

Study Guide

Arithmetic Sequences

A set of numbers in a specific order is called a **sequence**. Each number in a sequence is called a **term**. The first term is symbolized by a_1 and the second term by a_2 , so that, in general, a_n represents the n th term. An **arithmetic sequence** is a sequence in which each term, after the first, is found by adding a constant, called the *common difference*, to the previous term.

 n th Term of an Arithmetic Sequence

The n th term, a_n , of an arithmetic sequence with first term a_1 and common difference d is given by the formula $a_n = a_1 + (n - 1)d$, where n is a positive integer.

Example: Find the tenth term, a_{10} , of the arithmetic sequence with $a_1 = 7$ and $d = 3$.

$$\begin{aligned} a_n &= a_1 + (n - 1)d \\ a_{10} &= 7 + (10 - 1)3 \\ &= 7 + 27 \\ &= 34 \end{aligned}$$

The tenth term is 34.

Find the indicated term in each arithmetic sequence.

1. a_{14} for $a_1 = 4, d = 6$ 2. a_{12} for $a_1 = -4, d = -2$ 3. a_{15} for $a_1 = 5, d = -3$

4. a_{10} for $0, -3, -6, -9, \dots$ 5. a_{12} for $4, 10, 16, 22, \dots$ 6. a_{21} for $10, 6, 2, -2, \dots$

Find the missing terms in each arithmetic sequence.

7. $5, _, _, _, -3$ 8. $-7, _, _, _, 1$ 9. $_, _, 42, _, 60$

10. $18, _, _, _, -2$ 11. $_, _, 3, _, -11$ 12. $_, 10, _, _, 4, _$