

Name: _____ Instructor (circle): Maxwell Jurkowski Sus

- 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.
- 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.**

All students must affirm the following statements by initialing in the blanks provided. Students using their own paper must write out the statements in full.

_____ I will not seek or accept help from anyone.

_____ I will not use a calculator, books, notes, the internet or other aids.

_____ I understand that a correct answer without sufficient supporting work will be marked as incorrect.

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

a. $f(x) = e^2\sqrt{x} + \frac{x^9}{\pi} - \sqrt[3]{5}$

b. $g(x) = \tan(x)\cos(x)$

c. $h(t) = \frac{t^4}{t^3 - 2}$

d. $g(x) = e^{\sin(\alpha x)}$ where α is a constant.

e. $f(x) = \frac{e^x \cos(x)}{1+x}$

f. $y = x^3 \sin(e^x)$

g. $k(x) = \sin(x) \ln(x) \cos(7x - \pi)$

h. $f(x) = \sec\left(\frac{1}{1+x}\right)$

i. $y = \sin(\sqrt{1-x^2})$

j. $s(\theta) = \tan(\theta^2 \ln(\theta))$

k. $w(r) = \ln(\arctan(r))$

l. Compute dy/dx if $\sin(y)x = x^3y$. You must solve for dy/dx .