Name: _____

- 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.
- For at least one problem you must indicate correct use of a constant of integration.
- Circle or box your final answer.
- You must use parentheses correctly. A mis-parenthesized answer is incorrect. Do not write $8x \cdot -x^2$ to indicate $8x(-x^2)$, and definitely do not write $8x \cdot -x^2 + 2$ if you mean $8x(-x^2+2)$.

1. [12 points] Compute the following definite/indefinite integrals.

a. $\displaystyle\int \left(\frac{-4}{x^5} + \cos(x) \right) \, dx$

b. $\displaystyle\int e^{12x} \, dx$

c. $\displaystyle\int_0^{\sqrt{\pi}} x \sin(x^2) \, dx$

d. $\displaystyle\int \frac{1+\sec^2(3x)}{3x+\tan(3x)}\,dx$

e. $\displaystyle\int \left(\frac{x^2}{3}+\frac{5}{x}-\frac{1}{2}\right)\,dx$

f. $\displaystyle\int \frac{6}{2x(\ln x)^3}\,dx$

g. $\displaystyle\int \frac{1}{1+(4x)^2}\,dx$

h. $\displaystyle\int \frac{\arcsin(x)}{\sqrt{1-x^2}}\,dx$ (recall $\arcsin(x) = \sin^{-1}(x)$)

i. $\displaystyle\int (e^{-5x} + \cos(3x))\,dx$

j. $\displaystyle\int_{-1}^{1} x(5-x)\,dx$

k. $\displaystyle\int \frac{x^2}{\sqrt{1-x^3}}\,dx$

l. $\displaystyle\int \frac{t}{t+3}\,dt$