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. $f(x) = \dfrac{x^3 - 4x^2}{\sec(2x)}$

b. $g(x) = x^{-2}(x^3 + 2x - x^{-\frac{1}{2}})$

c. $h(x) = \ln\left(6 + 6x^{0.6}\right)$

d. $r(\theta) = \csc\left(\dfrac{9}{\theta}\right)$

e. $f(x) = \arctan(2-x)$

f. $p(t) = \sqrt{16t^3}$

g. $f(x) = x^a + b^x$ where a and b are fixed constants

h. $g(x) = \sin\left(e^x + \cos(2x)\right)$

i. $y = \dfrac{\ln x}{3 + 6x}$

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

k. $y = \log_2(x) + \log_2(8)$

l. Find $\dfrac{dy}{dx}$ for $x^2e^y = x + y$