WORKSHEET – 7.1,2,3 (30 points) NAME ________________________________

ATTACH AND SHOW ALL WORK! Use the properties of logarithms or even logarithmic differentiation when appropriate to make the problems easier to do. Simplify as appropriate (based on our class discussions of what is appropriate). Each problem is worth 2 points. BOX YOUR FINAL ANSWERS!

A. Find $f'(x)$ or y' (as appropriate):

1. $f(x) = \ln\left(\cos 5x \sin^2 3x\right)$

2. $f(x) = \left(\tan e^{-3x}\right)^2$

3. $f(x) = \ln\left(\sqrt{e^{x^2} + e^{-x^2}}\right)$

4. $f(x) = e^{3x}\sec\left(7x^4\right)$

5. $f(x) = \ln\left(\dfrac{e^{x^2}+1}{e^{3x}-1}\right)$

6. $f(x) = \left(e^{3x^2} - e^{-2x}\right)^4$

7. $f(x) = \ln\left(x^{4/7}\left(2x+5\right)^{-3/5}\right)$

8. $f(x) = x^{3e^5} + e^{4x^2}$

9. $e^{xy} + xy = 0$

10. $f(x) = x^3\, e^{x^4+3}$

11. $f(x) = \left(\cos x\right)^{\left(x^2+5\right)}$

12. $y^4 - \ln\left(\dfrac{x^3}{y^5}\right) + 2 = \sin 5x$

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B. Determine equations of the lines described.

13. An equation of the tangent line to the graph of $y = 5xe^{\left(x^2-3\right)}$ at the point where $x = -3$.

14. An equation of the normal line to the graph of $y = \left(x+5\right)e^{3x} - 2\ln\left(4x+7\right) - 5$ at the point where $x = 2$.

15. An equation of the line tangent to the graph of the inverse of $y = 2x^4 - 5x^3 + x^2 - 3x - 9$ at the point $\left(73, -2\right)$ (NB, this is a point on the graph of the inverse and the inverse of this function is not itself a function, but that is not of major concern here.)