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. $f(x) = \pi x^{1/8} + 7e^x + \sqrt{5}$

b. $f(t) = \dfrac{t^3 - t^{\frac{3}{2}} + 1}{\sqrt{t}}$

c. $f(x) = (x^3 - x)\cos(x)$

d. $f(x) = \dfrac{\sin(x)}{1+e^{-3x}}$

e. $f(x) = \dfrac{1}{\sin(x)}$

f. $f(t) = t\ln(at)$

g. $f(x) = \tan(x)x^{\frac{1}{2}}e^{3x}$

h. $f(z) = \arctan(\sqrt{z})$

i. $f(t) = \sec(\ln(1+t^2))$

j. $f(x) = \sin^5(x^2 + x)$

k. $f(x) = \dfrac{1}{9x} + \left(\pi \dfrac{x+2}{2}\right)^3$

l. Compute dy/dx if $e^y \sin(x) = 1 - xy$. You must solve for dy/dx.