

## HW 3: Sections 4.1 and 4.5

Due: Thursday, September 11th in SQRC by 9pm

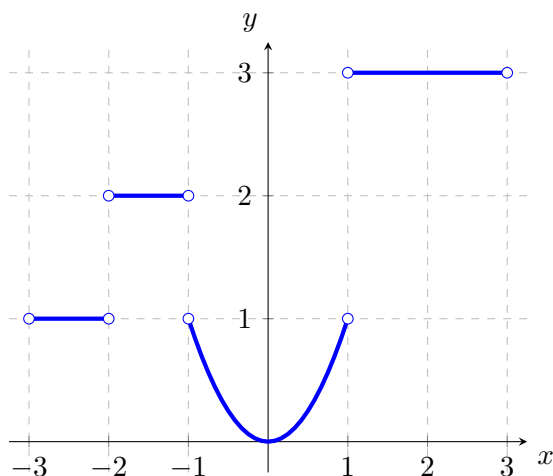
**Learning Goals:**

- Compute antiderivatives.
- Sketch the graph of a function from the graph of its derivative.
- Use the Fundamental Theorem of Calculus, Part I, to compute the integral of a function.
- Use the Fundamental Theorem of Calculus, Part II, to compute the derivative of an area function.

**A reminder about collaboration:** Collaboration is an important part of learning mathematics and I strongly encourage you collaborate with your classmates on homework and studying for exams. With that said, there is a difference between working with someone else and copying down what they say or write without understanding it. I encourage you to write up final solutions on your own after you understand a problem, which might mean stepping away from your study group for 5 or 10 minutes.

**Questions:**

1. Problem 4.1.8. Find the general antiderivative of  $2x^{-2} + \frac{1}{\sqrt{x}}$ .
2. Problem 4.1.20. Find the general antiderivative of  $2x^{-1} + \sin(x)$ .
3. Problem 4.1.22. Find the general antiderivative of  $\frac{3}{4x^2+4}$ .
4. Problem 4.1.49.b. Sketch the graph of the function  $f(x)$  corresponding to the graph of  $y = f'(x)$  given below.



5. Problem 4.5.4. Use the Fundamental Theorem of Calculus to compute

$$\int_0^2 x^3 + 3x - 1 \, dx.$$

6. Problem 4.5.30. Find the derivative  $f'(x)$  where  $f(x) = \int_{2-x}^{xe^x} e^{2t} dt$ .