

Section 5.1

After viewing the lecture videos and reading the textbook, you should be able to answer the following questions:

1. In general, how will we estimate the area under the graph of a nonnegative continuous function, $y = f(x)$, over a closed interval, $[a, b]$?
2. To estimate the area under the graph of a positive continuous function, $y = f(x)$, over a closed interval, $[a, b]$, we use the formula

$$A \approx f(c_1) \cdot \Delta x + f(c_2) \cdot \Delta x + f(c_3) \cdot \Delta x + \cdots + f(c_n) \cdot \Delta x.$$

- a. What does A represent?
 - b. What does the symbol \approx mean?
 - c. What does n represent?
 - d. What does Δx represent? How can we calculate Δx ?
 - e. What do we mean when we talk about the k -th subinterval of $[a, b]$?
 - f. What does c_k represent?
 - g. Other than “the value of $f(x)$ at $x = c_k$ ”, what does $f(c_k)$ represent?
3. Suppose an object is moving only forwards in a straight line and that its velocity at a time t is given by $v(t)$. To find the **total distance traveled** over the time interval $[a, b]$ we (select one):
 - a. Calculate $v'(b) - v'(a)$.
 - b. Find the area under the graph of $y = v(t)$ over the interval $[a, b]$.
 - c. Find the area under the graph of $y = v'(t)$ over the interval $[a, b]$.
 - d. Calculate $v(b) - v(a)$.
 4. What is the difference between **displacement** and **total distance traveled**?
 5. What is the average value of a nonnegative continuous function, $y = f(x)$, over a closed interval, $[a, b]$?