

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.
- Correct parenthesization is required.
- Do not put a $+C$ where it does not belong, and you must include $+C$ where it is needed.
- You must show sufficient work to justify your final expression. A correct answer for a nontrivial computation with no supporting work will be marked as incorrect.

1. [12 points] Compute the following integrals.

a. $\int (x^5 + e^x - 2x^{-3}) dx$

b. $\int_1^4 \frac{x^2 - 2\sqrt{x}}{x} dx$

c. $\int e^x \sin(e^x + 1) dx$

d. $\int \pi \left(\frac{x-2}{5} \right) dx$

e. $\int \frac{1 + \ln(x)}{3x} dx$

f. $\int \left(e^{2x} + \sec^2(3x) + \frac{1}{x} \right) dx$

g. $\int_0^{\pi/2} \frac{5 \sin(x)}{\sqrt{1+3 \cos(x)}} dx$

h. $\int \frac{e^2}{1+x^2} dx$

i. $\int (\cos \theta + \sec \theta \tan \theta + \csc(\pi/4)) d\theta$

j. $\int ax^p dx$ where a and p are positive constants

k. $\int \frac{5}{3x-1} dx$

l. $\int x(x+2)^{10} dx$