Algebra 1A
Unit 3: Functions
Assignment 7: Patterns and Arithmetic Sequences

Vocabulary

Word	My own description	Illustration/Example
Arithmetic Sequence		
Common Difference		
Sequence		

Arithmetic Sequences

An arithmetic sequence is a _____ of numbers where the _____ is the same between each number and the next/previous number.

Choose one of the two options to correctly complete the sentence:
In other words, to get the next number in an arithmetic sequence, you (add or subtract / multiply or divide) by the same number each time. This number is called the _____.

To find the *common difference*, just _____ one term from the one before it.

Examples:
What is the common difference in the pattern 11, 19, 27, 35, ...?
1) Choose two terms that are next to each other: _____ and _____
2) Subtract the second term from the one before it:
    _____ - _____ = _____← common difference
3) Double check that the pattern works for the other numbers (repeat steps 1 and 2 with different sets of two "neighbor" numbers.
        _____ - _____ = _____← common difference
        _____ - _____ = _____← common difference
    Did you get the same number each time? If so, it's an arithmetic series and the number you found is the common difference!

Extending Arithmetic Sequences

To find out what comes next, _____ the common difference to the last term. You can keep doing this as many times as you need to.

Example:
What are the next three terms in the pattern 4, 7, 10, 13, ...?
1) Find the common difference

   _____ - _____ = _____← common difference
2) What is the last term? _____
3) Add the common difference to the last term:

   _____ + _____ = _____ ← next term (#1)
4) Do this as many times as you need to (in this example, you need the next **three** terms)

   _____ + _____ = _____ ← next term (#2)

   _____ + _____ = _____ ← next term (#3)

Equations for Extending Sequences

Common difference * the term position - first term = term value

Example:
What is the twentieth term in the pattern 3, 7, 11, 15, ...?
1) Find the common difference:

   _____ - _____ = _____← common difference
2) What is the term position? **20**
3) What is the first term? _____
4) Plug it into the pattern:

   _____ * 20 - _____ = _____ ← 20th term

Let's Review

Before continuing, make sure you understand the main points of this lesson.
- One type of math pattern is an arithmetic sequence.
- In an arithmetic sequence, each term is separated from the previous term by a common difference. For example, even terms are separated by a common difference of two.
- You can extend a pattern by adding the common difference to the last known term.
- You can write equations to describe a pattern. A sequence equation will include multiplying the term number by the common difference, and then adding or subtracting a constant.
- Using a sequence equation, you can find the nth term of a pattern.