Name: _____

- There are 12 points possible on this proficiency, one point per problem. **No partial credit will be given.**
- You have one hour to complete this proficiency.
- No aids (book, calculator, etc.) are permitted.
- You do **not** need to simplify your expressions.
- You must show sufficient work to justify your final expression. A correct answer for a nontrivial computation with no supporting work will be marked as incorrect.
- Your final answers **must start with** $f'(x) =$, $\frac{dy}{dx} =$, or similar.
- **Draw a box around your final answer.**

1. [12 points] Compute the derivatives of the following functions.

a. $f(t) = 7t^8 + \dfrac{9}{t} + \sqrt{\dfrac{3}{11}}$

b. $g(x) = \ln(6x^2) + \tan(x)$

c. $y = e^{3x^2-4}\sin(12x-3)$

d. $h(x) = \dfrac{7\sec(3x)}{9e^x + \sqrt{3}}$

e. $j(\theta) = \ln(\cot(\theta) + \cos(5\theta))$

f. $f(x) = 5^x(Ax+B)^{-1/2}$, where A and B are fixed constants

g. $y = \pi \csc(x) + \ln(3)$

h. $k(t) = \dfrac{t^2 - 4t + 5}{t^{3/2}}$

i. $f(h) = \dfrac{h + \log_3(h^2)}{7}$

j. $y = \sqrt[3]{e^2 + e^{\cos(x)}}$

k. $f(x) = \arctan(5x)$ (this is the same as writing $f(x) = \tan^{-1}(5x)$)

l. Find $\dfrac{dy}{dx}$ for $y^3 + \cos(x + y^2) = x^4 - 12$. *[You must solve for* $\dfrac{dy}{dx}$*.]*