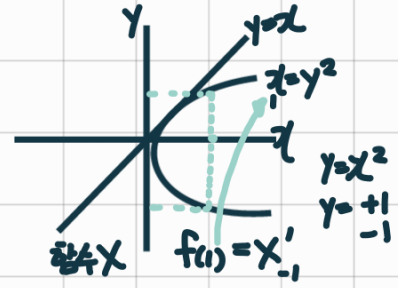
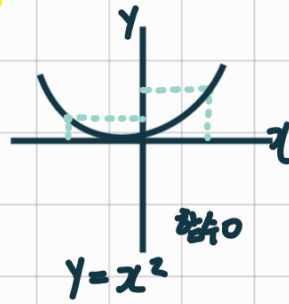
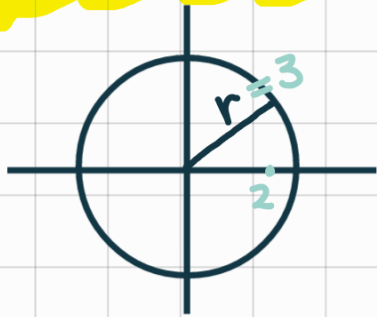


수학: 집합과 함수를 다루는 것



원의 방정식



$$x^2 + y^2 = r^2$$

$$4 + y^2 = 9$$

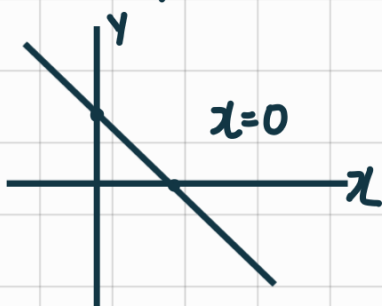
$$y^2 = 5$$

$$y = \sqrt{5}$$

$$-\sqrt{5}$$

직선의 방정식

$$2x + y = 5$$



$$2x + y = 5$$

$$(0, 5)$$

$$2x + 0 = 5$$

$$y = 0 \quad 2x = 5$$

$$x = \frac{5}{2}$$

$$\left(\frac{5}{2}, 0\right)$$

$$y = -2x + 5$$

$$\text{기울기: } -2$$

$$y\text{-절편: } 5$$

$$\begin{aligned}
 (x+1)^2 &= (x+1)(x+1) \\
 &= x^2 + x + x + 1 \\
 &= x^2 + 2x + 1
 \end{aligned}$$

=> 완전제곱식

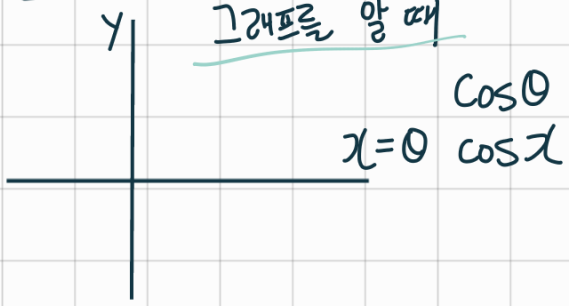
^{풀었으면}
한 번 증명을 했으면

외워야 하는 것이다!

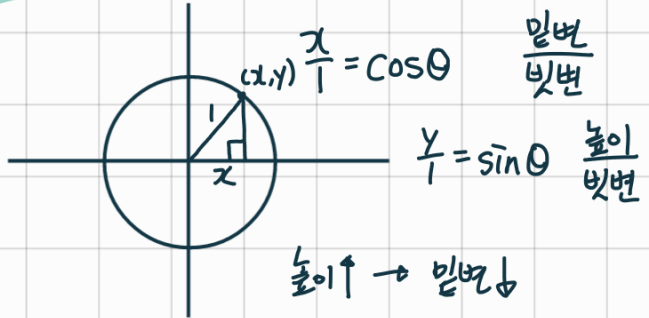
$$\begin{aligned}
 (a+b)^2 &= (a+b)(a+b) \\
 &= a^2 + ab + ba + b^2 \\
 &= a^2 + 2ab + b^2
 \end{aligned}$$

$$\begin{aligned}
 (a-b)^2 &= (a-b)(a-b) \\
 &= a^2 - ab - ab + b^2 \\
 &= a^2 - 2ab + b^2
 \end{aligned}$$

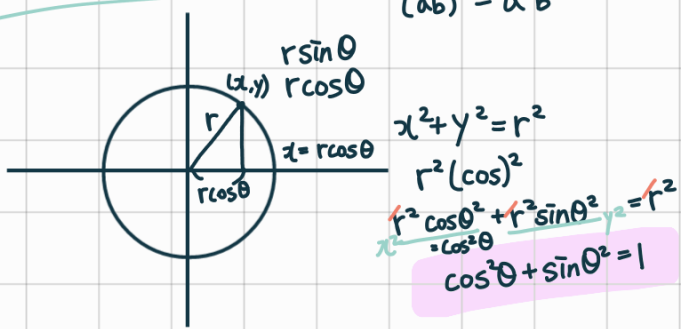
삼각함수



동위원



동위원이 아니면



	$\sin \theta$	$\cos \theta$
0	0	1
30	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$
45	$\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$
90	1	0

$(\frac{1}{2})^2 + 0^2 = 1$
 $\frac{1}{4} + 0^2 = 1$
 $0^2 = 1 - \frac{1}{4}$
 $0^2 = \frac{3}{4}$
 $0 = \sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{2}$

$0^2 + 0^2 = 1$
 $2 \cdot 0^2 = 1$
 $0^2 = \frac{1}{2}$
 $0 = \frac{1}{\sqrt{2}}$

27

$$\log ab = \log a + \log b$$

$$\log a^b = b \log a$$

$$\log 1 = 0$$

$$\log a^a = 1$$

$$\log_a b = x$$

\Leftrightarrow

$$a^x = b$$

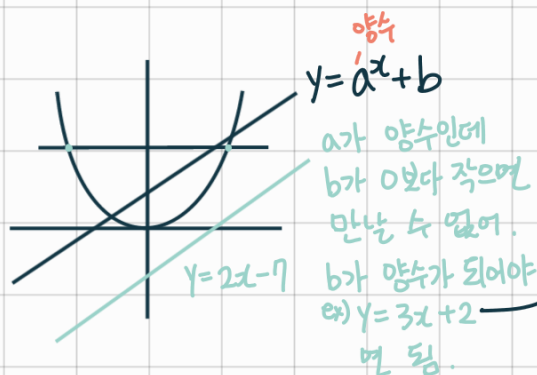
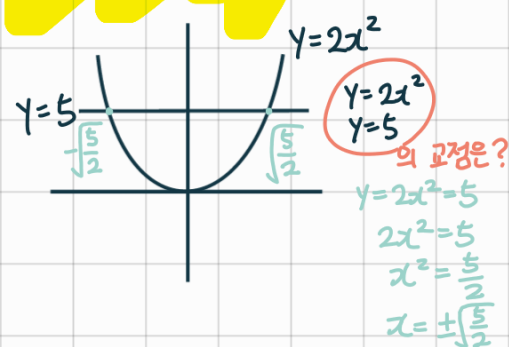
$$\log ab = \log a + \log b$$

$$\log \frac{b}{a} = \log b \times a^{-1} \quad \frac{1}{a} = a^{-1} \quad \frac{1}{2} = 2^{-1}$$

$$= \log b + \log a^{-1}$$

$$= \log b - \log a$$

미분



$$\begin{aligned}
 y &= 2x^2 \\
 y &= 3x + 2 \\
 2x^2 &= 3x + 2 \\
 2x^2 - 3x - 2 &= 0 \\
 \text{해가 실근} &\rightarrow \text{근의 공식 써야} \\
 &\text{할지만 복잡해} \\
 \text{만날 수 없으면 허근.} &\text{되고}
 \end{aligned}$$

$$(x+2)(x-2)$$

$$x^2 + 2x - 2x - 4$$

$$x^2 - 4$$

$$(a+b)(a-b)$$

$$a^2 - b^2$$

$$e^a \cdot e^b = e^{a+b}$$

$$2^3 \cdot 2^5 = 2^8$$

$$2^3 \times 2^{-2} = 2^{3-2} = 2^1$$

$$2^3 \times 2^{-4} = 2^{-1} = 2^{-\frac{1}{2}}$$

$$\log_{10} 9 = \frac{\log_3 9}{\log_3 10}$$

미분

의 정의를 알아야 파이썬으로 코딩을 함.

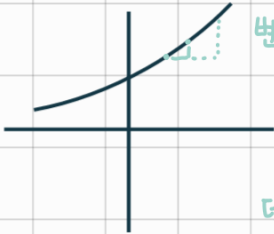
$$\text{미분} = \text{기울기} = \frac{\Delta S}{\Delta t}$$

델타(변화량)

$$S = f(x)$$

종속 변수

독립 변수



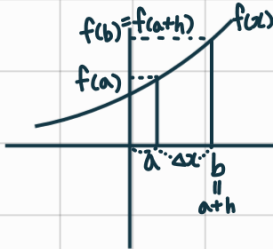
변화량 적어야
근사값 나옴

$$\lim_{\Delta x \rightarrow 0}$$

델타 x를 0으로 보낸다는 것은
→ 이게 0이 아니라는 것임

미분의 정의

$$\lim_{\Delta x \rightarrow 0} \frac{\Delta y}{\Delta x} \rightarrow \lim_{h \rightarrow 0}$$



$$b = a + \Delta x \quad \text{or} \quad h$$

$$= a + h$$

$$\lim_{b \rightarrow a} \frac{f(b) - f(a)}{b - a} = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$$

$$y = f(x)$$

$$(x^n)' = (n \times x^{n-1})$$

$$y' = f'(x)$$

$$3x^7 = 3 \times 7x^6$$

$$f'(a)$$

$$f(x) = 3x^7 \Rightarrow f'(1)$$

$$= 3 \times 7 \times 1^6$$

$$= 21 \quad \text{z=1에서의 기울기}$$

$$y = f(x) \quad \frac{dy}{dx} = \frac{dy}{dx}$$

$$f(x, y) \begin{cases} \frac{\partial f}{\partial x} & \text{z가 변할 때} \\ & \text{y가 어떻게 변하는가} \\ \frac{\partial f}{\partial y} & \text{y가 변할 때} \\ & \text{z가 어떻게 변하는가} \end{cases}$$

$$y = f(x, t, v) \begin{cases} \frac{\partial y}{\partial x} = ? \\ \frac{\partial y}{\partial t} = ? \\ \frac{\partial y}{\partial v} = ? \end{cases}$$

$$\nabla = \begin{pmatrix} \frac{\partial}{\partial x} \\ \frac{\partial}{\partial t} \\ \frac{\partial}{\partial v} \end{pmatrix}$$

$$y = f(x^1, x^2, \dots, x^{100}) \quad \nabla = \begin{pmatrix} \frac{\partial}{\partial x^1} \\ \frac{\partial}{\partial x^2} \\ \frac{\partial}{\partial x^3} \\ \vdots \\ \frac{\partial}{\partial x^{100}} \end{pmatrix}$$