Name: ———————————————————————— ————— / 12

- There are 12 points possible on this proficiency: one point per problem with no partial credit.

- 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 should start with $f'(x) =$, $dy/dx =$ or something similar.

- Circle your final answer.

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

   a. $f(x) = \sqrt{19}\, x^{1/3} - 2e^x + \pi$

   b. $f(t) = \dfrac{t^{\frac{5}{2}} + t^2 - t}{\sqrt{t}}$

   c. $f(x) = (x - x^2)\sin(x)$

d. $f(x) = \dfrac{\cos(x)}{1 + \sin(3x)}$

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

f. $f(t) = t^2 \ln(at)$

g. $f(x) = \sec(x)x^{\frac{1}{3}}e^{4x}$

h. $f(z) = \arcsin(\sqrt{z})$

i. $f(t) = \tan(\ln(t^3 - 1))$

j. $f(x) = \cos^4(x^2 - x)$

k. $f(x) = \dfrac{1}{9x^2} + \left(\pi \dfrac{x-3}{5}\right)^3$

l. Compute dy/dx if $\quad e^y \cos(x) = x^2 y - 3$. You must solve for dy/dx.