

# MAT 136: Calculus I

## Weekly Homework 7

NAME:

### Instructions

Complete each of the following exercises. Your solutions should be complete and neatly written. In particular, you should show all of your work. Write your solutions on your own paper or prepare them digitally. You will need to capture your work digitally and then upload a single PDF document (possibly with multiple pages) to BbLearn. There are many free smartphone apps for doing this. I use TurboScan on my iPhone. This assignment is due on **Friday, October 30 by 8:00pm**.

### Problems

1. Compute each of the following indefinite integrals.

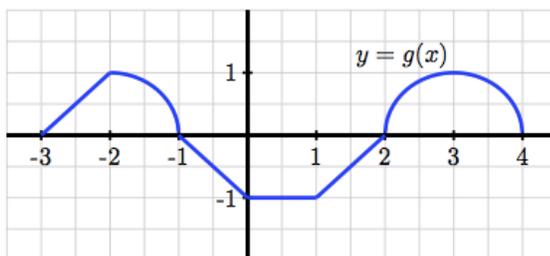
(a)  $\int 3x^2 + 5x^{-2} dx$

(c)  $\int \sec(x)(\sec(x) + \tan(x)) dx$

(b)  $\int \frac{x^2 + 4x}{x^3} dx$

(d)  $\int \sin(3x) dx$

2. Let  $g$  be the function given by the following graph. Assume that each piece of the function is part of a circle or part of a line. Compute each of the following integrals.



(a)  $\int_{-3}^4 g(x) dx$

(b)  $\int_{-3}^4 |g(x)| dx$

3. Approximate the value of  $\int_0^2 x^2 + 3x + 2 dx$  using 4 rectangles and right endpoints. Feel free to use a calculator for this problem, but be sure to write down the sum that needs to be computed.
4. Let  $f$  and  $g$  be functions such that  $\int_a^b f(x) dx = \int_a^b g(x) dx$ . Does this imply that  $f = g$  on  $[a, b]$ ? If the answer is yes, explain why. If the answer is no, provide a specific counterexample.
5. Suppose  $f$  is a bounded continuous function on the interval  $[1, 7]$  such that  $2 \leq f(x) \leq 3$  for all  $x \in [1, 7]$ . What are the minimum and maximum possible values of  $\int_1^7 f(x) dx$ ?
6. Compute  $\int_0^1 3x^2 + 1 dx$  using a limit of Riemann sums with right endpoints.