Name:_____

Math 221 Section 10336 *Practice Exam 2* *May 24, 2012*

Follow the instructions for each question and show enough of your work so that I can follow your thought process. If I can't read your work or answer, you will receive little or no credit!

For problems 1 and 2, write each expression as an algebraic expression.

1. $\cos(\tan^{-1} x)$

2. $\tan(\sin^{-1} x)$

For problems 3 and 4, find the exact value of each expression.

3. $\cos\left(\sin^{-1}\left(\frac{1}{2}\right)\right)$

4. $\csc\left(\arccos\left(\frac{3}{5}\right)\right)$

For problems 5 - 16 differentiate each function.

5. $y = \cos^4(\tan\theta)$

6. $f(x) = \sec(3x^2 + 1)$

7. $y = \sin^2\theta \sin\theta^2$

8. $r(x) = 3x^6 \cos(x^2 + 1)$

9. $g(t) = \dfrac{3e^t}{1 - 4e^t}$

10. $g(x) = e^{x^2} \ln(x^2 + 1)$

11. $s(t) = \dfrac{\ln t}{1 + e^t}$

12. $f(x) = x^e \ln(5x)$

13. $y = \arcsin(x^2 + 1)$

14. $g(t) = \tan^{-1}(t) + \tan^{-1}\left(\dfrac{1}{t}\right)$

15. $y = \arccos(1 + \sqrt{x})$

16. $v(t) = \tan^{-1}(\cos t)$

For problems 17 and 18, compute the differential for each function.

17. $y = \sqrt{4 + x^3}$.

18. $y = \ln(x^2 + 2x + 1)$.

19. Find to numbers whose difference is 100 and whose product is a minimum.

20. Find the dimensions of a rectangle with area 1000 m^2 whose perimeter is as small as possible.

For problems 21 and 22, compute the derivative of each function.

21. $f(x) = \dfrac{e^x + e^{-x}}{2}$

22. $f(x) = \dfrac{e^x - e^{-x}}{2}$