

Now, take  $H = f(a+h) - f(a)$ ,  
where  $h \neq 0$ . If  $h \rightarrow 0$ , then  $H \rightarrow 0$ .

$$\begin{aligned} \Rightarrow g(f(a) + [f(a+h) - f(a)]) \\ = g(f(a)) + [f(a+h) - f(a)]g'(f(a)) \\ + HECH \end{aligned}$$

$\Rightarrow \forall h \neq 0,$

$$\frac{g(f(a+h)) - g(f(a))}{h} = \frac{f(a+h) - f(a)}{h} g'(f(a)) + \frac{f(a+h) - f(a)}{h} ECH$$

Letting  $h \rightarrow 0$ , we get

$$\begin{aligned} \lim_{h \rightarrow 0} \frac{g(f(a+h)) - g(f(a))}{h} \\ = f'(a)g'(f(a)). \end{aligned}$$