Name: _____

- There are 12 points possible on this proficiency, one point per problem. **No partial credit will be given.**
- You have 60 minutes to complete this proficiency.
- No aids (book, calculator, etc.) are permitted.
- You do **not** need to simplify your expressions, but you must show sufficient work to justify your final expression.
- 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. $f(x) = \dfrac{3}{x^{1/3}} + e^{x-1} + \ln(2)$

b. $g(x) = \dfrac{\cos(x)}{\sin(x)}$

c. $h(x) = (x - x^5)\sec(x)$

d. $f(x) = \dfrac{1+e^{-2x}}{\cot(x)}$

e. $f(t) = \dfrac{t\sqrt{t}-\sqrt{10}}{\sqrt{t}}$

f. $f(x) = 2^x \sin(2x)$

g. $y = x^a \ln(ax+3)$ where a is a constant

h. $f(x) = \dfrac{1}{4x} + \left(\dfrac{\pi(x-1)}{3}\right)^2$

i. $f(x) = \ln(x + \csc^2(x))$

j. $f(x) = \cos\left(\dfrac{x}{e^x}\right)$

k. $f(x) = \arcsin\left(\dfrac{1}{x}\right)$

l. Find $\dfrac{dy}{dx}$ for $\cos(x) + \sin(y) = xy$. You must solve for $\dfrac{dy}{dx}$.