Lesson 1.2: Arithmetic Series

Practice Solutions – III

1. Determine the sum of each arithmetic series.

    a. $7 + 9 + 11 + \ldots + 167$

    First, find the number of terms, n.

    $t_1 = 7$
    $t_n = 167$
    $d = 9 - 7 = 2$
    $n = ?$

    $t_n = t_1 + (n - 1)d$
    $167 = 7 + (n - 1)(2)$
    $160 = 2n - 2$
    $81 = n$

    Then, find the sum of the series, S_{81}.

    $$S_n = \frac{n}{2}(t_1 + t_n)$$

    $$S_{81} = \frac{81}{2}(7 + 167)$$

    $$S_{81} = 7\,047$$

    b. $16.2 + 16.5 + 16.8 + \ldots + t_{18}$

    $t_1 = 16.2$
    $S_{18} = ?$
    $d = 16.5 - 16.2 = 0.3$
    $n = 18$

    $S_n = \frac{n}{2}[2t_1 + (n - 1)d]$

    $S_{18} = \frac{18}{2}[2(16.2) + (18 - 1)0.3]$

    $S_{18} = 337.5$

2. Determine the value of t_1 for the arithmetic series with $d = -0.1$ and $S_{17} = 1\,713.6$.

    $$S_n = \frac{n}{2}[2t_1 + (n - 1)d]$$

    $$1\,713.6 = \frac{17}{2}[2t_1 + (17 - 1)(-0.1)]$$

    $$201.6 = 2t_1 - 1.6$$

    $$101.6 = t_1$$

3. The sum of the first eight terms of an arithmetic series is 216 and the sum of the first nine terms is 270.

   a. What is the value of t_9?

   Notice that the two sums are consecutive. Therefore, by subtracting S_8 from S_9, the value of t_9 is found.

   $t_9 = S_9 - S_8$
   $ = 270 - 216$
   $ = 54$

   b. Determine the first term, t_1, of the arithmetic series.

   $t_1 = ?$
   $t_9 = 54$
   $S_9 = 270$
   $n = 9$

   $S_n = \dfrac{n}{2}(t_1 + t_n)$

   $270 = \dfrac{9}{2}(t_1 + 54)$

   $60 = t_1 + 54$

   $6 = t_1$

   Please return to *Unit 1: Sequences and Series Lesson 1.2* to continue your exploration.