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.

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

a. $f(x) = \dfrac{x^e}{5} + 7e^x + \sqrt{5}$

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

c. $f(x) = (x^4 - 2x)\tan(x)$

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

e. $f(x) = \dfrac{1}{\sqrt{x}} + \left(\dfrac{2}{3x}\right)^2 + \sec(x)$

f. $f(t) = \tan^{-1}(2t) + t\ln(at+b)$ where a and b are a fixed constants

g. $f(x) = \dfrac{\ln(x^2+1)^4}{\csc(x)}$

h. $f(z) = \sin^{-1}(\sqrt{z})$

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

j. $f(x) = \sin^5(e^{-x} + x)$

k. $f(x) = \dfrac{1}{4x^2} + \left(\dfrac{3-x}{2}\right)^2$

l. Compute dy/dx if $e^y + x^2 = 1 - xy$. You must solve for dy/dx.