

Reteaching 10-1 Patterns and Sequences

A **sequence** is a set of numbers that follows a pattern.

In an **arithmetic sequence**, each term is found by *adding* a fixed number to the previous term. The number that you add is called the **common difference**.

Find the next three terms in the arithmetic sequence

8, 5, 2, -1, -4,

- The common difference is $5 - 8 = -3$.
- Add -3 for the next three terms.
 - $-4 + (-3) = -7$
 - $-7 + (-3) = -10$
 - $-10 + (-3) = -13$

The next three terms are $-7, -10, -13$.

In a **geometric sequence**, each term is found by *multiplying* the previous term by a fixed number. The number that you multiply by is called the **common ratio**.

Find the next three terms in the geometric sequence: 2, 6, 18, 54,

- The common ratio is $\frac{18}{6} = 3$.
- Multiply by 3 for the next three terms.
 - $54 \times 3 = 162$
 - $162 \times 3 = 486$
 - $486 \times 3 = 1,458$

The next three terms are 162, 468, 1,458.

The sequence: 1, 4, 9, 16, . . . is neither arithmetic nor geometric.

Its pattern is $1^2, 2^2, 3^2, 4^2,$

Its next three terms are $5^2, 6^2, 7^2$, or 25, 36, 49.

Identify the common difference in each arithmetic sequence.

1. 2, 6, 10, 14, . . .

2. 30, 20, 10, 0, . . .

3. $-12, -4, 4, 12, . . .$

Identify the common ratio in each geometric sequence.

4. 6, 12, 24, 48, . . .

5. $1, \frac{1}{3}, \frac{1}{9}, \frac{1}{27}, . . .$

6. 250, 25, 2.5, 0.25, . . .

Identify each sequence as *arithmetic*, *geometric*, or *neither*.

Find the next three terms of the sequence.

7. 4, 2, 1, $\frac{1}{2}, . . .$

8. 0.2, 0.4, 0.6, 0.8, . . .

9. $1, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, . . .$

10. 70, 50, 30, 10, . . .

11. 1, 2, 1, 2, 1, 2, . . .

12. 4, 8, 16, 32, . . .
