

$$\begin{aligned}
5.6 \quad (f+g)'(x) &= \lim_{h \rightarrow 0} \frac{(f+g)(x+h) - (f+g)(x)}{h} \\
&= \lim_{h \rightarrow 0} \frac{(f(x+h) + g(x+h)) - (f(x) + g(x))}{h} \\
&= \lim_{h \rightarrow 0} \frac{(f(x+h) - f(x)) + (g(x+h) - g(x))}{h} \\
&= \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} + \frac{g(x+h) - g(x)}{h} \\
&= \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} + \lim_{h \rightarrow 0} \frac{g(x+h) - g(x)}{h} \\
&= f'(x) + g'(x)
\end{aligned}$$