$$\frac{d}{dx}(c)=0 \Rightarrow (c)'=c$$

$$\frac{d}{dx}(x^n)=nx^{n-1} \Rightarrow \frac{d}{dx}(x)=1$$

$$\frac{d}{dx}\sqrt{x}=\frac{d}{dx}\left(x^{\frac{1}{2}}\right)=\frac{1}{2\sqrt{x}}$$

$$\frac{d}{dx}[cf(x)]=c\frac{d}{dx}f(x) \Rightarrow (cu)'=cu'$$

$$\frac{d}{dx}[f(x)\pm g(x)]=\frac{d}{dx}f(x)\pm\frac{d}{dx}g(x)$$

$$\Rightarrow (u\pm v)'=u'\pm v'$$

$$(abcd)'=a'bcd+ab'cd+abc'd+abcd'$$

$$\frac{d}{dx}[f(x)g(x)]=g(x)\frac{d}{dx}f(x)+f(x)\frac{d}{dx}g(x)$$

$$\Rightarrow (uv)'=u'v+uv'$$

$$\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right]=\frac{g(x)\frac{d}{dx}f(x)-f(x)\frac{d}{dx}g(x)}{[g(x)]^2}$$

$$\Rightarrow \left(\frac{u}{v}\right)'=\frac{u'v-uv'}{v^2}$$

$$\left(\frac{ab}{cd}\right)'=\frac{a'bcd+ab'cd-abc'd-abcd'}{(cd)^2}$$

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

$$\lim_{h\to 0}\frac{a^h-1}{h}=\ln a \Rightarrow \lim_{h\to 0}\frac{e^h-1}{h}=1$$

$$\frac{d}{dx}(a^x)=a^x\ln a \Rightarrow \frac{d}{dx}(e^x)=e^x$$

$$\lim_{x\to 0}\frac{\sin x}{x}=1$$

$$\lim_{x\to 0}\frac{\cos x-1}{x}=0$$

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

$$\frac{d}{dx}(\cos x)=-\sin x$$

$$\frac{d}{dx}(\tan x)=\sec^2 x$$

$$\frac{d}{dx}(\cot x)=-\csc^2 x$$

$$\frac{d}{dx}(\sec x)=\sec x\tan x$$

$$\frac{d}{dx}(\csc x)=-\csc x\cot x$$

$$\frac{dy}{dx}=\frac{dy}{du}\frac{du}{dx}$$

$$(u^n)'=nu^{n-1}\,u'$$

$$\frac{d}{dx}\sqrt{f(x)}=\frac{f'(x)}{2\sqrt{f(x)}} \Rightarrow \left(\sqrt{u}\right)'=\frac{u'}{2\sqrt{u}}$$

$$\frac{d}{dx}\left[\frac{1}{f(x)}\right]=-\frac{f'(x)}{[f(x)]^2} \Rightarrow \left(\frac{1}{v}\right)'=-\frac{v'}{v^2}$$

$$\frac{d}{dx}(\sin^{-1}x)=\frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}(\cos^{-1}x)=-\frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}(\tan^{-1}x)=\frac{1}{1+x^2}$$

$$\frac{d}{dx}(\cot^{-1}x)=-\frac{1}{1+x^2}$$

$$\frac{d}{dx}(\sec^{-1}x)=\frac{1}{x\sqrt{x^2-1}}$$

$$\frac{d}{dx}(\csc^{-1}x)=-\frac{1}{x\sqrt{x^2-1}}$$

$$\frac{d}{dx}(\ln x)=\frac{1}{x}$$

$$\frac{d}{dx}(\ln u)=\frac{u'}{u}$$

$$\frac{d}{dx}(\log_a x)=\frac{1}{x\ln a}$$

$$\frac{d}{dx}(\log_a u)=\frac{u'}{u\ln a}$$

$$\frac{d}{dx}(\ln|x|)=\frac{1}{x}$$

$$e=\lim_{x\to 0}(1+x)^{\frac{1}{x}}=\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$$

$$\sinh x=\frac{e^x-e^{-x}}{2}$$

$$\cosh x=\frac{e^x+e^{-x}}{2}$$

$$\cosh^2 x-\sinh^2 x=1$$

$$1-\tanh^2 x=\operatorname{sech}^2 x$$

$$\frac{d}{dx}(\sinh x)=\cosh x$$

$$\frac{d}{dx}(\cosh x)=\sinh x$$

$$\frac{d}{dx}(\tanh x)=\operatorname{sech}^2 x$$

$$\frac{d}{dx}(\coth x)=-\operatorname{csch}^2 x$$

$$\frac{d}{dx}(\operatorname{sech} x)=-\operatorname{sech} x\tanh x$$

$$\frac{d}{dx}(\operatorname{csch} x)=-\operatorname{csch} x\coth x$$

$$\sinh^{-1}x=\ln\left(x+\sqrt{x^2+1}\right)$$

$$\cosh^{-1}x=\ln\left(x+\sqrt{x^2-1}\right)$$

$$\tanh^{-1}x=\frac{1}{2}\ln\left(\frac{1+x}{1-x}\right)$$

$$\frac{d}{dx}(\sinh^{-1}x)=\frac{1}{\sqrt{x^2+1}}$$

$$\frac{d}{dx}(\cosh^{-1}x)=\frac{1}{\sqrt{x^2-1}}$$

$$\frac{d}{dx}(\tanh^{-1}x)=\frac{d}{dx}(\coth^{-1}x)=\frac{1}{1-x^2}$$

$$\frac{d}{dx}(\operatorname{sech}^{-1}x)=-\frac{1}{x\sqrt{1-x^2}}$$

$$\frac{d}{dx}(\operatorname{csch}^{-1}x)=-\frac{1}{|x|\sqrt{x^2+1}}$$