

4.2/4.6 Quiz Review WS #3

Use sigma notation to write sum

4.2, 4.6 Quiz  
Review #3

$$1) 7\left[\frac{3}{6}+4\right]+7\left[\frac{6}{6}+8\right]+7\left[\frac{9}{6}+12\right]+ \dots + 7\left[\frac{18}{6}+24\right]$$

2) Use Limit Definition to find area:  $h(x) = 3x - x^2$   $[-1, 2]$ .

3) Use 3 right-handed rectangles to approximate area of  $f(x) = 1 + 3x^2$ ,  $x$ -axis,  $x=2$ ,  $x=4$

4) Use 2 trapezoids to approximate area  $[3, 20]$

x	2	3	6	9	10	11	13	17	19	20	33
f(x)	8	4	1	5	6	9	3	11	4	17	19

Use sigma notation to write sum Review #3  
Key WSH3

$$1) 7 \left[ \frac{3}{6} + 4 \right] + 7 \left[ \frac{6}{6} + 8 \right] + 7 \left[ \frac{9}{6} + 12 \right] + \dots + 7 \left[ \frac{18}{6} + 24 \right]$$

$$\sum_{i=1}^6 7 \left[ \frac{3i}{6} + 4i \right]$$

2) Use Limit Definition to find area:  $h(x) = 3x - x^2$   $[-1, 2]$ .

$$A = \lim_{n \rightarrow \infty} \sum_{i=1}^n \left[ \frac{b-a}{n} \cdot f \left[ a + \frac{b-a}{n} i \right] \right]$$

$$\text{width} = \frac{b-a}{n} = \frac{2-(-1)}{n} = \frac{3}{n}$$

$$A = \lim_{n \rightarrow \infty} \sum_{i=1}^n \left[ \frac{3}{n} \cdot f \left[ -1 + \frac{3}{n} i \right] \right]$$

$$A = \lim_{n \rightarrow \infty} \sum_{i=1}^n \left[ \frac{3}{n} \cdot \left[ 3 \left( -1 + \frac{3}{n} i \right) - \left( -1 + \frac{3}{n} i \right)^2 \right] \right]$$

$$= \lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{3}{n} \cdot \left[ -3 + \frac{9}{n} i - \left( 1 - \frac{6}{n} i + \frac{9}{n^2} i^2 \right) \right]$$

$$= \lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{3}{n} \cdot \left[ -4 + \frac{15}{n} i - \frac{9}{n^2} i^2 \right]$$

$$= \lim_{n \rightarrow \infty} \sum_{i=1}^n \left[ -\frac{12}{n} + \frac{45}{n^2} i - \frac{27}{n^3} i^2 \right]$$

$$= \lim_{n \rightarrow \infty} \left[ \sum_{i=1}^n -\frac{12}{n} + \sum_{i=1}^n \frac{45}{n^2} i - \sum_{i=1}^n \frac{27}{n^3} i^2 \right]$$

$$= \lim_{n \rightarrow \infty} \left[ -\frac{12}{n} \sum_{i=1}^n 1 + \frac{45}{n^2} \sum_{i=1}^n i - \frac{27}{n^3} \sum_{i=1}^n i^2 \right]$$

$$= \lim_{n \rightarrow \infty} \left[ -\frac{12}{n} (n) + \frac{45}{n^2} \left[ \frac{n(n+1)}{2} \right] - \frac{27}{n^3} \left[ \frac{n(n+1)(2n+1)}{6} \right] \right]$$

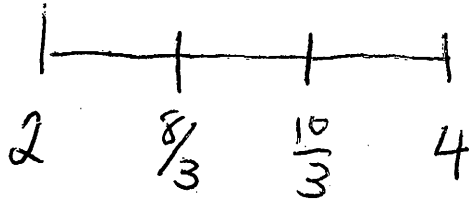
$$= \lim_{n \rightarrow \infty} \left[ -\frac{12n}{n} + \frac{45n^2 + 45n}{2n^2} - \frac{54n^3 + \dots}{6n^3} \right]$$

$$= -12 + \frac{45}{2} - \frac{54}{6}$$

$$= \boxed{\frac{3}{2} \text{ or } 1.5}$$

3) Use 3 right-handed rectangles to approximate area of  $f(x) = 1 + 3x^2$ , x-axis,  $x=2$ ,  $x=4$

$$\text{width} = \frac{b-a}{n} = \frac{4-2}{3} = \frac{2}{3}$$



$$A = \frac{2}{3} \cdot f\left(\frac{8}{3}\right) + \frac{2}{3} \cdot f\left(\frac{10}{3}\right) + \frac{2}{3} f(4)$$

$$A = \frac{2}{3} [22.33 + 34.33 + 49] = \boxed{70.44}$$

4) Use 2 trapezoids to approximate area  $[3, 20]$

x	2	3	6	9	10	11	13	17	19	20	33
f(x)	8	4	1	5	6	9	3	11	4	17	19

$$A = \frac{w}{2} [h_1 + h_2]$$

$$A = \frac{8}{2} [f(3) + f(11)] + \frac{9}{2} [f(11) + f(20)]$$

$$= 4(4 + 9) + \frac{9}{2}(9 + 17)$$

$$= 4(13) + 4.5(26)$$

$$= 52 + 117 = \boxed{169}$$