**Barron’s Let’s Review Regents – Algebra I**

# Chapter 11: Sequences

## 11.1 Types of Sequences

A sequence is a list of numbers. It is sometimes possible to predict the next number on a list by examining the numbers before and detecting a pattern. The pattern could be adding a number to the term before, multiplying a number by the term before, or something even more complicated.

**Sequence Notation**

An example of a sequence is 3, 7, 11, 15, 19, …

The sequence is often named with the letter a. The individual elements of the sequence are named by the name of the sequence with a subscript identifying the element’s position in the list. For this list, . Sometimes instead of a subscript, the term number is put into parentheses, like with functions, like or .

**Arithmetic Sequences**

To find the value of , check to see if this is the kind of sequence where each number can be calculated by adding or subtracting the same thing from the previous number. When this happens, this sequence is called an *arithmetic sequence.*

In this example, since 3 + 4 = 7, 7 + 4 = 11, 11 + 4 = 15, and 15 + 4 = 19, this seems to be an arithmetic sequence. To continue the pattern,   
.

The sequence 40, 32, 24, 16 is also an arithmetic sequence. By subtracting 8 from each term, the next term is obtained. When each term is smaller than the previous term, it is a *decreasing* sequence. When each term is larger than the previous term, it is an *increasing* sequence.

**Geometric Sequences**

The sequence, 3, 6, 12, 24, 48, … is not an arithmetic sequence. 3 + 3 = 6, but 6 + 3 is not 12. In this sequence, each term is found by multiplying the previous term by 2. When this happens, the sequence is called a geometric sequence. The next term is . Since each term is larger than the previous term, this is an increasing geometric sequence. A sequence like 160, 80, 40, 20, … is a decreasing geometric sequence, since each term is ½ the previous term.

### Check Your Understanding of Section 11.1

1. Multiple-Choice
2. In the sequence , what is the value of ?  
   (2) 3
3. What type of sequence is 3, 7, 11, 15, … ?  
   (1) Increasing arithmetic
4. What type of sequence is 25, 18, 11, 4, … ?  
   (2) Decreasing arithmetic
5. What type of sequence is 4, 8, 16, 32, …. ?  
   (3) Increasing geometric
6. What type of sequence is 1215, 405, 135, 45, … ?  
   (4) Decreasing geometric
7. What is the next number in the sequence 8, 13, 18, 23?  
   (3) 28
8. What is the next number in the sequence 14, 6, -2, -10?  
   (2) -18
9. What is the next number in the sequence ?  
   (1)
10. A sequence begins with 2, 6, If this is a geometric series, what is the next number?  
    (4) 18
11. What type of sequence is ?  
    (3) Increasing geometric