

# Chapter 5.3: Fundamental Theorem, Averages, Interpretations Calculus II

College of the Atlantic

1. Find the average value of  $x^2$  on the interval from 0 to 1. Illustrate this average value on a graph of  $x^2$ .
2. Find the average value of  $x^3$  on the interval from 0 to 1. Illustrate this average value on a graph of  $x^3$ .
3. Which function ( $x^2$  or  $x^3$ ) has a larger average value from 0 to 1? Does this make sense geometrically? How can you see geometrically that the average value for both functions has to be less than a half?
4. Evaluate the following definite integrals using the fundamental theorem:

$$\int_{-2}^2 e^x + x^2 dx . \quad (1)$$

$$\int_{-2}^2 e^t + t^2 dt . \quad (2)$$

5. Let  $r(t)$  be the rate at which snow falls, in inches per hour, where  $t$  is measured in hours since midnight. What is the practical interpretation of the following equations:

$$r(8) = 1.2 , \quad (3)$$

$$r'(8) = -0.2 , \quad (4)$$

$$\int_6^{14} r(t) dt = 9.5 . \quad (5)$$