

$$\begin{aligned}
 \lim_{x \rightarrow a} (f(x) - f(a)) &= \lim_{x \rightarrow a} \left((x - a) \frac{f(x) - f(a)}{(x - a)} \right) \\
 &= \left(\lim_{x \rightarrow a} (x - a) \right) \left(\lim_{x \rightarrow a} \frac{f(x) - f(a)}{(x - a)} \right) \\
 &= 0 \cdot f'(a) \\
 &= 0
 \end{aligned}$$