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. $f(x) = \sqrt[5]{x} + 4x^3 + \dfrac{x - \sqrt{2}}{9}$

b. $y = x^3 \tan(x)$

c. $y = \dfrac{\sec(x)}{1 + \ln(x)}$

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

e. $f(x) = \arcsin(\cos(7x))$

f. $g(x) = \sqrt{2 + \sin^2(6x)}$

g. $y = \tan\left(x^3 e^x\right)$

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

i. $y = \sin\left(\dfrac{x}{x-3}\right)$

j. $h(x) = \ln\left(\pi x^3 + (5x)^7\right)$

k. $g(x) = \dfrac{e^5}{3 - x^2}$

l. Compute dy/dx if $\quad -2x^3 + x^2 y^2 + y^5 = 0$. You must solve for dy/dx.