10-1 Study Guide and Intervention

Sequences as Functions

Arithmetic Sequences An **arithmetic sequence** is a sequence of numbers in which each **term** is found by adding the **common difference** to the preceding term.

| **nth Term of an Arithmetic Sequence**	$a_n = a_1 + (n - 1)d$, where a_1 is the first term, d is the common difference, and n is any positive integer

Example **Find the next four terms of the arithmetic sequence 7, 11, 15, … . Then graph the first seven terms of the sequence.**

Find the common difference by subtracting two consecutive terms.

$11 - 7 = 4$ and $15 - 11 = 4$, so $d = 4$.

Now add 4 to the third term of the sequence, and then continue adding 4 until the four terms are found. The next four terms of the sequence are 19, 23, 27, and 31.
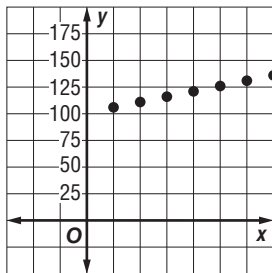
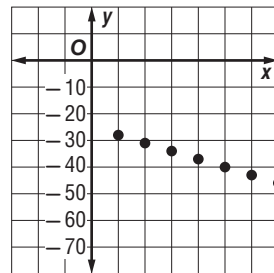Plot each point $(1, 7)$, $(2, 11)$, $(3, 15)$, $(4, 19)$, $(5, 23)$, $(6, 27)$, and $(7, 31)$ on a graph.
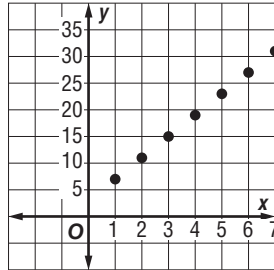
Exercises

Find the next four terms of each arithmetic sequence. Then graph the sequence.
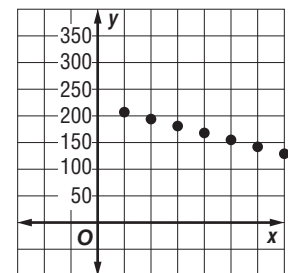
1. 106, 111, 116, …
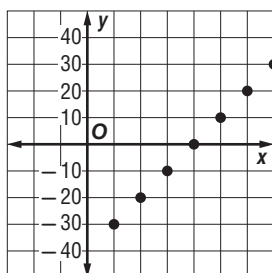

121, 126, 131, 136

2. −28, −31, −34, …

−37, −40, −43, −46

3. 207, 194, 181, …

168, 155, 142, 129

4. −30, −20, −10, …

0, 10, 20, 30

5. 13, 7, 1, …
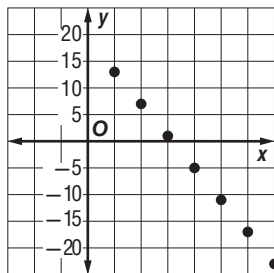
−5, −11, −17, −23

6. 151, 177, 203, …
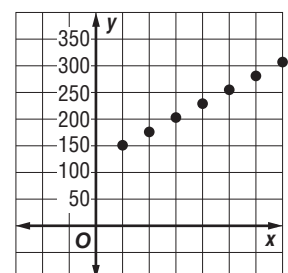
229, 255, 281, 307

10-1 Study Guide and Intervention *(continued)*

Sequences as Functions

Geometric Sequences

Term	Definition	Example
Common Ratio	$r = a_{n+1} \div a_n$	The common ratio in a geometric sequence with consecutive terms …5, 10 … is $10 \div 5 = 2$.
*n*th Term of a Geometric Sequence	$a_n = a_1\,(r^{n-1})$ where a_1 is the first term and r is the common ratio.	The fourth term of the geometric sequence with first term 5 and common ratio 2 is $5\,(2^{4-1}) = 40$.

Example **Find the next three terms of the geometric sequence 2, 6, 18 … .**
Then graph the sequence.

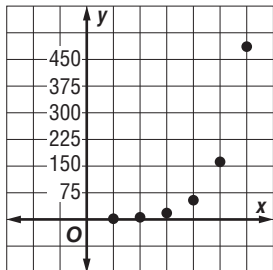Find the common ratio by dividing two consecutive terms.

$6 \div 2 = 3$ and $18 \div 6 = 3$, so $r = 3$.

Now multiply the third term of the sequence by 3, and then continue multiplying by 3 until the three terms are found. The next three terms are 54, 162, and 486.

Find the domain and range for the first six terms of the sequence.
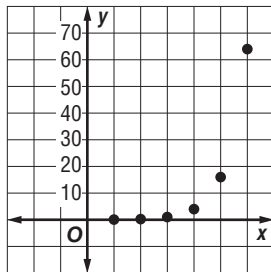Domain: {1, 2, 3, 4, 5, 6}
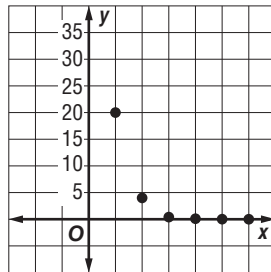Range: {2, 6, 18, 54, 162, 486}

Exercises

Find the next three terms of each geometric sequence. Then graph the sequence.
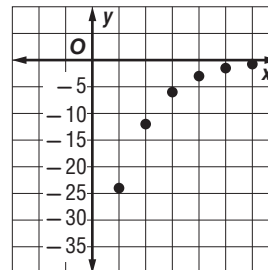
1. $\dfrac{1}{16}, \dfrac{1}{4}, 1, \ldots$

4, 16, 64

2. $20, 4, \dfrac{4}{5}, \ldots$

$\dfrac{4}{25}, \dfrac{4}{125}, \dfrac{4}{625}$

3. $-24, -12, -6, \ldots$

−3, −1.5, − 0.75