

1.2: Arithmetic Sequences

“I WILL ...

Find the explicit formula that generates an arithmetic sequence

Write an arithmetic sequence in implicit form

Find the number of terms in an arithmetic sequence.”

I. Arithmetic Sequence

- A. **Arithmetic Sequence** is a sequence whose consecutive terms have a common difference
- B. **For example, look at this pattern and decide what the common difference is with each number.**

II. Formulas

- A. **Determine the difference (slope) of the equation (create a t-chart if necessary)**
- B. **Attach a variable with the difference**
- C. **Plug the equation in to determine the constant**
- D. **Check to see if all of the other equations are equal to the equation written**

III. Model Problems

<p>Ex 1: Find the explicit rule to represent 7, 11, 15, 19,...</p>	<p>YT: Determine the arithmetic sequence equation of 19, 12, 5, -2, -9, ...</p>	
<p>Ex 2: Determine the equation whose nth term of the arithmetic where the first term is 2 and common difference is 3.</p>	<p>Ex 3: Determine the equation whose nth term of the arithmetic where the first term is 35 and common difference is 4.</p>	<p>YT: Determine the equation whose nth term of the arithmetic where the first term is -10 and common difference is -50.</p>

<p>Ex 4: Determine the equation from an arithmetic sequence and its first five terms from the given equation, $a_n = 12 + 7n$. Determine the 20th term.</p>	<p>Ex 5: If the common difference is 4 and the fifth term is 15, what is the <u>10th term</u> of an arithmetic sequence?</p>	<p>YT: If the common difference is 9 and the 5th term is 73, what is the <u>10th term</u> of an arithmetic sequence?</p>
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I. Key Terms

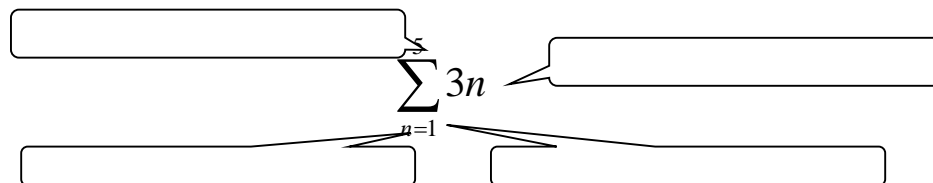
A. Arithmetic – There is a _____ (adding/subtracting) between any two terms.

B. Series – The _____ of a sequence.

C. Sigma Notation: $\sum_{n=first}^{last} \textit{summand}$. If you do not recognize the pattern,

you could plug in ALL the numbers from the bottom (first) to the top (last), evaluate each one, then add them up.

II. Sigma Notation:



III. Formulas

A. Sum: $S = \frac{n(a_1 + a_n)}{2}$

B. Sigma form for arithmetic: $\sum_{n=1}^k a_1 + d(n-1)$

k is _____, a_1 is _____, n is the index

(variable), and d is _____.

C: Arithmetic Mean: $A = \frac{S}{n}$

<p>Ex 6: Find the following sum, $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21$</p>	<p>Ex 7: Write in Sigma Notation, $4, 15, 26, \dots, 301$</p>	<p>Your Turn: Write in Sigma Notation, $15, 11, 7, \dots, -61$</p>
<p>Ex 8: Evaluate, $\sum_{k=1}^5 3k$</p>	<p>Ex 9: Evaluate, $\sum_{k=5}^8 3k - 4$</p>	<p>Your Turn: Evaluate, $\sum_{k=2}^6 2k + 1$</p>
<p>Ex 10: Determine the amount of terms in this arithmetic series, $a_1 = 19, a_n = 96, S_n$ (Sum) = 690</p>		<p>YT: Determine the amount of terms in this arithmetic series, $a_1 = 7, a_n = 25, S_n$ (Sum) = 10</p>

