Precalculus Name ______________________

8.1 Notes: *Sequences and Series-Day 1*

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				

A ________________________ has a limited number of terms. An example would be: 1, 2, 4, 8, 16

a) How many terms are in this sequence?

b) What is a_3?

c) Write a rule for finding the nth term.

An _____________________________ continues without stopping. The set of natural numbers is an example of an infinite sequence. What are the natural numbers?

a) What is a_5?

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.** $a_n = \frac{2 + (-1)^n}{n}$

Write an expression for the apparent n^{th} term of the sequence. (Assume *n* begins with 1).

4. 2, 4, 6, 8…	**5.** 1, 3, 5, 7
What is the rule?	**What is the rule?**
What is a_7?	What is a_8?

Write an expression for the apparent n^{th} term of the sequence. (Assume n begins with 1).

6. $1, 4, 9, 16$	**7.** $2, 5, 10, 17, \ldots$
8. $1, 2, 7, 14, 23\ldots$	**9.** $1, 2, -7, 14, -23\ldots$

When a sequence is built using **PREVIOUS TERMS** the sequence is said to be defined

________________________________.

Fill in the missing terms:

a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_n
1	2	6	24			5040	

To find the rule:

$a_2 = a_1 \bullet$ $a_3 = a_2 \bullet$ $a_4 = a_3 \bullet$ $a_n =$

10. Consider the sequence $1, 1, 2, 3, 5, 8, 13, 21\ldots$

Describe the pattern in words.

Write a recursive formula to define this sequence.

What is this very famous sequence of numbers called?

11. Write the first five terms of the sequence.

$a_{k+1} = \frac{1}{2}a_k; \quad a_1 = 32$

Write an expression for the apparent n^{th} term of the sequence.

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8.1 Notes: *Sequences and Series-Day 2*

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 $\sum_{i=1}^{n} a_i = a_1 + a_2 + a_3 + \ldots + a_n$, 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.** $\sum_{k=1}^{\infty}\left(\frac{3}{10^k}\right)$
10. $\sum_{k=1}^{3}5\left(\frac{1}{10^k}\right)$ **third partial sum*	**11.** $\sum_{k=1}^{\infty}5\left(\frac{1}{10^k}\right)$