An arithmetic sequence is a set of numbers in a specific order whose difference between successive terms is constant. Any number in the set is a term. To move from one term to the next term a constant number must be added to the previous term. For example, 3, 6, 9, 12,... is an arithmetic sequence because to progress from one term to the next, like 6 to 9, you must add a constant number, 3, to the previous term. In this example, 3 is called the common difference. Therefore, an arithmetic sequence can be found with \( a_1, a_1 + d, a_2 + d, a_3 + d, \ldots \) where \( a_1 \) is the first term of the sequence and \( d \) is the common difference. To calculate the \( n \)th term of an arithmetic sequence, you can use the formula \( a_n = a_1 + (n - 1)d \).

**Examples**

### a. Find the next three terms of the arithmetic sequence 0, 9, 18, 27,....

\[
\begin{align*}
9 - 0 &= 9 & \text{Find the common difference by subtracting successive terms.} \\
18 - 9 &= 9 \\
27 - 18 &= 9 \\
27 + 9 &= 36 & \text{Add the common difference to the next three terms.}
\end{align*}
\]

The next three terms are 36, 45, and 54.

### b. Find the 7th term of the arithmetic sequence 10, 23, 36,....

\[
\begin{align*}
23 - 10 &= 13 & \text{Find the common difference.} \\
36 - 23 &= 13 \\
\end{align*}
\]

\[
\begin{align*}
\quad &a_n = a_1 + (n - 1)d \\
\quad &a_1 = 10 \\
\quad &a_7 = 10 + (7 - 1)13 \\
\quad &a_7 = 10 + 6 \cdot 13 \\
\quad &a_7 = 10 + 78 \\
\quad &a_7 = 88
\end{align*}
\]

**Practice**

Find the next three terms of each arithmetic sequence.

1. 1, \( \frac{1}{2} \), 0, \( -\frac{1}{2} \),...

2. 13, 30, 47, 64,....

3. 102, 94, 86, 78,....

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

5. 7, \( \frac{25}{4} \), \( \frac{11}{2} \), \( \frac{19}{4} \),....

6. 13, 11, 9, 7,....

7. \( -1, -7, -13, -19, \)....

8. \( -1, 2, 5, 8, \)....

9. **Standardized Test Practice** Which of the following is the 24th term of the arithmetic sequence 3, \(-2\), \(-7\), \(-12\),...?

   A \(-62\)  \hspace{1cm} B \(-92\)  \hspace{1cm} C \(-112\)  \hspace{1cm} D \(-162\)