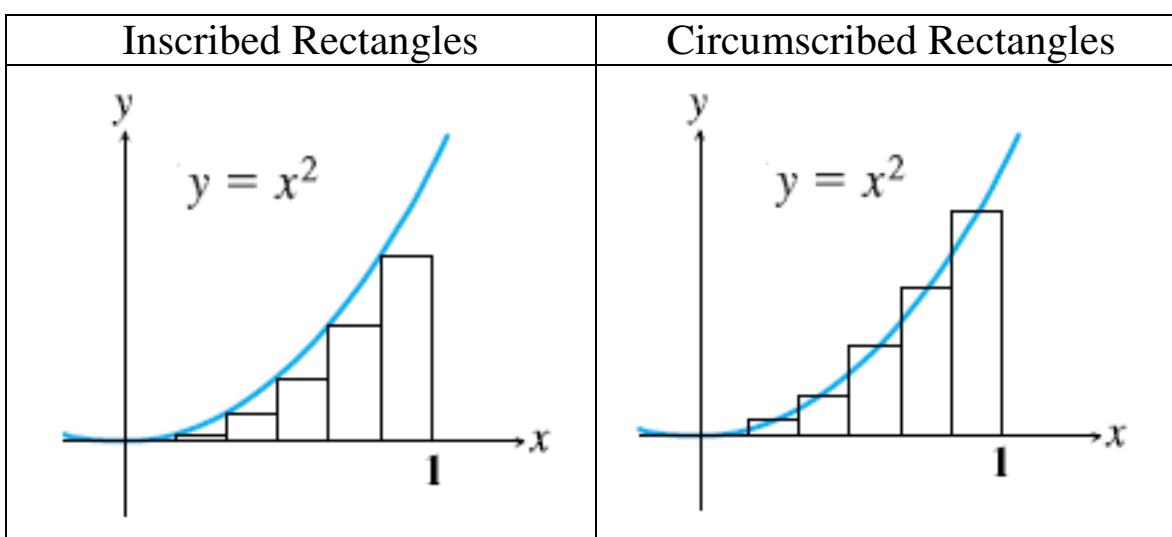


## LESSON 2: THE PROBLEM OF AREA

- |             |  |
|-------------|--|
| Objectives: | <ol style="list-style-type: none"><li>1. To use inscribed rectangles, circumscribed rectangles, and limits to calculate area under the curve</li><li>2. To define and geometrically describe a Riemann sum</li></ol> |
|-------------|--|



### Problems

1.  $y = x^2$  on  $[0, 1]$
2.  $y = x^2$  on  $[1, 2]$
3.  $f(x) = 2x + 1$  on  $[1, 4]$
4.  $f(x) = x^3 + 2$  on  $[0, 3]$
5.  $f(x) = 3x^2 + x - 1$  on  $[1, 2]$

## Sigma Notation for Sums

$$\sum_{j=1}^k 1 = 1 + 1 + 1 + \dots + 1 = 1 \cdot k = k$$

$$\sum_{j=1}^k j = 1 + 2 + 3 + \dots + k = \frac{k(k+1)}{2}$$

$$\sum_{j=1}^k j^2 = 1^2 + 2^2 + 3^2 + \dots + k^2 = \frac{k(k+1)(2k+1)}{6}$$

$$\sum_{j=1}^k j^3 = 1^3 + 2^3 + 3^3 + \dots + k^3 = \frac{k^2(k+1)^2}{4}$$