Algebra 1 7.7

Identify and generate geometric sequences

Relate geometric sequences to exponential functions

sequence

arithmetic sequence (3.5)

geometric sequence → mult. rule

common ratio rule r =

whiteboards

3, 6, 12, 24, 48... 96, 192, 384

first term: 3

common ratio (r): 2

look for patterns

a_1 3

a_2 $3 \cdot 2$

a_3 $3 \cdot 2 \cdot 2$

$3 \cdot 2 \cdot 2 \cdot 2$

$3 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

→ $y = (3)(2)^{n-1}$

Gem A

27. The first term of a geometric series is 2 and the common ratio is 4. What is the 14th term of the sequence?

$y = 2(4)^{14-1}$

$y = 2 \cdot 4^{13}$

$= 134,217,728$

KeyConcept *n*th term of a Geometric Sequence

The ***n***th term a_n of a geometric sequence with first term a_1 and common ratio r is given by the following formula, where n is any positive integer and $a_1, r \neq 0$.

$$a_n = a_1 r^{(n-1)}$$

GuidedPractice

$r = \frac{1}{2}$ a_1

3. Write an equation for the nth term of the geometric sequence 96, 48, 24, 12, … .
Then find the tenth term of the sequence.

$$y = 96\left(\frac{1}{2}\right)^{n-1}$$

$$y = 96\left(\frac{1}{2}\right)^{9}$$

$$= 0.1875$$

Real-World Example 4 Graph a Geometric Sequence

BASKETBALL The NCAA women's basketball tournament begins with 64 teams. In each round, one half of the teams are left to compete, until only one team remains. Draw a graph to represent how many teams are left in each round.

32 (1,64)
16 (2,32)
8 (3,16)
4 (4,8)
2 (5,4)
1 (6,2)

63 games

WB 7.7
prac.