

**EXPLORE & REASON**

A seating plan is being designed for Section 12 of a new stadium.



A. Describe the pattern.

B. Write an equation for this pattern.

C. **Use Structure** Row Z of Section 12 must have at least 75 seats. If the pattern continues, does this seating plan meet that requirement? Justify your answer. © MP.7

**HABITS OF MIND**

**Use Appropriate Tools** When is using a diagram the best tool to determine the number of seats in a given row? Explain. © MP.1

**EXAMPLE 1** **Try It! Identify Arithmetic and Geometric Sequences**

1. Is each sequence an arithmetic or a geometric sequence? Explain.

a. 1, 2.2, 4.84, 10.648, 23.4256, ...

b. 1, 75, 149, 223, 297, ...

**EXAMPLE 2** **Try It! Write the Recursive Formula For a Sequence**

2. Write the recursive formulas for the geometric sequence  
3,072, 768, 192, 48, 12, ....

**HABITS OF MIND**

**Make Sense and Persevere** Explain why a common ratio in a geometric sequence cannot be zero. © MP.1

**EXAMPLE 3** **Try It! Use the Explicit Formula**

3. What is the 12th term of the sequence described?

Initial condition is 3

recursive formula is  $a_n = 6(a_{n-1})$



## EXAMPLE 4

**Try It! Connect Geometric Sequences and Exponential Functions**

4. How many subscribers will there be in Week 9 if the initial number of subscribers is 10?

## EXAMPLE 5

**Try It! Apply the Recursive and Explicit Formulas**

5. The formula  $a_n = 1.5(a_{n-1})$  with an initial value of 40 describes a sequence. Use the explicit formula to determine the 5th term of the sequence.

**HABITS OF MIND**

**Reason** What is the relationship between the explicit formula and the recursive formula? Explain. © MP.2

## Do You UNDERSTAND?

1. **ESSENTIAL QUESTION** How are geometric sequences related to exponential functions?

2. **Vocabulary** How are *geometric sequences* similar to arithmetic sequences? How are they different?

3. **Error Analysis** For a geometric sequence with  $a_1 = 3$  and a common ratio  $r$  of 1.25, Jamie writes  $a_n = 1.25 \cdot (3)^{n-1}$ . What mistake did Jamie make? © MP.3

4. **Generalize** Is a sequence geometric if each term in the sequence is  $x$  times greater than the preceding term? © MP.8

## Do You KNOW HOW?

Determine whether the sequence is an arithmetic or a geometric sequence. If it is geometric, what is the common ratio?

5. 30, 6, 1.2, 0.24, 0.048, ...

6. 0.5, 2, 8, 32, 148, ...

Write the recursive formula for each geometric sequence.

7. 640, 160, 40, 10, 2.5, ...

8. 2, 5, 12.5, 31.25, 78.125, ...

9. What is the recursive formula for a sequence with the following explicit formula?  
 $a_n = 1.25 \cdot (3)^{n-1}$

10. A sequence has an initial value of 25 and a common ratio of 1.8. How can you write the sequence as a function?