Name: ———————————————————   **Instructor (circle):   Maxwell   Jurkowski   Sus**

- 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 60 minutes to complete this proficiency.

- No aids (book, calculator, etc.) are permitted.

- You do **not** need to simplify your expressions.

- You must show sufficient work to justify your final expression; a correct answer for a non-trivial computation with no supporting work will be marked as incorrect.

- 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. $f(x) = e^2 x^{1/2} + 2e^x + \sqrt{9}$

   b. $r(x) = (x^4 - x^2)\sin(x)$

   c. $h(x) = \sin(kx^2 - 5)$ where k is a constant.

d. $g(x) = \dfrac{2}{x} + \dfrac{x^3}{\sqrt{5}}$

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

f. $y = \dfrac{\cos(2x)}{x^5 + \pi}$

g. $w(x) = \ln(\cos(x^3) - 4x^7)$

h. $f(x) = \arctan(\sqrt{1+x})$

i. $h(x) = x^4 \tan(x) \sin(x)$

j. $r(x) = \sin(\ln(1+x^2))$

k. $g(x) = \sec(xe^x)$

l. Compute dy/dx if $e^y \cos(x) = xy + 1.$ You must solve for dy/dx.