the points that make the derivative zero and/or the points that make the derivative undefined (provided that they are in the domain). These points are called *critical points*. Endpoints of the interval may or may not give rise to an extremum, or a relative extremum, of the function.

The following one-dimensional version of the inverse function theorem states that a differentiable function $f$ is invertible (i.e., has an inverse) in a neighborhood of any point $x$ at which $f'(x) \neq 0$, and its inverse is differentiable.

**THEOREM 5.2.8.** *(Inverse Function Theorem) Suppose that $I$ is an interval and a function $f : I \to \Re$ is differentiable with $f'(x) \neq 0$, for any $x \in I$. Then*

**(a)** *$f$ is an injection,*

**(b)** *$f^{-1}$ is continuous on $f(I)$,*

**(c)** *$f^{-1}$ is differentiable on $f(I)$, and*

**(d)** $(f^{-1})'(y) = \dfrac{1}{f'(x)}$, *with $y = f(x)$. This may be written as* $\dfrac{dx}{dy} = \dfrac{1}{\frac{dy}{dx}}$.