Name: _____ _____ / **12**

- There are 12 points possible on this proficiency: one point per problem with no partial credit.
- You have 30 minutes to complete this proficiency.
- No aids (book, calculator, etc.) are permitted.
- You do **not** need to simplify your expressions.
- Your final answers should start with $f'(x) =$, $dy/dx =$ or something similar.
- Circle your final answer.

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

a. $f(x) = \dfrac{7^{1/3}}{x^{1/3}} + e^{x-1} + \pi^2$

b. $f(x) = \dfrac{\cos(x)}{\sin(x)}$

c. $f(x) = (x^5 - x)\cos(x)$

d. $f(x) = \dfrac{1+e^{-11x}}{\tan(x)}$

e. $f(t) = \dfrac{t\sqrt{t}-9\sqrt{t}+1}{\sqrt{t}}$

f. $f(t) = t^p \ln(at+1)$

g. $f(x) = 2^x \sin(2x)$

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

i. $g(x) = \ln(x + \sec^2(x))$

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

k. $f(z) = \arcsin\left(\dfrac{1}{z}\right)$

l. Compute dy/dx if $\quad e^y + \cos x = \ln(5) - xy$. You must solve for dy/dx.