**Arithmetic Sequence** – a series of numbers that increase or decrease by a constant “*d*”

* *d* is called the common difference
* When you subtract two consecutive numbers, their difference will always equal “*d*”

Find the common difference for each arithmetic sequence

 Ex. $5, 8, 11, 14, 17, …$

 Ex. $9, 5, 1, -3, -7, … $

 Ex. $1, \frac{7}{6}, \frac{4}{3}, \frac{3}{2}, \frac{5}{3}$, …

 Ex. $\frac{6}{6},\frac{7}{6}, \frac{8}{6}, \frac{9}{6}, \frac{10}{6}$, …

**The nth Term of an Arithmetic Sequence**

 $a\_{n}=a\_{1}+\left(n-1\right)d$ $a\_{1}=first term and d=common difference$

**Recursive Formula for an Arithmetic Sequence**

 $\left\{\begin{matrix}a\_{1}= \\a\_{n}=a\_{n+1}+d\end{matrix}\right.$

Ex. Find the 10th term of the arithmetic sequence that starts with $8, 20, …$

Ex. Find the 7th term of the arithmetic sequence that starts with $5, 11, …$

Ex. Find a formula for the nth term of an arithmetic sequence whose common difference is 5, and the first term is $-1$.

Ex. The 8th term of an arithmetic sequence is 25 and the 12th term is 41. Write the first 5 terms of the sequence.

**The Sum of a Finite Arithmetic Sequence**

 $S\_{n}=\frac{n}{2}\left(a\_{1}+a\_{n}\right)$

Ex. Find the sum: $40 + 37 + 34 +31 + 28 + 25 + 22$

Ex. Find the sum of the integers from 1 to 57

Ex. Find the 50th partial sum of the arithmetic sequence $-6, -2, 2, 6, 10, …$

Ex. Find the sum: $15 + 20 + 25 +30 + \cdots + 535$

**Application Problems**

Ex. Determine the seating capacity of an auditorium with 30 rows of seats if there are 20 seats in the first row, 22 seats in the second row, 24 seats in the third row, and so on.

Ex. Consider a job offer with a starting salary of $32,500 and an annual raise of $2,500 and a job offering $38,000 a year without raises. Which job will allow you to make the most amount of money after 6 years?