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. $f(x) = \sqrt{6x} - \dfrac{e^x}{3} + \ln 4$

b. $f(t) = \frac{5t - t^{1/3} + 1}{t}$

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

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

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. $y = 3x + \sin^2\left(x - 5x^2\right)$

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

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

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