Name: _____ Group Members: _____

Exploration 14-2b: Arithmetic and Geometric Sequences

Date: _____

Objective: Use patterns to find terms in an arithmetic or geometric sequence or to find the term number of a given term.

Car Manufacturing Problem: Two competing manufacturers come out with new sport-utility vehicles, the Flame which is 200 inches long, and the Seeker, which is only 195 inches long. In the second year, the Seeker is made 2% longer, meaning its length is multiplied by 1.02. In order to maintain its lead in size, the Flame is made 3 inches longer in the second year. The patterns of multiplying the previous length by 1.02 and adding 3 to the previous length are continued for several years.

1. Write the first four terms of each sequence of lengths.

2. What kind of sequence is formed by repeatedly multiplying by 1.02?

3. What kind of sequence is formed by repeatedly adding 3?

4. Will the Seeker's length ever exceed the Flame's length? Give numerical evidence to support your conclusion.

5. Calculate algebraically the length of the Flame in the 40th year if the pattern is maintained each year.

6. Calculate algebraically the length of the Seeker in the 30th year if the pattern is maintained each year.

7. The number 341 is a term in the sequence of Flame lengths. Calculate the term number algebraically.

8. The number 1205.73 is (approximately) a term in the sequence of Seeker lengths. Calculate the term number algebraically.

9. What did you learn as a result of doing this Exploration that you did not know before?