$f(x) = y$

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

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

$f'(f^{-1}(x)) \frac{d}{dx}(f^{-1}(x)) = 1$

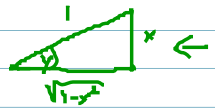
$\frac{d}{dx}(f^{-1}(x)) = \frac{1}{f'(f^{-1}(x))}$ ←

$\sin^{-1}(x) = y$ ←

$x = \sin(y)$

$1 = \cos(y) \frac{dy}{dx}$

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



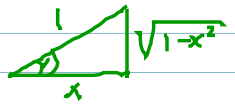
$\frac{dy}{dx} = \frac{1}{\cos(\sin^{-1}(x))}$

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

$x = \cos(y)$

$1 = -\sin(y) \frac{dy}{dx}$

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



$\sin^2(x) + \cos^2(x) = 1$

$\tan^2(x) + 1 = \sec^2(x)$

$1 + \cot^2(x) = \csc^2(x)$

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

$x = \tan(y)$

$1 = \sec^2(y) \frac{dy}{dx}$

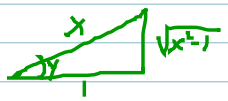
$\frac{dy}{dx} = \frac{1}{\sec^2(y)} = \cos^2(y) = \left(\frac{1}{\sqrt{1+x^2}}\right)^2 = \frac{1}{1+x^2}$

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

$x = \sec(y)$

$1 = \sec(y)\tan(y) \frac{dy}{dx}$

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



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

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

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

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

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

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

$f(x) = y$

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

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

$f'(f^{-1}(x)) \frac{d}{dx}(f^{-1}(x)) = 1$

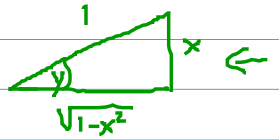
$\frac{d}{dx}(f^{-1}(x)) = \frac{1}{f'(f^{-1}(x))}$ ⇐

$\sin^{-1}(x) = y$ ⇐

$x = \sin(y)$

$1 = \cos(y) \frac{dy}{dx}$

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



⇐

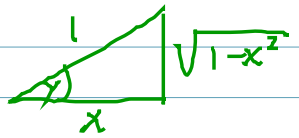
$\frac{dy}{dx} = \frac{1}{\cos(\sin^{-1}(x))}$

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

$x = \cos(y)$

$1 = -\sin(y) \frac{dy}{dx}$

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



$\sin^2(x) + \cos^2(x) = 1$

$\tan^2(x) + 1 = \sec^2(x)$

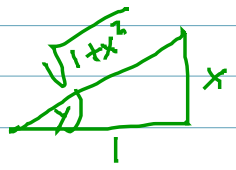
$1 + \cot^2(x) = \csc^2(x)$

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

$x = \tan(y)$

$1 = \sec^2(y) \frac{dy}{dx}$

$\frac{dy}{dx} = \frac{1}{\sec^2(y)} = \cos^2(y) = \left(\frac{1}{\sqrt{1+x^2}}\right)^2 = \frac{1}{1+x^2}$

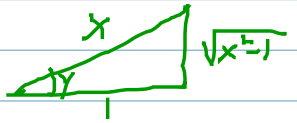


$\sec^{-1}(x) = y$

$x = \sec(y)$

$1 = \sec(y)\tan(y) \frac{dy}{dx}$

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



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

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

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

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

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

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