Algebra
Activity 2b - Arithmetic Sequences

In this activity, assume that all patterns are formed by adding the same number to get from one term to the next. This list of numbers is called an arithmetic progression or an arithmetic sequence. The pattern of growth, when graphed, is a straight line, and is called *linear growth*.

1. Find the missing term in the sequence $\{17, 19, 21, 23, \_\_, 27, 29, 31, \ldots\}$
2. Find the next term in the sequence $\{5, 11, 17, 23, \_\_, \ldots\}$

   Do you need to know what comes after the blank? What is the minimal amount of information you need to know in order to answer a question of this type?
3. Find the next term in the sequence $\{30, 40, \_\_, \ldots\}$
4. Find the first term in the sequence $\{\_\_, \_\_, 12, 17, \_\_, \ldots\}$
5. Fill in the blanks: $\{\_\_, \_\_, 51, \_\_, \_\_, 60, \_\_, \ldots\}$
6. Fill in the blanks: $\{\_\_, \_\_, x, \_\_, \_\_, x + 3d, \_\_, \ldots\}$
7. Find the first term in the sequence: $\{\_\_, \_\_, \_\_, x, \_\_, \_\_, \_\_, y, \_\_, \ldots\}$

   If the k^{th} term in an arithmetic sequence is x and the n^{th} term in an arithmetic sequence is y, what is the amount you add to get from one term to the next? What is the first term? What term would come one blank before the first term?
8. Write a formula for the n^{th} term of the sequence $\{1, 2, 3, 4, 5, \ldots\}$
9. Write a formula for the n^{th} term of the sequence $\{5, 10, 15, 20, \ldots\}$
10. Write a formula for the n^{th} term of the sequence $\{4, 9, 14, 19, \ldots\}$

    Hint: All of the terms are one less than the previous sequence. What term would come one blank before the first term?
11. Write a formula for the n^{th} term of the sequence 3 $\{7, 11, 15, 19, 23, \ldots\}$

    Note: the first term of the sequence is 7, the second term is 11. The 3 may remind you of a different mathematical topic.
12. Write a formula for the n^{th} term of the sequence b $\{b + m, b + 2m, b + 3m, \ldots\}$.
13. The cost of a gallon of gasoline in 1972 was 29.9 cents per gallon and the cost of a gallon of gasoline in 2017 was \$2.399 per gallon. Assuming linear growth, what was the cost of a gallon of gasoline in 1985?