

## Summary: Chain rule

### The Chain Rule

If  $h(x) = f(g(x))$ , then

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

at all points where the derivatives  $f'(g(x))$  and  $g'(x)$  are defined.

Alternatively, if  $y = f(u)$ , and  $u = g(x)$ , then

$$\left. \frac{dy}{dx} \right|_{x=a} = \left. \frac{dy}{du} \right|_{u=g(a)} \left. \frac{du}{dx} \right|_{x=a}$$

at any point  $x = a$  where the derivatives on the right hand side are defined.