

Name: \_\_\_\_\_

- There are 12 points possible on this proficiency, one point per problem. **No partial credit will be given.**
- A passing score is 10/12.
- You have 30 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.  $y = 3 \sec(3x)$

b.  $f(x) = \frac{\sqrt{x}}{6} + \frac{5}{\sqrt{x}} - \frac{4}{\sqrt{5}}$

c.  $f(x) = (\ln(x))(\tan(x))$

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

e.  $f(x) = 4 \sin^{-1}(4x)$

f.  $f(x) = \frac{\cos(x)}{\sin(x)}$

g.  $y = (x^{0.1} + 1)^{-2/5}$

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

i.  $f(x) = \frac{\sin(\pi/x)}{x^2 + 2}$

j.  $f(x) = \frac{\cos(2)}{\sqrt[3]{\cos(x)}}$

k.  $f(x) = \ln\left(\frac{\sin^2(2x)}{2x+1}\right)$

l. Find  $\frac{dy}{dx}$  for  $xe^y + 5(x^3 + y^3) = 0$ . You must solve for  $\frac{dy}{dx}$ .