



Chapter 4.1: An Introduction to
Sequences

Definition: Sequence



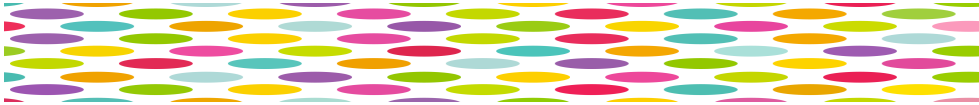
Example) Given the sequence, identify the following term values:

$$\{3, 12, 21, 30, 39, 48, \dots\}$$

$$a_1 = \underline{\quad} \quad a_4 = \underline{\quad} \quad a_7 = \underline{\quad} \quad a_{11} = \underline{\quad}$$

Since each term value is paired with exactly one term number in the sequence, we can think of a sequence as a function where the domain is the _____ and the range is the set of _____.

n	1	2	3	4	5	6	7
a_n	3	12	21	30	39	48	57



Example) Karin has been doing crunches and recording the number she completes each day for the last week.

20, 22, 24, 26, 28, 30, 32, . . .

Describe the pattern in your own words.

This type of description of a sequence is called _____, because it is based on a recurring pattern.

Although the description is correct, we can shorten it if we use a standard notation.

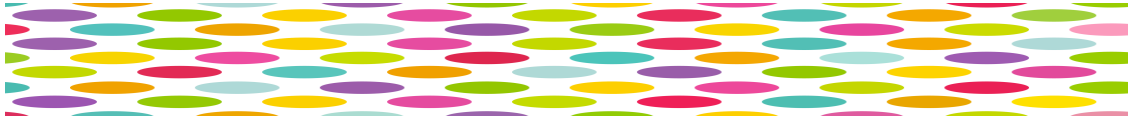


20, 22, 24, 26, 28, 30, 32, . . .

$$a_{\text{initial}} =$$

$$a_{\text{next}} =$$

Therefore



Example) Find the first five terms in each sequence.

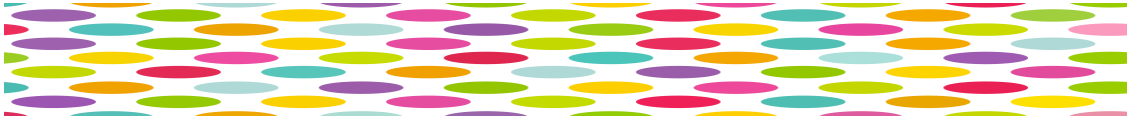
1) $\begin{cases} a_1 = 17 \\ a_n = a_{n-1} + 4; n > 1 \end{cases}$ 2) $\begin{cases} a_1 = 8 \\ a_n = 3a_{n-1} - 1; n > 1 \end{cases}$



Example) Describe the sequence in words and then write in standard recursive notation.

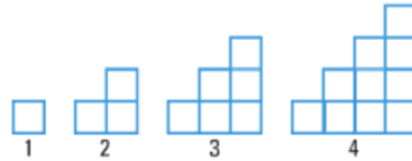
1) $\{ 17, 20, 23, 26, 29, 32, \dots \}$

2) $\{ 81, 27, 9, 3, 1, (1/3) \}$



A rule in which the n^{th} term is defined as a function of n is called an _____ formula for a sequence.

Which rule gives the total number of squares in the n th figure of the pattern shown?



- A] $a_n = 3n - 3$ B] $a_n = 4n - 5$ C] $a_n = n$ D] $a_n = \frac{n(n+1)}{2}$

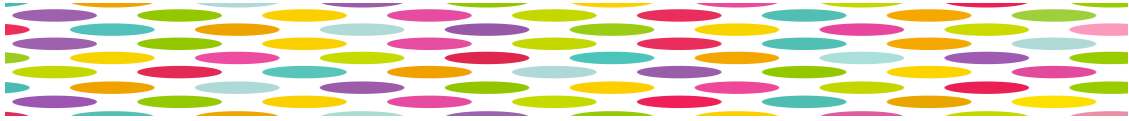


Example) Find the first five terms in each sequence.

1) $a_n = -2n + 8$

2) $a_n = n^2 - n + 3$

3) $a_n = (3)^{n-1}$



Classwork/Homework

Problem Set 4.1