Notes: Sequences and Series

A ______________________ is a function whose DOMAIN is a set of consecutive integers. If a domain is NOT SPECIFIED it is understood that the domain starts with ______. The values in the RANGE are called the ____________ of the sequence.

Domain	1	2	3	…	…	…	n
Range	a_1	a_2	a_3				

Instead of using function notation, sequences are usually written using subscript notation.

Write the first five terms of the sequence.	**Write the first five terms of the sequence.**	**Find the 3rd, 4th and 5th term of the sequence.**
1. $a_n = 2n + 1$	**2.** $a_n = 2 - (-1)^n$	**3.** $a_n = \frac{2 + (-1)^n}{n}$

If n is a positive integer, ***n*** __________________ is defined as: $n! = n \bullet (n-1) \bullet (n-2) \bullet \ldots \bullet 3 \bullet 2 \bullet 1.$

As a special case, **zero factorial** is defined as: ___________.

1. Evaluate. $7!$	**2. Simplify the factorial expression.** $\frac{9!}{3!7!}$
3. Write the first 5 terms of the sequence. $a_n = \frac{2^n}{n!}$	**4. Simplify the factorial expression.** $\frac{(n+1)!}{n!}$

A ________________ is the sum of the terms in a sequence. A series can be written with

____________________________ where the sum of the first n terms of a sequence is represented

by $\sum_{i=1}^{n} a_i = a_1 + a_2 + a_3 + ... + a_n$, where i is called the ___________________________________,

n is the _______________________ and **1** is the ________________________ .

Find the sum.

5. $\sum_{i=1}^{4}(4i+1)$ **How many terms are in this series?**	**6.** $\sum_{k=2}^{5}(2+k^3)$ **How many terms are in this series?**	**7.** $\sum_{n=0}^{8}\left(\frac{1}{n!}\right)$ **How many terms are in this series?**
To find the number of terms in a series:		

A _______________________ is the sum of the first n terms of the sequence, which is also called a

_________________________.

An _______________________ is the sum of **all** the terms of the sequence.

Find the sum.

8. $\sum_{k=1}^{3}\left(\frac{3}{10^k}\right)$ **third partial sum*	**9.** $\sum_{k=1}^{\infty}\left(\frac{3}{10^k}\right)$

Arithmetic Sequences, also known as a discrete linear function, is a sequence for which consecutive terms have a **common difference**, ***d***.

Determine whether or not the sequence is arithmetic. If it is, find the common difference.

1. 5, 8, 11, 14, 17,...	**2.** 1, 4, 9, 16, 25,...
3. $1, \frac{7}{6}, \frac{4}{3}, \frac{3}{2}, \frac{5}{3}, \ldots$	**4.** $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \ldots$

Writing an explicit formula/rule for an arithmetic sequence a_n.

Fill in the missing terms from the sequence:

n	1	2	3	4				
a_n	4	7	10	13				

Expanded:

$a_2 = 4 +$

$a_3 = 4 +$

$a_4 = 4 +$

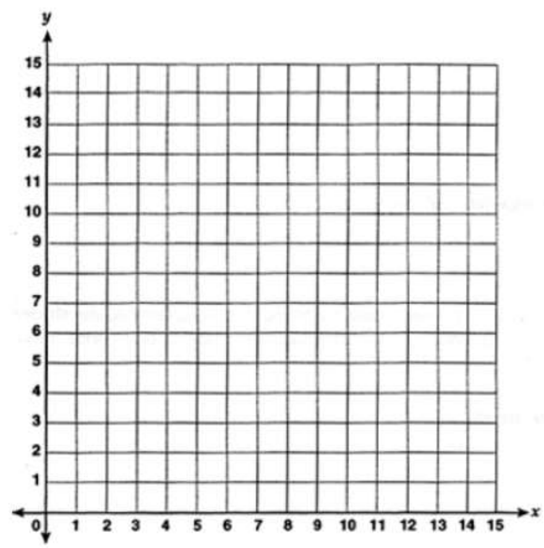
Condensed:

$a_2 = a_1 +$

$a_3 = a_1 +$

$a_4 = a_1 +$

Arithmetic Explicit Rule: $a_n =$



Write an explicit rule for the given sequence. Then answer any additional questions. Assume $n \geq 1$.

5. 5, 12, 19, 26,...	**6.** Find an explicit formula for a_n for the arithmetic sequence with the following terms: $a_3 = 19$ and $a_5 = 27$.

Arithmetic Series

Find the sum of: 40+37+34+31+28+25+22

The ______________ of a finite arithmetic sequence with *n* terms (n^{th} partial sum) can be found by:

$S_n = \frac{n}{2}(a_1 + a_n)$ where n=__________________ a_1 =__________________ and a_n =________________

Find the sum of the finite arithmetic sequence.

Sum of integers from 1 to 35.	Sum of odd integers from 1 to 57
50^{th} partial sum of the arithmetic sequence $-6, -2, 2, 6, \ldots$	Determine the seating capacity of an auditorium with 30 rows of seats if there are 20 seats in the first row, 22 in the second, 24 in the third row, and so on.
$\sum_{n=1}^{100}(2+3n)$	$\sum_{n=21}^{100}(2+3n)$