Name _____ Period _____ Date _____

Assignment #21B

Derivatives of Trig Functions Practice

Please work on the following problems with your group. Show all steps. Check your answers on the back. *No calculators*.

1. $\frac{d}{dx}\left(x^5 \cos x\right)$
2. $\frac{d}{dx}\left(4\tan x - 5\csc x\right)$
3. $\frac{d}{dx}\left[\cos\left(x^3\right)\right]$
4. $\frac{d}{dx}\left[\cos^3 x\right]$
5. $\frac{d}{dx}\left[\cos\left(3x\right)\right]$
6. $\frac{d}{dx}\left[\sin\left(\frac{2x}{x+1}\right)\right]$

Find the derivative of each function.

7. $f\left(x\right) = \tan\sqrt{x^2+1}$
8. $f\left(x\right) = \sin\left(\tan\left(x^2\right)\right)$
9. $f\left(x\right) = \frac{1}{\sin\left(4x\right)}$
10. $f\left(x\right) = 4\sin^2 x + 4\cos^2 x$
11. Find an equation of the tangent line to $y = 3\tan x - 2\csc x$ at $x = \frac{\pi}{3}$. *No calculators!*
12. Now check your work in #11 using a graphing calculator. Graph the original function and the tangent line. Use the window settings $\left[0,1.5\right]$ by $\left[-10,10\right]$.

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1. $5x^4 \cos x - x^5 \sin x$
2. $4\sec^2 x + 5\csc x \cot x$
3. $-3x^2 \sin\left(x^3\right)$
4. $-3\sin x \cos^2 x$
5. $-3\sin\left(3x\right)$
6. $\frac{2}{\left(x+1\right)^2}\cos\left(\frac{2x}{x+1}\right)$
7. $f'\left(x\right) = \frac{x}{\sqrt{x^2+1}}\sec^2\sqrt{x^2+1}$
8. $f'\left(x\right) = 2x\cos\left(\tan\left(x^2\right)\right)\sec^2\left(x^2\right)$
9. $f'\left(x\right) = -4\csc\left(4x\right)\cot\left(4x\right)$
10. $f'\left(x\right) = 0$
11. The equation of the tangent line is $y = \frac{40}{3}\left(x - \frac{\pi}{3}\right) + 3\sqrt{3} - \frac{4}{\sqrt{3}}$