Name: ————————————————————————————

- There are 12 points possible on this proficiency, one point per problem. **No partial credit will be given.**

- You have 1 hour to complete this proficiency.

- No aids (book, calculator, etc.) are permitted.

- You do **not** need to simplify your expressions.

- Correct parenthesization is required.

- Your final answers **must start with** $f'(x) =$, $dy/dx =$, or similar.

- **Circle or box your final answer.**

1. **[12 points]** Compute the derivatives of the following functions.

   a. $f(x) = \dfrac{8x}{3} + \dfrac{8}{3x} + \ln(3)$

   b. $f(t) = \cos(5 - \sqrt[3]{t})$

   c. $k(x) = \dfrac{\pi + \pi x}{1 + x^2}$

d. $h(\theta) = \dfrac{1}{\sqrt{1 - \theta^2}}$

e. $g(x) = \arctan(x) + (\sin(x))^{-1}$

f. $f(x) = e^x \tan(x)$

g. $j(z) = \cos(z + e^{9z})$

h. $g(x) = 7\ln(x + x^2)$

i. $f(x) = (4 - x)\sec(2x)$

j. $f(x) = \ln\left(x + \sin(x^2)\right)$

k. $f(x) = a^2 x + e^{x+b}$ (Assume a and b are fixed positive constants.)

l. Find $\dfrac{dy}{dx}$ for $\quad (x+y)^2 = 3x + 4y$