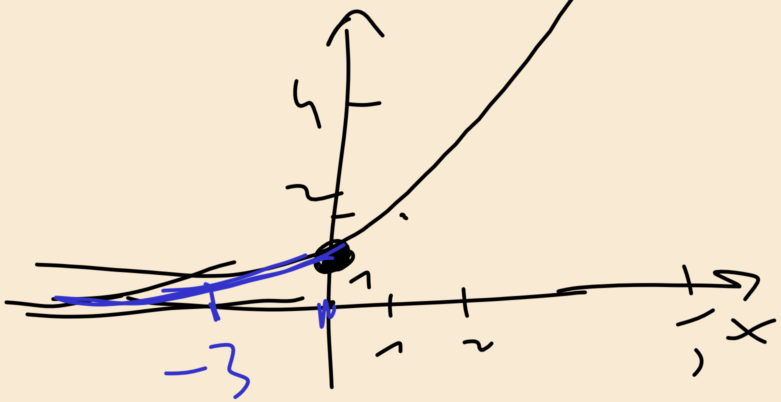
exp:

2^x



$2^0 = 1$

a^x

$a > 0$ $\quad 2^0 = 1$

$x = -3$

$$2^{-x} = \frac{1}{2^x} \qquad \frac{1}{8} \qquad \frac{1}{2^3}$$

$a^x \quad a < 1$

$a = \frac{1}{2}$

$0.5^0 \qquad 0.5^3$

$$\left(\frac{1}{2}\right)^{-50} \qquad \frac{1}{2^{-50}} = 2^{50}$$

$$\left(\frac{1}{2}\right)^3 = \frac{1}{8} = 2^{-3}$$

$e = 2.71 \ldots$

$\pi = 3.14$

$2^x \ldots$

1^x

$1^{\frac{1}{2}}$

$1^3 \quad 2^3 \quad 3 \ldots$

$1+$

$\left(1+\frac{1}{2}\right)^2 = 2.25 \quad \left(1+\frac{1}{3}\right)^3$

$(1+1)^1 = 2$

$(1.33)^3$

$2 \ldots$

3^x

$\left(1+\frac{1}{1000000\ldots}\right)^{1000000}$

$\left(1+\frac{1}{n}\right)^n \xrightarrow[n\to\infty]{} \boxed{e} \quad 2.71\ldots$

$\boxed{e^x}$

$(2.5)^x$

$1000000 \ldots$

$\frac{100}{e}$

$\left(a^x\right)^y = a^{xy}$

$\log_e n \quad \log_e e = 1$

$2^2 \cdot 2^1 = 8 = 2^3$

$a, b > 0 \quad m, n \in \mathbb{R}$

$a^m \cdot a^n = a^{m+n}$

$\frac{a^m}{a^n} = a^m \cdot a^{-n} = \quad a^{-4} = \frac{1}{a^4}$

$= a^{m-n}$

$(a^m)^n = a^{m \cdot n}$

$(2^2)^3 = 2^2 \cdot 2^2 \cdot 2^2 = 2^{2 \cdot 3}$

$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n} \quad a^{\frac{1}{2}} = \sqrt{a}$

$a^{1/n} = \sqrt[n]{a}$

$27^{\frac{1}{3}} = \sqrt[3]{27} = 3$

$\underline{\underline{a}}^x \quad x$

$\log_2 8 = \quad \uparrow \quad f(y(x)) = x$

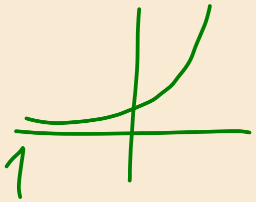
$y(x) = a^x$

$\log_2 8 = 3$ $\boxed{8}$

$8 = 2^3$

$$\boxed{\log_a b = c \Rightarrow b = a^c}$$

$\log_4 1 = 0$ $\quad 1 = 4^c \quad a^0 = 1$



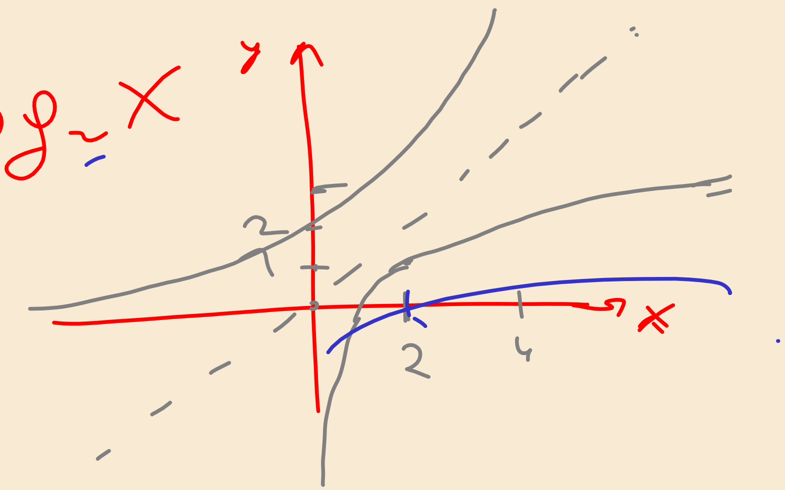
$\log_4 0.25 = -1$ $\quad 4^c = 1 \quad 4^c = \frac{1}{4}$

a^x

$a^n \cdot a^n = a^{n+n}$

$\log_a a^x$

$\log_2 x$



$a^{\log_a x} = \boxed{x}$

e $\quad \ln x = \log_e$

log $\quad \log_{10} \quad 2$

$x, y > 0 \qquad a > 0$

$$\log_a xy = \log_a x + \log_a y$$

$$\log_2 4 \cdot 8 = \log_2 2^2 \cdot 2^3 =$$

$$= \log_2 2^{2+3} = 5 =$$

$$= \log_2 2^2 + \log_2 2^3 =$$

$$= 2 + 3$$

x_1 $\quad P(x_1)$

x_2

$\frac{1}{2} \cdot \frac{1}{2}$ $\quad$ 2 2

0.25

$P(x_1)\,P(x_2)\,P(x_3)$

$P(x_1) + P(x_2) + \cancel{P(x_3)}$

$\log P(x_1)\,P(x_1)\,P(x_2) =$

$= \log P(x_1) + \log P f \quad g + fg$

$\sum \quad \prod$

$1+2+3 \dots + n \qquad \sum_{i=1}^{n} i$

$n! = 1 \cdot 2 \cdot 1 \qquad \prod_{i=1}^{n} i$

$\log_a \frac{x}{y} = \log_a x - \log_a y$

$\log_a x \cdot \frac{1}{y} = \log_a y$

$= \log_a x - 1 \log_a y$

$\log_a y^{-1} = -1 \log_a y$

$\boxed{\log_a x^n} = n \cdot \log_a x$

$2c$

$\log_2 8 = 3$

$\log_2 8^2 =$

$= \underline{\log_2 8} + \log_2 8$

$$\log_a X = \frac{\ln x}{\ln a}$$

$$\log_e X = \frac{\ln x}{\cancel{\ln e}}$$

$\log_a 1 = 0$ $e^1 = e$

$\log_a a = 1 \rightarrow a^1 = a$

$a = e$

$\log_e 2$ $\ln x$ e^x

$a = 2.7 \ldots$ e 1, 2, 2.77... e

$$\ln \frac{x^2\sqrt{y}}{z^3} = \ln x^2\sqrt{y} - \ln z^3 =$$

$$\sqrt{y} = y^{\frac{1}{2}} \quad \ln x^2 + \ln\sqrt{y} - \ln z^3 =$$

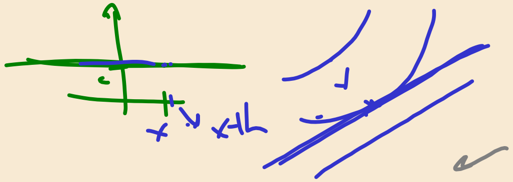
$$= 2\ln x + \frac{1}{2}\ln y - 3\ln z$$

$$\log_a x \cdot y = \quad \frac{1}{y}$$

$$= \log_a x + \log_a y =$$

$$= \log_a x + 2\ln$$

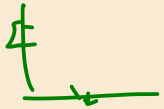
$(c)' =$



$f(x) = c$

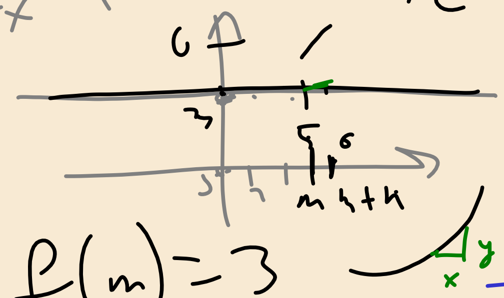
$f(x) = 3$

$\forall x \quad f(x) = 3$



$$\lim_{h \to 0} \frac{f(x+h) - f(x)}{h} = \frac{3-3}{h} = \frac{0}{h} = 0$$

os/e



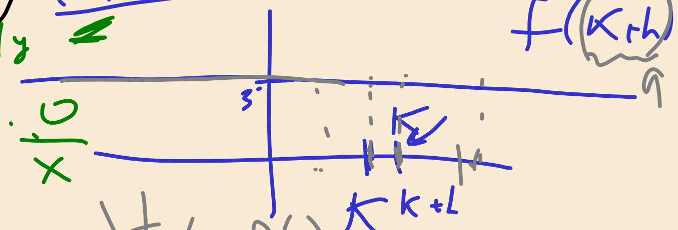
$\boxed{f(x) = 3}$

$f(k) = 3$

$f(k+h) = 3$

$f(n) = 3$

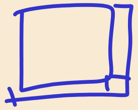
$f(n+h) = 3$

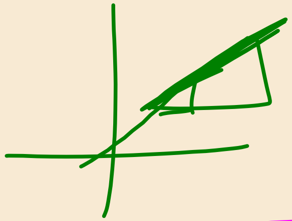


$\forall x \quad f(x) = 3$

$(c)'=0$

$f(x)'=x'=1$





$(x^2)'=2x$

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

$(\sqrt{x})'=(x^{\frac{1}{2}})'=\frac{1}{2}x^{\frac{1}{2}-1}=\frac{1}{2}x^{-\frac{1}{2}}=\frac{1}{2}\frac{1}{x^{\frac{1}{2}}}=\frac{1}{2\sqrt{x}}$

$\boxed{x^{-a}=\frac{1}{x^a}} \leftrightarrow x^{-a}\cdot x^m=1$

$x^{-a+m}=1=x^0$

$-a+m=0$

$m=a$

$x^{-\frac{1}{2}}$

$\frac{1}{x^{\frac{1}{2}}}$

$\left(\frac{1}{x}\right)'=x^{-1}=-1x^{-1-1}=-1x^{-2}=-\frac{1}{x^2}$

$\frac{1}{x}$ x^{-1} $\frac{1}{x^a}$ x^{-a}

$\frac{x}{2}$

$(e^x)' = e^x$

$a^x = a^x \cdot \ln a$ $\quad \ln e = 1$

$\boxed{(\ln x)' = \frac{1}{x}}$ $\quad \left(\frac{1}{x}\right)^{-1} = -\frac{1}{x^2}$

$\log_a x = \frac{1}{x \cdot \ln a}$

$$\boxed{\begin{aligned}(\sin x)' &= \cos x\\ (\cos x)' &= -\sin x\end{aligned}}$$

$\tan$ $\quad \frac{\sin x}{\cos x}$

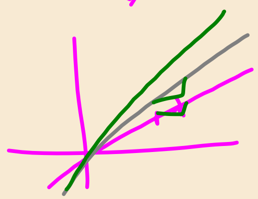
$(\arcsin x)' = \frac{1}{\sqrt{1-x^2}}$

$\arccos x = -\frac{1}{\sqrt{1-x^2}}$

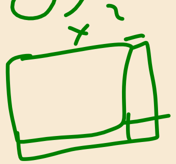
$\arctan x = \frac{1}{1+x^2}$

$(f+g)' = f' + g'$

$(x^2 + x^3)' = 2x + 3x^2$



$$(f\cdot g)' = f'g + fg'$$



$$(x^2 \sin x)' =$$

$$= 2x \sin x + x^2 \cdot \cos x$$

$$\frac{f}{g} \cdot fg^{-1}$$

$$\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$$

$$\left(f \cdot \frac{1}{g}\right)' =$$

$$\left(\frac{1}{x}\right) \quad g(x)$$

$$= f'\frac{1}{g} + f\left(\frac{1}{g}\right)'$$

$$g(x) = x^2$$

$$f(x) = e^x$$

$$f(g(x)) = f(x^2) = e^{x^2}$$

$$f'(g(x))\, g'(x)$$

$$e^{\boxed{x^2}} = e^{x^2}(x^2)'$$

$$e^u = e^u$$

$$\left((3x+5)^2\right)' =$$

$$(3x+5)' = 3$$

$$= \boxed{2(3x+5)} \cdot 3$$

$$y^2 = 2y \cdot y'$$

$$\frac{1}{x^2}$$

$$\frac{f'g \pm fg'}{g^2}$$

$$f$$

$$(x)' = 1$$

$$\frac{x + x\,2x}{x^2} = \frac{x^2}{x} = x$$

$$\frac{f}{g} = f \cdot \frac{1}{g} =$$

$$= f' \frac{1g}{g^2} - f \frac{1}{g^2} \cdot g' =$$

$$= \boxed{\frac{f'g - fg'}{g^2}}$$