1.通用的求导法则（general formulas for derivatives）

1. 函数和的求导：$(u+v)' = u' + v'$
2. 常数乘以函数的求导:$(Cu)' = Cu'$
3. 乘法法则:$(uv)' = u'v + uv'$
4. 除法法则:$(u/v)' = (u'v - uv')'v^2$
5. 求导复合函数的链式法则:$\frac{d}{dx}f(u) = f'(u)u'(x) \quad [u = u(x)]$
6. 隐函数微分法：处理反函数时最典型的方法；对数微分法也属于这个类型

2.特定函数的求导：

$$\boxed{\begin{array}{l} x^r \\ \sin x, \cos x, \tan x, \sec x \\ \tan^{-1} x, \sin^{-1} x \qquad \#\text{反函数} \\ e^x, \ln x \end{array}}$$

3. 例子

3.1 通用求导法则的例子

1. $y = 10x + b$
   $$\boxed{y' = \frac{d}{dx}(10x+b) = \frac{d}{dx}10x + \frac{d}{dx}b = 10 + 0 = 10}$$

三角函数

$$\boxed{\begin{aligned}\frac{d}{dx}\sec x &= \frac{d}{dx}(\cos x)^{-1}\\ &= (\cos x)^{-2}(-\sin x)\\ &= \frac{\sin x}{cos^2 x}\\ &= \frac{1}{\cos x}\cdot\frac{\sin x}{\cos x} = \sec x\cdot\tan x\end{aligned}}$$

$$\boxed{\begin{aligned}\frac{d}{dx}\ln(\sec x) &= \frac{1}{\sec x}\cdot(\sec x)'\\ &= \frac{\sec x\tan x}{\sec x}\\ &= \tan x\end{aligned}}$$

$$\boxed{\begin{aligned}&y = \tan^{-1} x\\ &\tan y = x\\ &\frac{d}{dx}\tan y = \frac{d}{dx}x\\ &\frac{d}{dy}\tan y\frac{d}{dx}y = 1\\ &(\sec^2 y)y' = 1\\ &y' = \frac{1}{\sec^2 y}\\ &y' = cos^2 y\\ &y' = (\frac{1}{\sqrt{1+x^2}})^2 = \frac{1}{1+x^2}\end{aligned}}$$

$$\boxed{\frac{d}{dx}(x^{10}+8x)^6 = 6(x^{10}+8x)^5(10x^9+8)}$$

$$\boxed{\begin{aligned}\frac{d}{dx}e^{x\tan^{-1}x} &= e^{x\tan^{-1}x}\frac{d}{dx}(x\tan^{-1}x)\\ &= e^{x\tan^{-1}x}(\tan^{-1}x + \frac{x}{1+x^2})\end{aligned}}$$