# Appendix 2: Solutions

## Lesson 1.1: Arithmetic Sequences

### Practice Solutions – I

1. Identify the arithmetic sequence(s) below. For the arithmetic sequence(s), indicate the value of $t_1$, $d$, and the simplified general term, $t_n$. For any sequence that is not arithmetic, explain why not.

   a. $a, a + w, a + 2w, a + 3w, \ldots$

   Arithmetic sequence
   $d = w$ for each pair of consecutive terms
   $t_1 = a$
   $t_n = a + (n - 1)w$

   b. 78, 75, 71, 66, 61, …

   Not arithmetic
   $75 - 78 = -3$
   $71 - 75 = -4$
   The differences between pairs of consecutive terms are not constant; therefore, the sequence is not arithmetic.

2. Given $t_1 = 652$ and $d = -3$, list the first four terms in the arithmetic sequence.

   $t_1 = 652$
   $t_2 = 652 - 3 = 649$
   $t_3 = 649 - 3 = 646$
   $t_4 = 646 - 3 = 643$

3. Determine the number of terms, $n$, in the arithmetic sequence $91, 67, 43, ..., -245$.

   $t_1 = 91$
   $t_n = -245$
   $d = 67 - 91 = -24$
   $n = ?$

   $t_n = t_1 + (n - 1)d$
   $-245 = 91 + (n - 1)(-24)$
   $-336 = -24n + 24$
   $-360 = -24n$
   $15 = n$

4. Does an arithmetic sequence with $t_1 = 24$ and $d = 13$ contain the term 57?

$$t_n = t_1 + (n-1)d$$
$$57 = 24 + (n-1)(13)$$
$$33 = 13n - 13$$
$$46 = 13n$$
$$3.538... = n$$

Because $n$ is not a natural number, 57 is not a term of this sequence.

5. The first three terms of an arithmetic sequence are $5y + 3$, $7y - 6$, and $6y$. Determine the numerical values of the first three terms in the sequence, and then determine the value of $d$.

Recall that $d$ is constant. To find $d$, subtract the first term from the second term of each pair of consecutive terms.

$$d = d$$
$$t_2 - t_1 = t_3 - t_2$$
$$(7y-6) - (5y+3) = 6y - (7y-6)$$
$$2y - 9 = -y + 6$$
$$3y = 15$$
$$y = 5$$

The first three terms are $5(5) + 3 = 28$
$7(5) - 6 = 29$
$6(5) = 30$

The value of $d$ is $29 - 28 = 1$.

Please return to *Unit 1: Sequences and Series Lesson 1.1* to continue your exploration.