Name: _____   Date: _____
AP Calc AB: Derivatives of Inverse Trig Functions   Ms. Loughran

Do Now:

1. If $f(x) = \sin^2 3x$, find $f'\left(\dfrac{\pi}{4}\right)$.

2. If $f(x) = 5e^{2x} - 4$, find $f'(\ln 3)$.

3. If $f(x) = \sec^2(e^{\cot^2(3x)}) - \tan^2(e^{\cot^2(3x)})$, find $f'\left(\dfrac{\pi}{4}\right)$.

Classwork:

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

$\therefore \dfrac{dy}{dx}(\sin^{-1} x) =$

More generally $\dfrac{d}{dx}(\sin^{-1} u) =$

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

$\therefore \dfrac{dy}{dx}(\cos^{-1} x) =$

More generally $\dfrac{d}{dx}(\cos^{-1} u) =$

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

$\therefore \dfrac{dy}{dx}(\tan^{-1} x) =$

More generally $\dfrac{d}{dx}(\tan^{-1} u) =$

These are not covered on the AP exam but for your information…

$$\frac{d}{dx}[\csc^{-1} u] = -\frac{1}{|u|\sqrt{u^2-1}}\frac{du}{dx}$$

$$\frac{d}{dx}[\sec^{-1} u] = \frac{1}{|u|\sqrt{u^2-1}}\frac{du}{dx}$$

$$\frac{d}{dx}[\cot^{-1} u] = -\frac{1}{1+u^2}\frac{du}{dx}$$

Examples. For each of the following, find $\dfrac{dy}{dx}$.

1. $y = \sin^{-1}(3x)$ 4. $y = \sin^{-1}(e^x)$

2. $y = \cos^{-1}\left(\dfrac{x}{2}\right)$ 5. $y = \cos^{-1}(3x+2)$

3. $y = \tan^{-1}\left(\dfrac{3}{x}\right)$