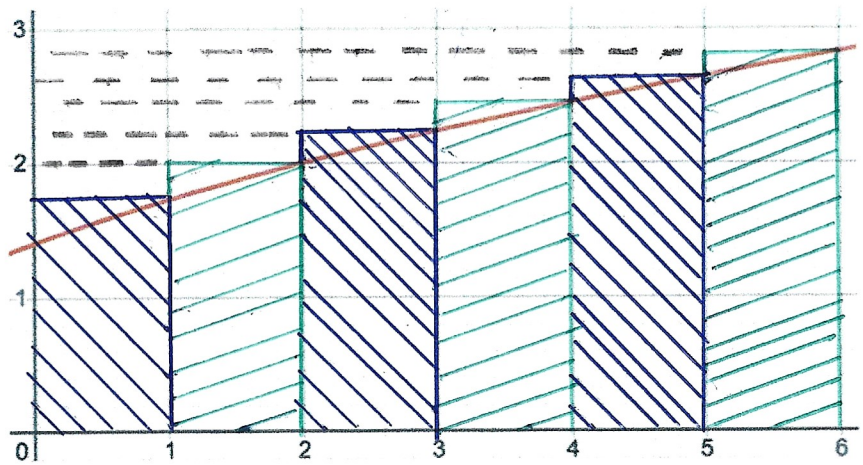
Calculus I SI Worksheet

Lesson 5.1 Area Under the Curve

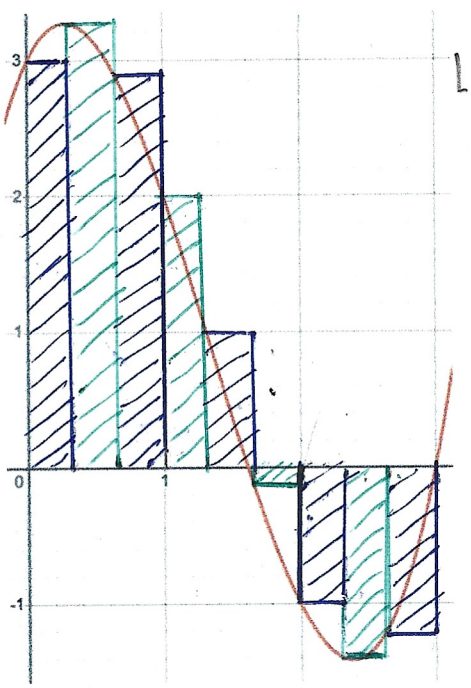
1. Use RHR to estimate the area from 0-6 with 6 rectangles.



$R_6 = 1(1.78 + 2 + 2.25 + 2.45 + 2.63 + 2.81)$

$R_6 = 13.92$ units^2

2. Use LHR to find the area from 0-3 with 9 rectangles.



$L_9 = \frac{1}{3}(3 + 3.23 + 2.90 + 2 + 1 - 0.15 - 1 - 1.4 - 1.21)$

$L_9 = 2.79$ units^2

3. Use midpoints to find the area from 0-5 using 10 rectangles for the function $f(x) = x^2 - x$

$$\Delta x = \frac{b-a}{n} = \frac{5-0}{10} = \frac{1}{2}$$

$$M = \sum_{i=1}^{10} \frac{1}{2} f(x_i)$$

$$M = \frac{1}{2}\left[f(0.25) + f(0.75) + f(1.25) + f(1.75) + f(2.25) + f(2.75) + f(3.25) + f(3.75) + f(4.25) + f(4.75)\right]$$

$$M = \frac{1}{2}\left[-0.1875 - 0.1875 + 0.3125 + 1.3125 + 2.8125 + 4.8125 + 7.3125 + 10.3125 + 13.8125 + 17.8125\right]$$

$$\boxed{M = 29.0625 \text{ units}^2}$$

4. Use RHR to find the area from 0-6 using 6 rectangles for the function $f(x) = \sqrt{x+2}$

$$\Delta x = \frac{b-a}{n} = \frac{6-0}{6} = 1$$

$$R = \sum_{i=1}^{6} 1 f(x_i)$$

$$R = \left[f(1) + f(2) + f(3) + f(4) + f(5) + f(6)\right]$$

$$R = [1.73 + 2 + 2.24 + 2.45 + 2.65 + 2.83]$$

$$\boxed{R = 13.89 \text{ units}^2}$$