

Derivative of the Square Root Function

- a) Use implicit differentiation to find the derivative of the inverse of $f(x) = x^2$ for $x > 0$.
- b) Check your work by finding the inverse explicitly and then taking its derivative.

a.)

$$y = x^2$$

$$x = y^{\frac{1}{2}}$$

$$\frac{d}{dx} (x = y^{\frac{1}{2}})$$

$$1 = 2y y'$$

$$y' = \frac{1}{2y} \text{ or } \frac{1}{2\sqrt{x}}$$

b.)

$$x = y^2 \quad = \frac{d}{dy} (x^{\frac{1}{2}})$$

$$y = \sqrt{x} \quad = \frac{1}{2} x^{-\frac{1}{2}}$$

$$y' = \frac{1}{2\sqrt{x}} = \frac{1}{2y}$$

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