

Math 1231-13: Single-Variable Calculus 1
George Washington University Spring 2024
Recitation 11

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Problem 1. Compute the following integrals, without using substitutions:

(a) $\int x(x+1) dx$

(b) $\int x\sqrt{x} dx$

(c) $\int 5 \csc(x) \cot(x) dx$

(d) $\int (x^4 - x)(x^2 + x + 1) dx.$

Problem 2. Compute the following integrals:

(a) $\int \sqrt{3x-4} dx.$

(b) $\int \frac{\sin(\sqrt{x})}{\sqrt{x}} dx.$

(c) $\int x\sqrt{x+1} dx.$

Problem 3. (a) Compute $\int_1^2 \frac{6x^2 - 7}{\sqrt{2x^3 - 7x + 14}} dx$ using a u -substitution and explicitly changing the bounds of integration.

(b) Now compute the indefinite integral $\int \frac{6x^2 - 7}{\sqrt{2x^3 - 7x + 14}} dx.$

- (c) Use your answer in part (b) to compute $\int_1^2 \frac{6x^2 - 7}{\sqrt{2x^3 - 7x + 14}} dx$ again. How does this compare to what you did in part (a)?

Problem 4. We want to compute $\int \sec^8(x) \tan(x) dx$. Can you find multiple u that all work?

Problem 5. Evaluate $\int_{-2}^2 4\sqrt{4-x^2} dx$ by thinking about area. (Hint: what does the graph of $\sqrt{4-x^2}$ look like?)

Problem 6. Compute the total area of the “valley” between two peaks of the sine function.

