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

b. $g(x) = \sin(x)\cos(x)$

c. $h(x) = \dfrac{\sec(x)}{x}$

d. $f(t) = \sin^{-1}\left(t^2\right)$

e. $f(x) = 3(5^x + 5^2)^3$

f. $f(\theta) = \ln\left(\theta^3 + \tan(3\theta)\right)$

g. $y = \left(x^{0.3} + x\right)^{-4/3}$

h. $f(x) = \csc(\pi/x)$

i. $y = e^{-x} + x^4 e^{4x}$

j. $f(x) = \ln\left(\dfrac{\sin^2(x)}{1-2x}\right)$

k. $g(x) = \dfrac{\cos(2)}{\sqrt[3]{\cos(x)}}$

l. Find $\dfrac{dy}{dx}$ for $5(x^2+y^2) = ye^x$. You must solve for $\dfrac{dy}{dx}$.