

1) Find the Sum  $\sum_{k=3}^7 \frac{k}{4-k^2}$

2) Use Sigma Notation to write the sum  $\frac{2}{2+1} + \frac{4}{2+2} + \frac{8}{2+9} + \dots + \frac{12}{2+36}$

3) Use properties of summation to evaluate the sum:

$$\sum_{i=1}^{24} 3i + 2i^2 - 2$$

4) Use Left, Middle, and Right endpoints to find approximations of area of region between the graph and the x-axis:  $f(x) = 3 + 4x$  in interval  $[1, 13]$  using 3 rectangles

a) Left endpoint (LRAM):

b) Right Endpoint (RRAM):

c) Middle rectangle (MRAM):

5) Selected values of a function,  $f$ , are given in the table below:

x	0	3	7	8	12	15	18
f(x)	3	2	4	11	15	2	1

a) Give the middle approximation with 3 subintervals for  $f$  on the interval  $[0, 18]$

x	0	3	7	8	12	15	18
f(x)	3	2	4	11	15	2	1

b) Use right-handed rectangles to approximate the area with 4 subintervals for  $f$  on the interval  $[3, 15]$

x	0	3	7	8	12	15	18
f(x)	3	2	4	11	15	2	1

c) Use left-handed rectangles to approximate the area with 4 subintervals for  $f$  on the interval  $[0, 12]$

x	0	3	7	8	12	15	18
f(x)	3	2	4	11	15	2	1

d) Use trapezoids to approximate the area with 3 subintervals for  $f$  on the interval  $[0, 18]$

1) Find the Sum  $\sum_{k=3}^7 \frac{k}{4-k^2}$

$$\frac{3}{4-3^2} + \frac{4}{4-4^2} + \frac{5}{4-5^2} + \frac{6}{4-6^2} + \frac{7}{4-7^2}$$

$$\frac{3}{-5} + \frac{4}{-12} + \frac{5}{-21} + \frac{6}{-32} + \frac{7}{-45} = \boxed{\frac{-7633}{5040} \approx -1.514}$$

2) Use Sigma Notation to write the sum:  $\frac{2}{2+1} + \frac{4}{2+2} + \dots + \frac{12}{2+36}$

$$\sum_{i=1}^6 \frac{2i}{2+i^2}$$

3) Use properties of summation to evaluate the sum:

$$\sum_{i=1}^{24} 3i + 2i^2 - 2$$

$$3 \sum i + 2 \sum i^2 - 2 \sum 1$$

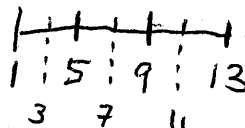
$$3 \left[ \frac{n(n+1)}{2} \right] + 2 \left[ \frac{n(n+1)(2n+1)}{6} \right] - 2[n]$$

$$3 \left[ \frac{24(25)}{2} \right] + 2 \left[ \frac{(24)(25)(49)}{6} \right] - 2(24)$$

$$= 900 + 9800 - 48 = \boxed{10652}$$

4) Use Left, Middle, and Right endpoints to find approximations of area of region between the graph and the x-axis:  $f(x) = 3 + 4x$  in interval  $[1, 13]$  using 3 rectangles

$$\text{width} = \frac{b-a}{n} = \frac{13-1}{3} = \frac{12}{3} = 4$$



a) Left endpoint (LRAM):

$$\begin{aligned} \text{Area} &\approx 4 \cdot f(1) + 4 \cdot f(5) + 4 \cdot f(9) \\ &= 4(7) + 4(23) + 4(39) = \boxed{276} \end{aligned}$$

b) Right Endpoint (RRAM):

$$\begin{aligned} \text{Area} &\approx 4 \cdot f(5) + 4 \cdot f(9) + 4 \cdot f(13) \\ &= 4(23) + 4(39) + 4(55) = \boxed{468} \end{aligned}$$

c) Middle rectangle (MRAM):

$$\begin{aligned} \text{Area} &\approx 4 \cdot f(3) + 4 \cdot f(7) + 4 \cdot f(11) \\ &= 4(15) + 4(31) + 4(47) = \boxed{372} \end{aligned}$$

5) Selected values of a function,  $f$ , are given in the table below:

x	0	3	7	8	12	15	18
f(x)	3	2	4	11	15	2	1

a) Give the middle approximation with 3 subintervals for  $f$  on the interval  $[0, 18]$

$$\begin{aligned} \text{Area} &= 7(2) + 5(11) + 6(2) \\ &= \boxed{81} \end{aligned}$$

b) Use right-handed rectangles to approximate the area with 4 subintervals for  $f$  on the interval  $[3, 15]$

$$\begin{aligned} \text{Area} &= 4(4) + 1(11) + 4(15) + 3(2) \\ &= \boxed{93} \end{aligned}$$

c) Use left-handed rectangles to approximate the area with 4 subintervals for  $f$  on the interval  $[0, 12]$

$$\begin{aligned} \text{Area} &= 3(3) + 4(2) + 1(4) + 4(11) \\ &= \boxed{65} \end{aligned}$$

d) Use trapezoids to approximate the area with 3 subintervals for  $f$  on the interval  $[0, 18]$

$$\begin{aligned} \text{Area} &= \frac{w}{2} [h_1 + h_2] \\ \text{Area} &= \frac{7}{2} [3+4] + \frac{5}{2} [4+15] + \frac{6}{2} [15+1] \\ &= \frac{49}{2} + \frac{95}{2} + 48 = \boxed{120} \end{aligned}$$