Name: _____

- There are 12 points possible on this proficiency, one point per problem. **No partial credit will be given.**
- You have 1 hour to complete this proficiency.
- No aids (book, calculator, etc.) are permitted.
- You do **not** need to simplify your expressions.
- Correct parenthesization is required.
- Your final answers **must start with** $f'(x) =$, $dy/dx =$, or similar.
- **Circle or box your final answer.**

1. [12 points] Compute the derivatives of the following functions.

a. $g(\theta) = e^{\theta}\tan(\theta)$

b. $h(x) = \csc(x^3)$

c. $f(x) = \dfrac{5x}{3} + \dfrac{5}{3x^2} - \dfrac{\pi^2}{3}$

d. $f(x) = x\arctan(x)$

e. $y = (x^{0.3} + 3)^{-1/5}$

f. $f(t) = \sqrt{t^2 + \sin^2(t)}$

g. $g(x) = \dfrac{x^2+2}{6} + \ln(8+\cos(x))$

h. $f(x) = \dfrac{\sin(\pi/x)}{x^3+x}$

i. $y = \ln(9) + e^{x^2} + \sec(5x)$

j. $f(x) = \sqrt{2}\cos(1+e^{-Nx})$ (Assume N is a fixed positive constant.)

k. $j(x) = \dfrac{x\ln(x) - \sqrt{x}}{x}$

l. Find $\dfrac{dy}{dx}$ for $\quad 1 + xe^y = x^3 + y^2$