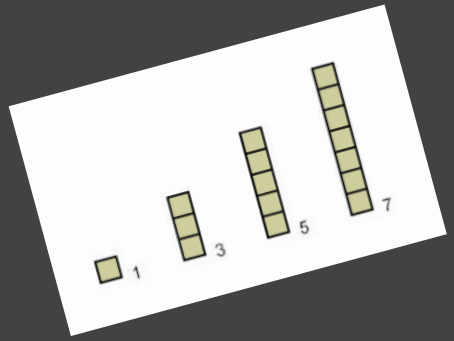
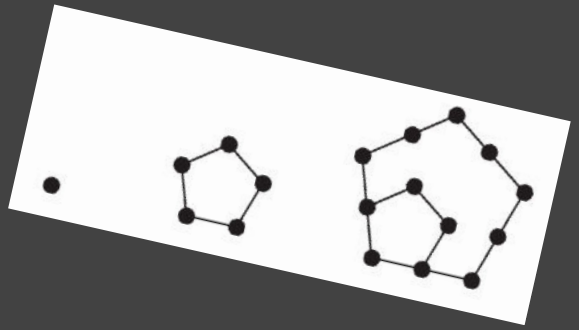




Lesson 3 :

Different Types of Sequences

Learning Targets:

- I can explain what it means for a sequence to be arithmetic or geometric

Let's look at other types of sequences.

3.1 Remembering Function Notation

Read the following quietly:

Consider the function f given by $f(n) = 3n - 7$. This function takes an input, multiplies it by 3, then subtracts 7.

Evaluate mentally:

- $f(10)$
- $f(10 - 1)$
- $f(10) - 1$
- $f(5) - f(4)$

3.2 Three Sequences

Complete the following task quietly. Then share with your partner.

Here are the values of the first 5 terms of 3 sequences:

- A: 30, 40, 50, 60, 70, . . .
- B: 0, 5, 15, 30, 50, . . .
- C: 1, 2, 4, 8, 16, . . .

1. For each sequence, describe a way to produce a new term from the previous term.

1. If the patterns you described continue, which sequence has the second greatest value for the 10th term?

1. Which of these could be geometric sequences? Explain how you know.

Activity Synthesis:

- A: 30, 40, 50, 60, 70, . . .
- B: 0, 5, 15, 30, 50, . . .
- C: 1, 2, 4, 8, 16, . . .

Sequence A is an example of an **arithmetic sequence.**

Two ways to know a sequence is **arithmetic:**

- You always add the same number to get from one term to the next.
- If you subtract any term from the next term, you always get the same number.

How are sequence *A* and sequence *C* alike?

How are sequence *A* and sequence *C* different?

3.3 Representing a Sequence

Jada and Mai are trying to decide what type of sequence this could be:

term number	value
1	2
2	6
5	18

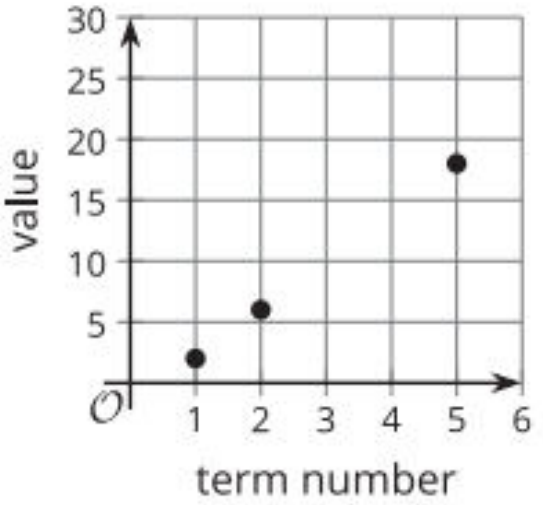
Jada says: "I think this sequence is geometric because in the value column each row is 3 times the previous row."

Mai says: "I don't think it is geometric. I graphed it and it doesn't look geometric."

Quiet Work Time

Do you agree with Jada or Mai? Explain or show your reasoning.

Activity Synthesis:



- How could you find the missing points for an arithmetic sequence just given (2, 6) and (5, 18).

Lesson Synthesis:

- How are arithmetic and geometric sequences alike and different?

Increasing Arithmetic Sequence	Decreasing Arithmetic Sequence
* Common difference is positive!	* Common difference is negative!
5 , 9 , 13 , 17 , ... +4 +4 +4	20 , 17 , 14 , 11 , ... −3 −3 −3

Geometric Sequences

- Ratio of consecutive terms is constant.
  - Called the "***common ratio.***"
- Examples:
- 1, 3, 9, 27, 81, … ratio= 3
- 64, -32, 16, -8, 4, … ratio = -1/2
- a, ar, ar^2, ar^3, ar^4, … ratio = r