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. $f(x) = \sqrt{5x} - \dfrac{e^x}{2} + \ln 4$

b. $f(t) = \frac{8t+t^{2/3}-1}{t}$

c. $h(x) = e^{x/3}\sin(x)$

d. $y = (2x^{-1/5} + 6)\ln x$

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

f. $f(x) = x^k + e^{-kx}$, where k is a fixed constant

g. $y = \dfrac{xe^x}{x+1}$

h. $y = \tan\left(x + \sqrt{x}\right)$

i. $y = 3x + \cos^2(x - 5x^2)$

j. $f(x) = \ln(x + \sqrt{x^2+1})$

k. $g(x) = \arcsin(2x)$

l. Compute ds/dt if $s^3 e^t + 5 = 2st^2$. You must solve for ds/dt.