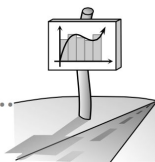


3.2.1 Summing it up with sigma.

Using Sigma Notation



#86 Evaluate each equation below for the given values of n and write the associated sum in expanded form by adding the terms of each sequence. Calculate the value of each sum and check your answers with your team.

a. $t(n) = 0.5(0.5n + 2)^2$ where $n = 0, 1, 2,$ and 3

b. $t(n) = 0.5(0.5n + 2)^2$ where $n = 1, 2, 3,$ and 4

c. What are the similarities and differences between the two sums written in expanded form?

#87 Write each of the following sums in expanded form and then calculate the value of each sum. Note: The first one has been expanded for you. The second one has been partially expanded.

a.

$$\sum_{j=3}^6 (2)^j = (2)^3 + (2)^4 + (2)^5 + (2)^6 =$$

b.

$$\sum_{n=3}^5 (4n^2 + 2) = (4(3)^2 + 2) + \dots =$$

#87 Continued

c.

$$\sum_{k=1}^5 16\left(\frac{1}{2}\right)^k =$$

d.

$$\sum_{m=1}^4 \frac{1}{m(m+1)} =$$

e. For part (b) above, identify the argument and the index.

f. Locate the summation feature on a calculator. Use this feature to verify that the sum you calculated by hand in part (a) is correct.

#88 Waylon wrote the following expansion for the sum below. Check his work. Is it correct? Explain.

$$\sum_{p=5}^7 p^2 = 5^2 + 5.5^2 + 6^2 + 6.5^2 + 7^2 = 182.5$$

#89 On his Calculus test, Carter needs to divide the interval $2 \leq x \leq 3$ into five segments of equal length.

a. What is the length of each sub-segment?
How did you calculate this length?

b. Sketch a diagram of this interval.

c. List the left endpoints of each sub-segment as a sequence. Then write an equation for this sequence.

d. List the right endpoints of each sub-segment as a sequence. Then write an equation for this sequence.

e. How are your sequences in parts (c) and (d) related?

#90 A **series** is the sum of the terms in a sequence. Use the following series written in expanded form to complete the parts below.

$$3.6 + 4.0 + 4.4 + 4.8 + 5.2$$

a. Use sigma notation to express the sum.

b. What changes would you make in your notation from part (a) to express the sum $4.0 + 4.4 + 4.8 + 5.2 + 5.6$?

c. Compute the sum from part (a) by hand, and then use a calculator's summation feature to verify your sum written in sigma notation.

#91 Suppose that $3.6 + 4.0 + 4.4 + 4.8 + \dots + 23.6$ is to be expressed in sigma notation where the index n begins at 0.

a. Why is the argument $0.4n + 3.6$?

b. What is the value of n for the last term?

c. Express the sum using sigma notation.

d. Use the same idea to express $2.5 + 2.7 + 2.9 + 3.1 + \dots + 22.5$ in sigma notation where the index n begins at 0.