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. $f(x) = \dfrac{2x}{5} + \dfrac{2}{5x} - \dfrac{2\pi}{5}$

b. $h(x) = \sqrt{x^2 - 25}$

c. $G(\theta) = \theta^4 \tan(\theta)$

d. $k(x) = \arcsin(3x)$

e. $R(\theta) = \left(2\theta + \sin\left(\frac{\theta}{\pi}\right)\right)^6$

f. $y = \cot(x)$

g. $f(x) = \left(c^2 + \ln(cx^2+1)\right)^{6.5}$ (Assume c is a fixed constant.)

h. $y = (4x-1)^{-1/5}\ln(x)$

i. $y = \ln(7) + e^{7x} + \sec(5x)$

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

k. $y = \dfrac{8e^x}{x - e^x}$

l. Find $\dfrac{dy}{dx}$ for $\cos(y^2) = x + y + \sqrt{2}$.