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. $f(x) = x^e + \dfrac{\pi}{2x} - \dfrac{4}{\pi^2}$

b. $g(x) = x\tan(x)$

c. $h(x) = \sec^4(3x)$

d. $f(x) = \arctan(x^2)$

e. $y = (\cos(x) + x^{-3.2})^5$

f. $f(\theta) = \dfrac{\sqrt{10}}{\sin(\theta)}$

g. $y = e^{-x}\cos\left(\frac{x}{3}\right)$

h. $y = \ln\left(2\sqrt{x^6 e^x}\right)$

i. $f(x) = \frac{x^5}{(x^2+2)^3}$

j. $f(x) = \cot\left(x^2 - bx\right)$ where b is a constant

k. $f(x) = \dfrac{x + 2\sin(x)}{\sin(8)}$

l. Find $\dfrac{dy}{dx}$ for $x^2 - y^3 = ye^x$. You must solve for $\dfrac{dy}{dx}$.