Derivative of the inverse of a function $f(x)$ at a point (a, b).

Case 1: Given $f(x)$, (a, b), find $(f^{-1})'(a)$

Procedure: Note that $b = f(a) \Rightarrow f^{-1}(b) = a$.

$$\Rightarrow (f^{-1})'(a) = \frac{1}{f'(f^{-1}(a))} = \frac{1}{f'(b)}$$

Case 2: Given $f^{-1}(x)$, (a, b), provide $f'(b)$

Note $f^{-1}(a) = b$

$$\frac{1}{(f^{-1})'(a)} = f'(f^{-1}(a)) = f'(b)$$

As required.