

$$\text{Let } a(x) = f(x) + g(x)$$

$$a'(x) = \lim_{h \rightarrow 0} \frac{a(x+h) - a(x)}{h}$$

$$= \lim_{h \rightarrow 0} \frac{(f+g)(x+h) - (f+g)(x)}{h}$$

$$= \lim_{h \rightarrow 0} \frac{f(x+h) + g(x+h) - f(x) - g(x)}{h}$$

$$= \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} + \lim_{h \rightarrow 0} \frac{g(x+h) - g(x)}{h}$$

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

$$\text{Hence } \underline{\underline{(f+g)' = f' + g'}}$$