

Math 1232: Single-Variable Calculus 2
George Washington University Spring 2023
Recitation 4

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February 9, 2024

Problem 1. (a) We want to compute $\int x^2 e^{-3x} dx$. Why do we want to use integration by parts? What should be our u and dv , and why?

(b) Compute the integral.

(c) Now we want to compute $\int \cos(3x)e^{2x} dx$. Why do we want to use integration by parts? What should be our u and dv , and why? When we need to make another choice, what forces us to make that choice?

(d) Compute the integral.

Problem 2. Compute $\int \arctan(x) dx$.

Problem 3. Compute $\int \sin^6(x) dx$.

Problem 4. Compute $\int \sec^6(x) \tan^5(x) dx$ with two different approaches. Do you get the same answer either way?

Problem 5 (Bonus). Do one of the following two integrals. Explain why you don't want to do the other one.

(a) $\int \tan^2(x) \sec^3(x) dx$

(b) $\int \tan^3(x) \sec^3(x) dx$.

Problem 6. Consider the integral $\int \frac{dx}{\sqrt{4x^2 - 1}}$.

- (a) Which trig function would let us simplify that square root, and what identity are we using?
- (b) What trigonometric substitution should we use here?
- (c) Compute the antiderivative.
- (d) Make sure to substitute your x back into the equation!