

**MT 1810 Calculus II**  
**Worksheet: Sections 6.1 – 6.3**  
**Review of Antiderivatives and FTC**

Name: \_\_\_\_\_

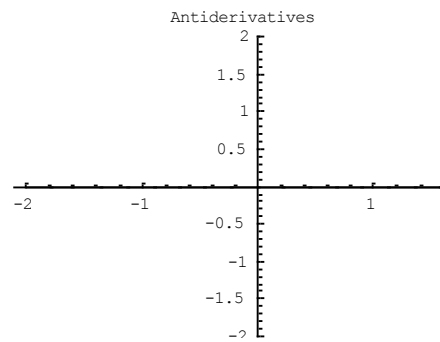
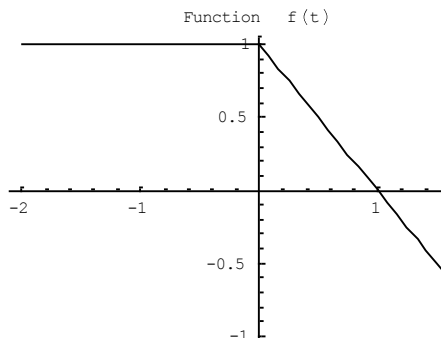
**Purpose:** In Calculus I, we studied Sections 6.1 – 6.3 to prepare for some of the applications in Chapter 11. We now review this material so we can continue with the main topics in Calculus II.

**Procedure:** You may work in groups, but each student must complete and submit his/her own copy of the worksheet. Show all work.

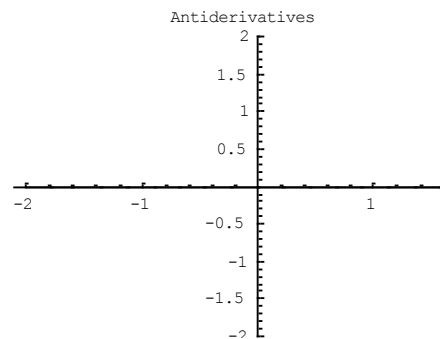
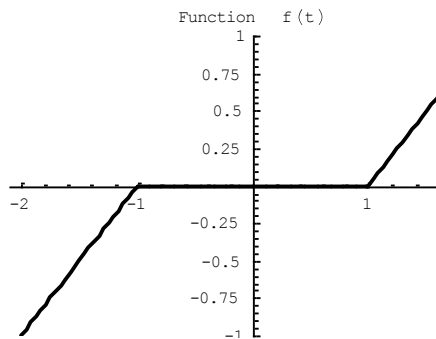
**Finding Antiderivatives Graphically and Numerically (Section 6.1):**

1. For each of the following, a graph of  $f(t)$  is given. For each graph, sketch graphs of two different antiderivatives.

a.



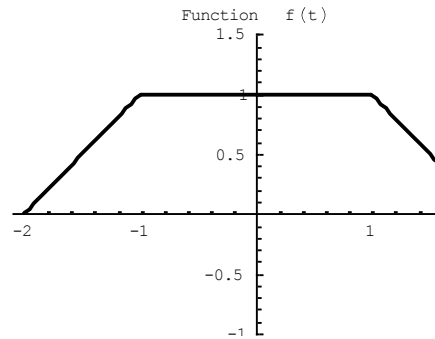
b.



2. We can use the Fundamental Theorem of Calculus (FTC) to compute values of an antiderivative (see page 263 in the text). Suppose  $F'(t) = f(t)$ . We can rewrite the FTC as follows:

$$F(b) = F(a) + \int_a^b f(t) dt$$

Thus if we know the value of  $F(a)$  and we have a formula or a graph for  $f(t)$ , we can compute the value of  $F(b)$ . Consider the graph of  $f(t)$  given below:



- a. Suppose  $F(-2) = 0$ . Compute  $F(0)$ .
- b. Suppose  $F(-1) = -2$ . Compute  $F(2)$ .
3. Suppose you know that  $f(t)$  is a decreasing function, and you are given some values in the chart below. Estimate the corresponding values of the antiderivative. Hint: Think area.

|        |    |   |   |   |     |
|--------|----|---|---|---|-----|
| $t$    | 0  | 2 | 4 | 6 | 8   |
| $f(t)$ | 10 | 6 | 4 | 3 | 2.5 |
| $F(t)$ | 0  |   |   |   |     |

**Finding Antiderivatives Analytically (Section 6.2):**

4. Find the following antiderivatives.

a.  $\int \left( \sqrt{t} + \frac{1}{\sqrt{t}} \right) dt =$

b.  $\int 5^x - x^5 dx =$

c.  $\int \left( 2 - \frac{1}{x} + e^{3x} \right) dx =$

d.  $\int 5 \sin(-2t) dt =$

5. Use FTC to compute the following definite integrals.

a.  $\int_1^4 \frac{1}{x^2} dx =$

b.  $\int_0^1 (3x+3)^2 dx =$

c.  $\int_0^{\frac{\pi}{4}} \cos(2t) dt =$