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. $g(x) = e^x \sin(x) + \csc(x)$

b. $f(x) = \ln\left((x^2 - 4x + 30)^5\right)$

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

d. $k(x) = x^2 \arcsin(x)$

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

f. $r(x) = \dfrac{e^{3x}+1}{\cos(\pi x)}$

g. $y = \tan^2(x) + 1$

h. $y = \dfrac{5x^{-0.2}}{x^4 + 20}$

i. $f(x) = \cot\left(\dfrac{2 - x^2}{3x}\right)$

j. $f(x) = \left(x^{-2} + \ln(x)\right)^a$ where a is a fixed constant

k. $y = 2^x + 2x^5$

l. Find $\dfrac{dy}{dx}$ for $\sin(y) + 5x = 10 + xy^2$