

MORE PRACTICESERIES AND SEQUENCES

(1) Find:

(a) 
$$\sum_{k=1}^2 \frac{6k}{k+1}$$

(c) 
$$\sum_{i=1}^3 (-1)^{i+1} \sin \frac{\pi}{i}$$

(b) 
$$\sum_{k=1}^4 \cos k\pi$$

(d) 
$$\sum_{j=1}^6 (-2)^{j-1}$$

(e) 
$$\sum_{n=0}^5 (-1)^n 2^n$$

(2) Evaluate

(a) 
$$\sum_{i=1}^{10} i$$

(f) 
$$\sum_{k=9}^{36} k$$

(b) 
$$\sum_{k=1}^{10} k^2$$

(g) 
$$\sum_{i=1}^n 4$$

(c) 
$$\sum_{i=1}^{10} k^3$$

(h) 
$$\sum_{i=1}^n (i-1)$$

(d) 
$$\sum_{k=1}^6 (3-k^2)$$

(i) 
$$\sum_{k=1}^n \left(\frac{1}{n} + 2n\right)$$

(e) 
$$\sum_{k=1}^6 (k^2 - 5)$$

(j) 
$$\sum_{k=1}^n \frac{k}{n^2}$$

(3) If  $f(x) = x$ ,  $c_k = \frac{kb}{n}$ ,  $\Delta x = \frac{b}{n}$ ,

find  $\sum_{k=1}^n f(c_k) \Delta x$ .

(Answer:  $\frac{b^2(n+1)}{2n}$ )

(4) Find  $1+4+9+16+\dots+100$ .

(5) Find  $\sum_{k=1}^4 f(c_k) \Delta x$  if  $f(x) = x^2$ ,  $\Delta x = \frac{1}{4}$   
and  $c_k = \frac{k}{4}$

(Answer:  $\frac{15}{32}$ )

(6) Find  $\sum_{k=1}^n f(c_k) \Delta x$  if  $f(x) = x^2$ ,  $\Delta x = \frac{1}{n}$ ,  
 $c_k = \frac{k}{n}$

(Answer:  $\frac{(n+1)(2n+1)}{6n^2}$ )

(7) Find  $\sum_{k=0}^{n-1} f(c_k) \Delta x$  if  $f(x) = x^2$ ,  $\Delta x = \frac{1}{n}$ ,  
 $c_k = \frac{k}{n}$

(Answer:  $\frac{(n-1)(2n-1)}{6n^2}$ )

(8) Find  $\sum_{k=1}^6 f(c_k) \Delta x$  if  $f(x) = x^3 - 6x$ ,  $\Delta x = \frac{1}{2}$ ,  
 $c_k = \frac{k}{2}$

(Answer:  $-3.9375$ )

(9) Find  $\sum_{k=1}^n f(c_k) \Delta x$  if  $f(x) = x^3 - 6x$ ,  $\Delta x = \frac{3}{n}$ ,  
 $c_k = \frac{3k}{n}$

(Answer:  $-\frac{27}{4}$ )

(10) Find  $\sum_{k=1}^n f(x_k) \Delta x$  if  $f(x) = 3x^2$ ,  $\Delta x = \frac{b}{n}$   
 $x_k = \frac{kb}{n}$

(Answer:  $\frac{3b^3(n+1)(2n+1)}{6n^2}$ )

(11) Find:

(a)  $\frac{1}{9} + \frac{1}{27} + \frac{1}{81} + \dots$

(Answer:  $\frac{1}{6}$ )

(b)  $\sum_{n=0}^{\infty} \frac{(-1)^n 5}{4^n}$

(Answer: 4)

(c)  $\sum_{k=1}^n \frac{1}{k(k+1)}$

(Answer:  $1 - \frac{1}{n+1}$ )

(d)  $\sum_{n=1}^{\infty} \frac{1}{2^{n-1}}$

(Answer: 2)

(e)  $\sum_{n=0}^{\infty} \frac{4}{2^n}$

(Answer:  $\infty$ )

(f)  $2 + \frac{2}{3} + \frac{2}{9} + \frac{2}{27} + \dots + \frac{2}{3^{n-1}}$

(g)  $\sum_{n=0}^{\infty} \frac{(-1)^n}{4^n}$

(h)  $\sum_{n=0}^{\infty} (-1)^n \frac{5}{4^n}$