

Name: _____ / 12

- There are 12 points possible on this proficiency: one point per problem with no partial credit.
- You have **60** 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. $f(x) = \frac{x - \sqrt{3}}{5} - 3x^4 - \sqrt[3]{x}$

b. $y = x^2 \sec(x)$

c. $y = \frac{\tan(x)}{1 + \ln(x)}$

d. $y = e^{ax^2} \cos(bx)$ where a and b are fixed constants.

e. $f(x) = \arctan(\sin(5x))$

f. $g(x) = \sqrt{\sin^2(3x) + 1}$

g. $y = \tan(xe^x)$

h. $f(x) = \sqrt{x} \ln(x) \arcsin(x)$

i. $y = \cos\left(\frac{x}{x-1}\right)$

j. $h(x) = \ln(\pi x^2 - (4x)^9)$

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

l. Compute dy/dx if $2x^2y^2 - x^3 + y^4 = 0$. You must solve for dy/dx .