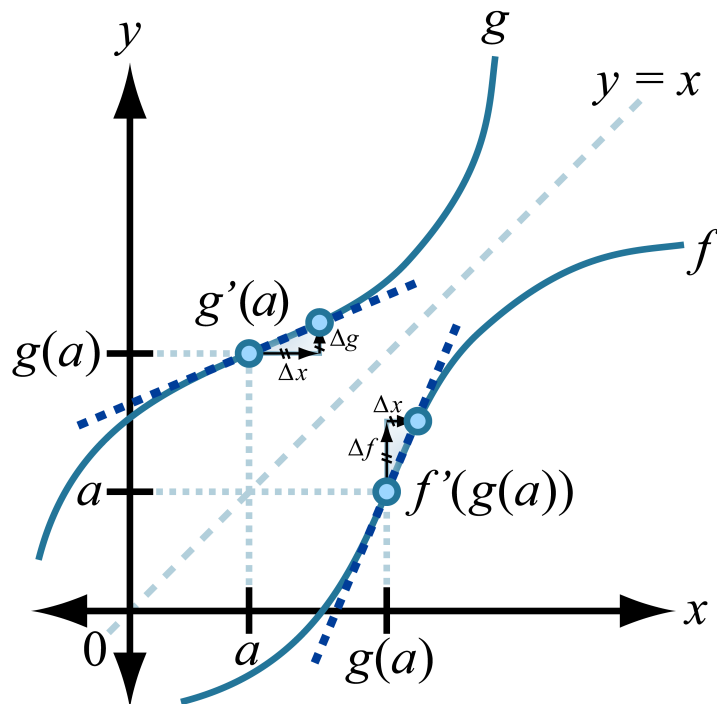


Derivatives of inverse functions



Hypothesis

- $g(x) = f^{-1}(x)$

Conclusion

$$g'(a) = \frac{1}{f'(g(a))} \text{ if } f'(g(a)) \neq 0$$

Inverse trigonometric functions

Example:

$$g(x) = \sin^{-1}(x) \text{ and } f(x) = \sin(x)$$

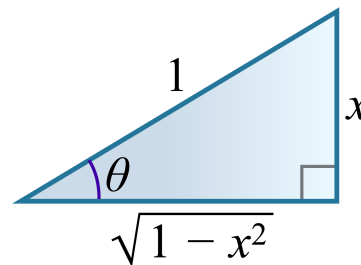
$$\frac{d}{dx} [\sin^{-1}(x)] = \frac{1}{\cos[\sin^{-1}(x)]}$$

$$\frac{d}{dx} \sin^{-1}(x) = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} \sin^{-1}(x) = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} \sec^{-1}(x) = \frac{1}{|x|\sqrt{x^2-1}}$$

$$\frac{d}{dx} \tan^{-1}(x) = \frac{1}{1+x^2}$$



$$\frac{d}{dx} \cos^{-1}(x) = -\frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} \csc^{-1}(x) = -\frac{1}{|x|\sqrt{x^2-1}}$$

$$\frac{d}{dx} \cot^{-1}(x) = -\frac{1}{1+x^2}$$

some trig $\left[\frac{\text{some trig}^{-1}(x)}{\theta} \right] \Leftrightarrow$ Draw right \triangle having a side of length $x \Leftrightarrow$ Express ratio of side lengths involving $\sqrt{\quad}$ and x^2