

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Class worksheet: Alg2H  
Sequences: Exploration  
(book chapter 14)

A sequence: Ordered set of numbers. 1, 3, 5, 7, 9, 11, ...

Infinite sequence: Does not end.  $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}, \dots$

Term: Each number, element, of the sequence.  
 $a_1, a_2, a_3, \dots, a_n, \dots$

Explicit and Recursive formulas

Explicit

$$a_n = 2n + 1$$

$$a_1 = 2 \cdot 1 + 1 = 3$$

$$a_2 = 2 \cdot 2 + 1 = 5$$

$$a_3 = 2 \cdot 3 + 1 = 7$$

⋮

↓  
Can also write as Recursive

$$\begin{aligned} a_n &= a_{n-1} + 2 \\ a_1 &= 3 \end{aligned}$$

Recursive

$$a_n = \frac{1}{2} a_{n-1}$$

$$a_1 = 8$$

$$a_2 = \frac{1}{2} \cdot 8 = 4$$

$$a_3 = \frac{1}{2} \cdot 4 = 2$$

$$a_4 = \frac{1}{2} \cdot 2 = 1$$

⋮

↓  
Can also write as Explicit

$$a_n = 8 \cdot \left(\frac{1}{2}\right)^{n-1}$$

Series: A sum of the  $n$  terms of sequence  
$$S_n = a_1 + a_2 + \dots + a_n.$$

---

Sequence: 1, 3, 5, 7, 9, ...

$$s_1 = 1$$

$$s_2 = 4$$

$$s_3 = 9$$

Sigma notation:

To element

$$\sum_{n=1}^4 (2n+1) = 3 + 5 + 7 + 9 = 24$$

from

$$\sum_{n=1}^5 n^2 = 1^2 + 2^2 + 3^2 + 4^2 + 5^2 = 55.$$

$$\sum_{n=1}^3 2^n = 2^1 + 2^2 + 2^3 = 2 + 4 + 8 = 14.$$