

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

\_\_\_\_\_ / 12

- There are 12 points possible on this proficiency: **One point per problem. No partial credit.**
- A passing score is 10/12.
- 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 your final answer.

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

a.  $f(t) = 2t^{2/3} + \frac{3}{t^{2/3}} + \sqrt{\frac{2}{3}}$

b.  $r(x) = \sec(x^2 + 1)$

c.  $g(x) = (e^{3x} + e) \tan(x)$

d.  $h(x) = \ln(B \cos(x^3) - A)$ , where  $A$  and  $B$  are fixed constants

e.  $f(x) = \frac{1}{\sin(7x)}$

f.  $q(t) = \left(\sqrt{t^2 + 1}\right) \ln(t)$

g.  $f(x) = (x^3 + 3)e^x \cos(x)$

h.  $g(z) = \sin(\pi - z^3)$

i.  $s(t) = \frac{\cos(2t)}{t^2 + 2}$

j.  $f(x) = \frac{2x+5}{2\ln x + \ln 5}$

k.  $g(x) = \arctan(e^x)$

l. Compute  $\frac{dy}{dx}$  if  $e^{x+y} = xy + 3 \cos y$ . You must solve for  $\frac{dy}{dx}$ .