Derivatives

f	f'
const	0
x	1
x^n $\quad n \in \mathbb{N}$	nx^{n-1}
x^r $\quad r \in \mathbb{R}$	rx^{r-1}
e^x	e^x
$\ln x$	$1/x$
$\sin x$	$\cos x$
$\cos x$	$-\sin x$
$\tan x$	$\sec^2 x$
$\operatorname{ctn} x = \cot x$	$-\csc^2 x$
$\sec x$	$\sec x \tan x$
$\csc x$	$-\csc x \cot x$
$\sinh x$	$\cosh x$
$\cosh x$	$\sinh x$

f, g, h

$f \pm g$	$f' \pm g'$
fg	$f'g + fg'$
fgh	$f'gh + fg'h + fgh'$

$$f/g \qquad\qquad \frac{gf' - g'f}{g^2}$$

$$\begin{matrix} f \\ | \\ g \\ | \\ x \end{matrix} \qquad f(g(x)) \leftarrow \qquad\qquad f'(g(x)) \cdot g'(x)$$

$$\frac{d}{dx} \underbrace{\int_c^x f(t)\,dt}_{F(x)} \qquad\qquad f(x)$$

$$\frac{d}{dx}\left(x^x\right) \stackrel{?}{=} \qquad x = e^{\ln x}$$

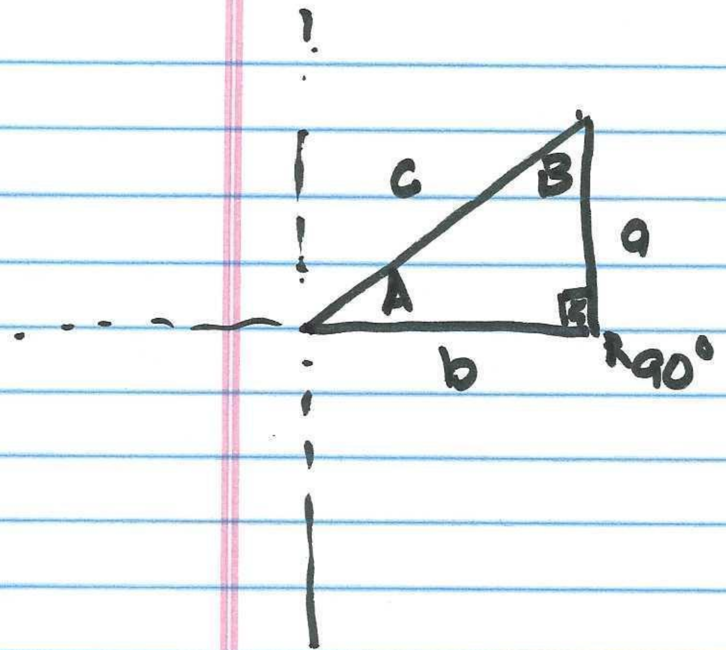
$$x^x = \left(e^{\ln x}\right)^x = \underline{e^{x \ln x}}$$

$$\left[e^{g(x)}\right]' = e^{g(x)} \cdot g'(x)$$

$$\left(e^{kx}\right)' = e^{kx} \cdot k$$

$$\Rightarrow e^{x \ln x}\left(x \cdot \ln x\right)' = e^{x \ln x}\left((1)\ln x + x \cdot \frac{1}{x}\right)$$

$$\boxed{= x^x\left(\ln x + 1\right)}$$



$$a^2+b^2=c^2$$

$\sin A = a/c \quad [-1,1]$

$\cos A = b/c \quad [-1,1]$

$\tan A = \dfrac{a}{b} \quad [-\infty,\infty]$

$\sec A = \dfrac{1}{\cos A}$

$\csc A = \dfrac{1}{\sin A}$

$\cot A = \dfrac{1}{\tan A}$

$$\frac{a^2}{a^2}+\frac{b^2}{a^2}=\frac{c^2}{a^2}$$

(i) $1+\cot^2 A=\csc^2 A$ #3

(ii) $\tan^2 A+1=\sec^2 A$ #2

(iii) $\sin^2 A+\cos^2 A=1$ #1

$$\frac{a^2}{b^2}+\underbrace{\frac{b^2}{b^2}}_{1}=\frac{c^2}{b^2}$$

$$\frac{a^2}{c^2}+\frac{b^2}{c^2}=\frac{c^2}{c^2}$$