

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.
- 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.  $f(x) = \sin^{-1}(e^x)$

b.  $f(x) = e^{\cos x}$

c.  $f(x) = \sqrt{3x + \ln(4x^2)}$

d.  $f(x) = \frac{\tan x}{x^3 + 1}$

e.  $f(x) = \frac{1}{2x} + \frac{7x^2}{2}$

f.  $f(x) = \frac{\cot x}{\csc x}$

g.  $f(x) = 4x^6 + 3x^5 - 5x^2 + \sin(\pi/2)$

h.  $f(t) = t \ln t + t^2$

i.  $f(x) = x \sin(2 - 5x)$

j.  $f(x) = \ln\left(\frac{x^2}{e^x}\right)$

k.  $f(x) = (5^x - x^5)^2$

l. Find  $\frac{dy}{dx}$  for  $x^2 + y^2 = \cos(xy)$ . You must solve for  $\frac{dy}{dx}$ .