$y = \sin^{-1} x$ Inverse sine $y = \arccos\left(x^{-1}\right)$ ratio

$y = \arcsin x$

$y = \sin(45°)$

$\frac{\sqrt{2}}{2} = \sin(45°)$

ratio angle

$y = \sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$

$\frac{\pi}{4} = \sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$

angle ratio

*A)* $y = \arcsin\left(x^2\right)$ ratio

$y = \arcsin\left(x^2\right)$

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

$= \frac{1}{\sqrt{1-(x^2)^2}} \cdot 2x = \boxed{\frac{2x}{\sqrt{1-x^4}}}$

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

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

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

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

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

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

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

*E)* $f(x) = \operatorname{arccsc}\left(5x^3 - \sin x\right)$

$y = x(1-x^2)^{1/2} + \arctan(x^{1/3})$

$y' = x\left[\frac{1}{2}(1-x^2)^{-1/2} \cdot (-2x)\right] + (1-x^2)^{1/2} + \frac{1}{1+(x^{1/3})^2} \cdot \frac{1}{3}x^{-2/3}$

Find the equation of the tangent line

*F)* $y = \csc^{-1} x$ at $x = 2$