

What you'll Learn About

- How to find the derivative of inverse functions:

A) $y = \arcsin(x^2)$

$$\frac{dy}{dx} = \frac{1}{\sqrt{1-(x^2)^2}} \cdot 2x$$

$$\frac{dy}{dx} = \frac{2x}{\sqrt{1-x^4}}$$

C) $y = x^2 \arccos(\sin x)$

$$\frac{dy}{dx} = x^2 \left(\frac{-1}{\sqrt{1-\sin^2 x}} \cdot \cos x \right) + \arccos(\sin x) \cdot 2x$$

D) $y = \arctan^3 \sqrt{x}$

$$y = \arctan^3 \sqrt{x}$$

$$y = \arctan(x^{1/3})$$

$$\frac{dy}{dx} = \frac{1}{1+(x^{1/3})^2} \cdot \frac{1}{3} x^{-2/3}$$

$$= \frac{1}{3x^{2/3}(1+x^{2/3})}$$

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B) $y = \arccos\left(\frac{1}{x}\right)$

$$y = \arccos(x^{-1})$$

$$\frac{dy}{dx} = \frac{-1}{\sqrt{1-(x^{-1})^2}} \cdot -x^{-2}$$

$$\frac{dy}{dx} = \frac{x^{-2}}{\sqrt{1-x^{-2}}}$$

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

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