Chapter 1 Test

Multiple Choice

For #1 to 5, select the best answer.

1. What are the missing terms of the arithmetic sequence 4, ☐, 14, ☐, 24, ☐?

   A 10, 20, 30

   B 9, 19, 29

   C 5, 10, 15

   D 8, 18, 28

2. While baking a cake, Dylan notices that each of his measuring cups is about half as big as the one before it. The largest (first) measuring cup is 250 mL. What is the approximate capacity of the fourth measuring cup?

   A 125 mL

   B 65 mL

   C 30 mL

   D 15 mL

3. The years in which the Commonwealth Games take place form an arithmetic sequence with a common difference of 4. In 1978, the Commonwealth Games were held in Edmonton, Alberta. In which of the following years could the Commonwealth Games be held again?

   A 2011

   B 2022

   C 2033

   D 2044

4. The sum of the first 20 terms of the arithmetic series 204 + 212 + 220 + ... is

   A 11 200

   B 7120

   C 5680

   D 5600

5. The sum of the first 11 terms of the geometric series 7 – 14 + 28 – … is

   A 28 679

   B 4 781

   C –9 555

   D –28 665

Short Answer

6. Gentry notices that the bank of lockers outside his math classroom are numbered 511, 513, 515, ..., 575. Determine the number of lockers in the set.

7. Brittany, a landscape designer, is setting out trees for planting. The 12 trees she needs are currently in one location, 40 m from the spot the first tree will be planted. The trees will be spaced 6 m apart. The cart she uses to transport the trees will only carry one tree at a time, so she must take the first tree to its spot, return for the second tree, take it to its spot, and so on. After Brittany takes all 12 trees to the correct spot and returns to the original location of the trees, how far will she have travelled, in total?

40 m   6 m   6m
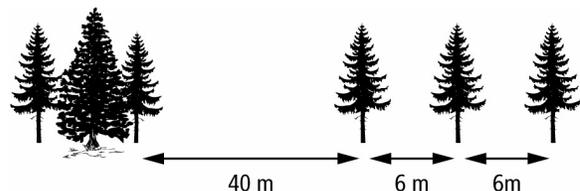
8. Determine the sum of the arithmetic series $9 + 21 + 33 + \cdots + 693$.

9. In an arithmetic sequence, $t_3 = 16$ and $t_7 = 40$.

   a) Determine the common difference in the sequence.

   b) Determine the first term in the sequence.

   c) Determine t_{100}.

10. $5, \square, 405$ is a geometric sequence.

   a) Determine all possible values for the second term of this sequence.

   b) Determine all possible general terms for this sequence.

11. The nth sum of a series is given by the formula $S_n = 1 - 4^n$.

   a) Determine the first three terms of the sequence.

   b) Decide whether the sequence is arithmetic or geometric. Determine the general term for the sequence.

Extended Response

12. Write a geometric series with a positive first term.

   a) Find the sum of the first ten terms of your series.

   b) Change the first term of your series so the sum of the first ten terms is the opposite sign, but the same value, as in part a). For example, if your sum was positive in part a), ensure that it is negative for part b).

   c) Create a geometric series so that S_n is positive when n is odd, and S_n is negative when n is even. Justify your answer.

13. According to Statistics Canada, Chestermere, Alberta is one of the fastest growing communities in Canada. Between 2001 and 2006, the population grew at an average rate of about 8% per year.

   a) The population of Chestermere in 2001 was 6462. Determine the population for the years 2002 through 2004, inclusive.

   b) Write the general term for the geometric sequence that models the population of Chestermere, where n is the number of years starting in 2001.

   c) Predict the population of Chestermere in the year 2020.

   d) What assumption(s) did you make in your answer to part c)?

14. Write a sequence that is both arithmetic and geometric.

   a) Prove that your sequence is arithmetic. Determine the general term of the sequence.

   b) Prove that your sequence is geometric. Determine the general term of the sequence.

   c) How many sequences could be both arithmetic and geometric? Justify your answer.