What you'll Learn About

- How to find the derivative of inverse functions

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

u

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

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

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

ratio

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

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

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

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

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

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

D) $\cancel{y = x\sqrt{1-x^2}} + \arctan\sqrt[3]{x}$

$$y = \arctan\sqrt[3]{x}$$

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

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

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

E) $f(x) = \operatorname{arccot}(5x^3 - \sin x)$

$$f(x) = \operatorname{arccot}(5x^3 - \sin x)$$

$$f'(x) = \frac{-1}{1+(5x^3-\sin x)^2} \cdot (15x^2 - \cos x)$$