Name: _____

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

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

a. $f(x) = 4\sin^{-1}(3x^3)$

b. $f(x) = 3\sin(x)\cos(x)$

c. $f(x) = \dfrac{\sqrt{x}}{5} - \dfrac{5}{\sqrt{x}} + \dfrac{\sqrt{3}}{4}$

d. $f(x) = \dfrac{\ln(x)}{\tan(x)}$

e. $y = 3\csc(e^x)$

f. $y = 6^x - \log_6(x)$

g. $y = \left(x^{0.2} + \sec(x)\right)^{-2/3}$

h. $f(x) = \dfrac{\cos(\pi/x)}{x^2}$

i. $f(x) = \left(x^4 + \dfrac{1}{x} + e^5\right)^3$

j. $f(x) = \ln\left(\dfrac{x^2 e^x}{12x}\right)$

k. $f(x) = \dfrac{\sin(5)}{\sqrt[3]{\sin(x)}}$

l. Find $\dfrac{dy}{dx}$ for the equation $e^x - e^y = 2\sin(xy)$. You must solve for $\dfrac{dy}{dx}$.