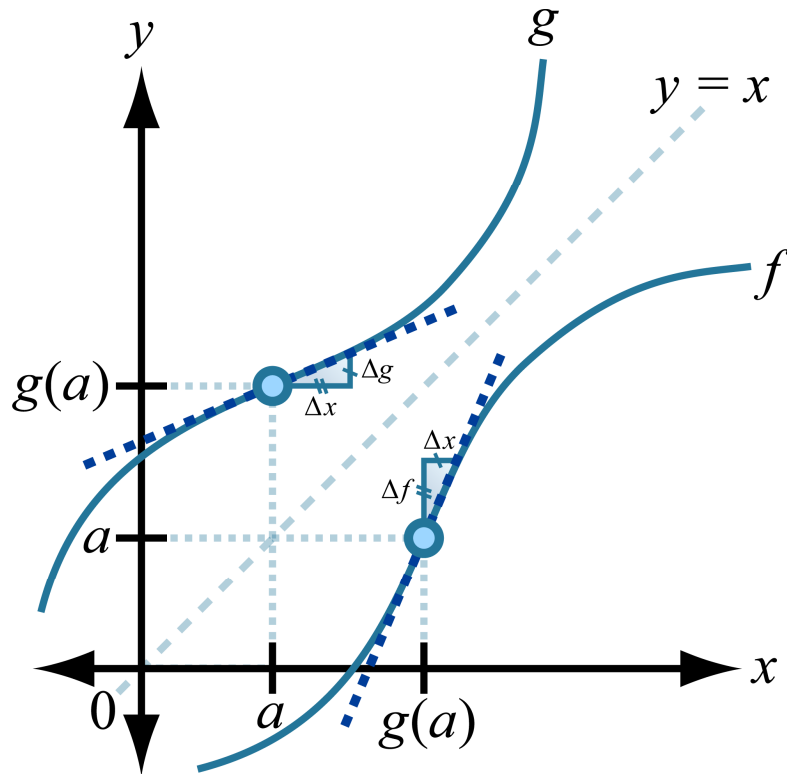


# Derivatives of inverse functions



$$g'(a) = \frac{1}{f'(g(a))}$$

## Inverse trigonometric functions

Example:

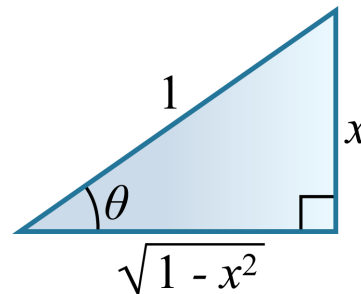
$$g(x) = \sin^{-1}(x) \text{ and } f(x) = \sin(x)$$

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

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

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

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



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

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

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

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