## 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.

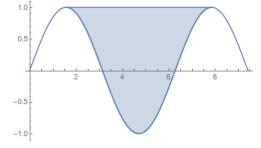
(b) Now compute the indefinite integral 
$$\int \frac{6x^2 - 7}{\sqrt{2x^3 - 7x + 14}} dx.$$

(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.



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