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. $f(x) = (\sqrt{3})x + \dfrac{1}{\sqrt{7x}} - \sqrt{\dfrac{2}{3}}$

b. $g(x) = e^x \cos(x)$

c. $h(\theta) = \sec\left(\dfrac{\theta}{9}\right)$

d. $y = (x + \ln(x^2 - 4))^3$

e. $k(x) = \dfrac{1}{x} + x \arcsin(x)$

f. $r(x) = \dfrac{\cos(\pi x)}{e^{2x} + 1}$

g. $f(x) = \left(x^2 + \ln(x)\right)^a$ where a is a fixed constant

h. $y = \cot(x)$

i. $y = \sin^6(x^2)$

j. $f(x) = \tan\left(\dfrac{2-x}{3}\right)$

k. $y = (\pi - 1)x^{\pi}$

l. Find $\dfrac{dy}{dx}$ for $\ln(y) + x = 10 + xy^2$