(x)}$

$\Rightarrow$ 역수

$\begin{cases} -1 \le \sin(x) \le 1 \\ -1 \le \cos(x) \le 1 \end{cases}$





$\sin\theta = \frac{c}{a}$

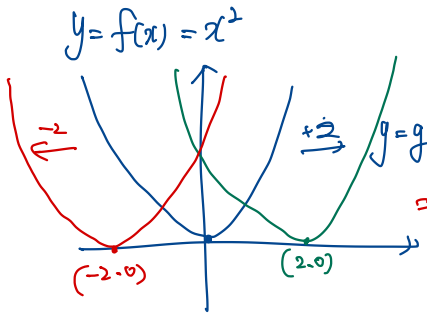
$\cos\theta = \frac{b}{a}$

$\tan\theta = \frac{c}{b} = \frac{\sin\theta}{\cos\theta}$

주기함수

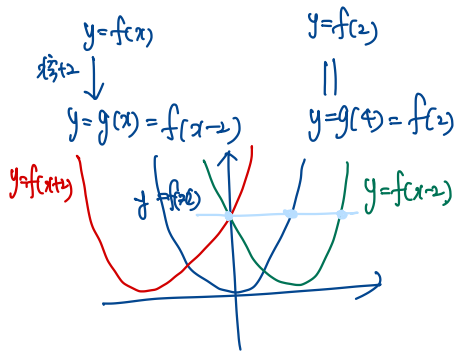
대칭이동 　　 평행이동 : 축으로

: 평행이동



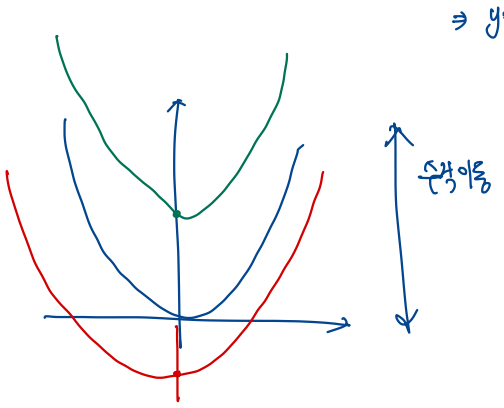
$y=g(x)=f(x-2)=(x-2)^2$

$=h(x)=f(x+2)=(x+2)^2$

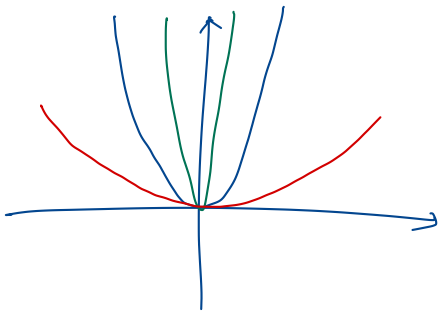


: 수직이동

⇒ $y=f(x)+\beta$

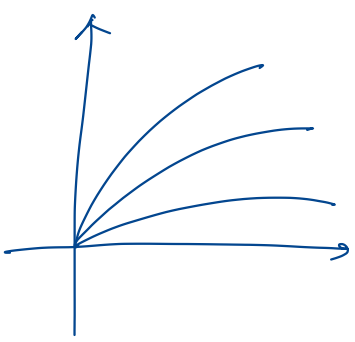


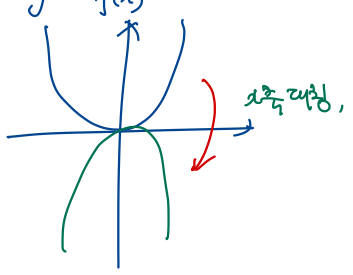
⇒ y축 대칭



(축소)

⇒ x축 대칭 ⇒ $y=-f(x)$





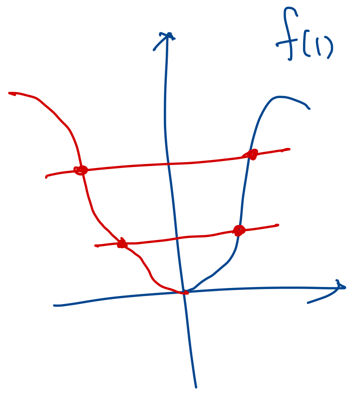
: 원점을 기준으로 대칭

우함수

ex) $\cos(x) = \cos(-x)$

$f(2) = f(-2)$

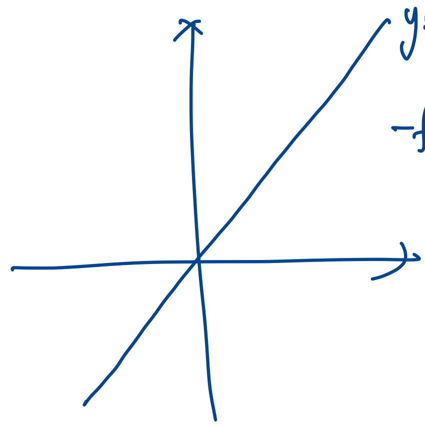
$f(1) = f(-1)$



y축을 기준으로 대칭

기함수

ex) · $\sin(-x) = -\sin(x)$
· $\tan(-x) = -\tan(x)$
: 원점을 기준으로 대칭



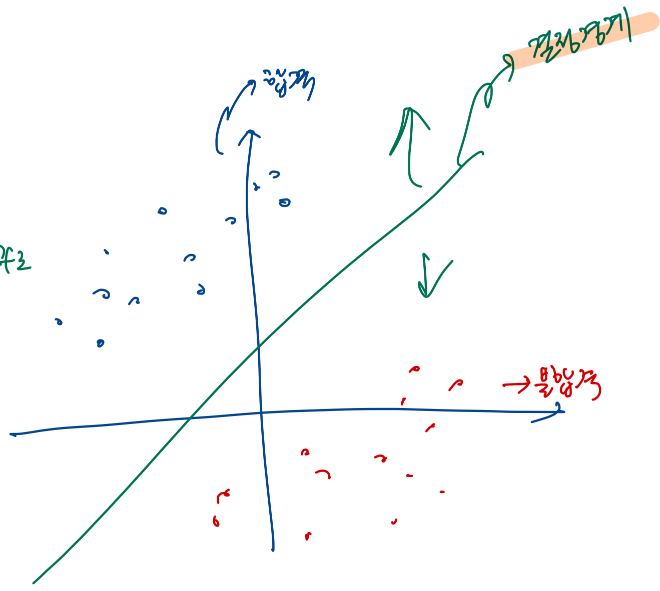
$y = f(x) = 2x$

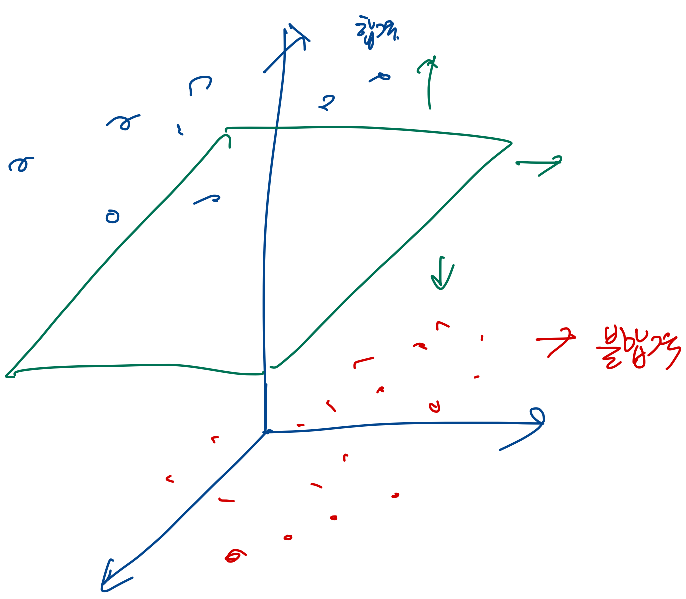
$-f(-x) = 2(-x) \Rightarrow 2x.$

① 다른 의미 { linear (D.B.) ☆ / linearity (선형)

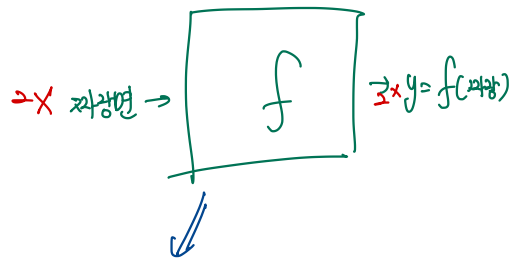
☆② 선형.

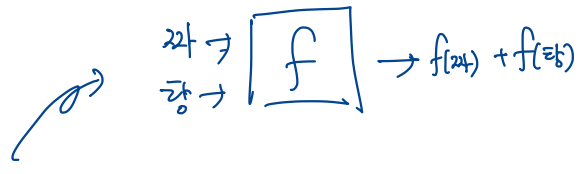
☆ 시그모이드 함수: 연속적인 Data를 on/off로 바꿔 줌





- Linear Functions





⇒ Homogeneity 와 Additivity 를 모두 고려 적용