Math Xb Spring 2005
Characteristics of the Area Function

April 11, 2005

1   Goals

- To determine where an area function A_f is increasing, decreasing, concave up, and concave down by examining f.

- To explore the relationship between the area function and the original function

2   Analyzing Area Functions

1. Some observations about the relationship between $_0A_f$ and f

   (a) $_0A_f$ is increasing when f is positive.
   (b) $_0A_f$ is decreasing when f is negative.
   (c) $_0A_f$ is concave up when f is increasing.
   (d) $_0A_f$ is concave down when f is decreasing.

2. Recall that on Friday's worksheet that if $f(t) = 3t + 1$, that

$$_0A_f(x) = \frac{3}{2}x^2 + x$$
$$_1A_f(x) = \frac{3}{2}x^2 + x - \frac{3}{2}$$
$$_2A_f(x) = \frac{3}{2}x^2 + x - 8$$

   What do you notice about the derivatives of each of these area functions?

3. Can you come up with a conjecture about the relationship between the area function for f and the function f?

3   References

- §23.2 in *Calculus: An Integrated Approach to Functions and Their Rates of Change.*