**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.

- 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.** $f(t) = t\sin(t)$

**b.** $f(x) = e^{(7-x^5)}$

**c.** $f(x) = \sqrt{3x + \ln(6x)}$

**d.** $f(x) = \dfrac{\cos(x/2)}{x^6}$

**e.** $f(x) = \dfrac{1}{9x} + \sqrt{5-x}$

**f.** $f(\theta) = \ln(\sec\theta + \tan\theta)$

**g.** $f(q) = \dfrac{q \ln(q)}{\ln 2}$

**h.** $f(x) = \dfrac{\cos(x)}{\sin(x)}$

**i.** $y = \pi \left( \dfrac{6+x}{12} \right)^5$

**j.** $f(x) = \left(\sin(x^3 + e^3)\right)^5$

**k.** $f(x) = \arctan(3x)$ (this is the same as writing $f(x) = \tan^{-1}(3x)$)

**l.** Find $\dfrac{dy}{dx}$ for $2y + x = y\sin(x)$. You must solve for $\dfrac{dy}{dx}$.