

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

b. $f(x) = e^{x-1} + 4\pi + \frac{6^{2/3}}{x^{2/3}}$

c. $f(x) = (x - x^7)\cos(x)$

d. $f(t) = \frac{t\sqrt{t} - 8\sqrt{t} + 1}{\sqrt{t}}$

e. $f(x) = \frac{\tan(x)}{1 + e^{-12x}}$

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

g. $f(x) = \frac{1}{2x} + \left(\frac{\pi(x+1)}{5}\right)^3$

h. $f(t) = t^q \ln(ct + 1)$

i. $f(x) = \sin\left(\frac{e^x}{x}\right)$

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

k. $f(z) = \arcsin\left(\frac{2}{z}\right)$

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