Proof (differentiability => continuity)

Let $x \neq a$ and x is in the domain of f.

We may write :

$$f(x) = f(a) + \frac{f(x)-f(a)}{x-a} \cdot (x-a)$$

$$f(a) \overset{!}{=} \lim_{x \to a} f(x) = f(a) + \underbrace{\lim_{x \to a} \frac{f(x)-f(a)}{x-a} \cdot (x-a)} = f(a)$$

$$\underset{\text{at } a}{\overset{f \text{ diff.}}{=}} \underbrace{\underbrace{\lim_{x \to a} \frac{f(x)-f(a)}{x-a}}_{= f'(a)} \cdot \underbrace{\lim_{x \to a} (x-a)}_{= 0}}_{=0}$$

=> by def. f is continuous in a $\square$