# Chapter 13 – 5a The Fundamental Theorem of Calculus

**Example 1.** The price-demand equation for hamburgers at a fast-food restaurant is given by

where x is the number of hamburgers per day and p is the price per hamburger. The total cost (in dollars) for producing x hamburgers is given by



A) Assume that hamburger sales increase from 150 hamburgers per day to 200 hamburgers per day. Compare the change in total cost with the area under the marginal cost curve from 150 to 200.

Result:

B) Under the same assumptions, compare the change in revenue with the area under the marginal revenue curve from 150 to 200.

Result:

C) Under the same assumptions, compare the change in profit with the area under the marginal profit curve from 150 to 200.

Result:

### The Fundamental Theorem of Calculus

If is continuous on the interval and is any antiderivative of then

### Average Value of a Continuous Function on [a,b]

If is continuous on the interval and is any antiderivative of then the average value of on the interval is given by

**Example 4.** Evaluate

**Example 5.** Evaluate

**Example 6.** Evaluate

**Example 7.** Evaluate

**Example 8.** Evaluate

**Example 9.** Evaluate

**Example 10.** Evaluate