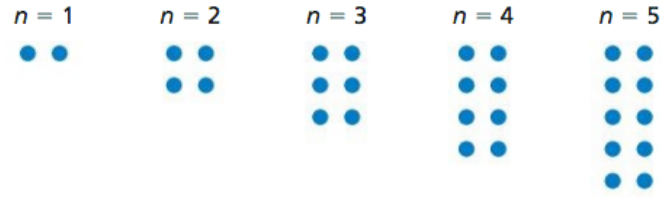
4.6 Arithmetic Sequences

Do Now: Using your calculator determine the line of best fit. What type of correlation?

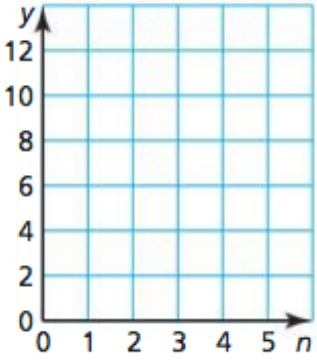
Exercise Time (x) min	11	100	75	32	115	83	60	120
Calories Burned (y)	70	936	700	381	1276	915	656	1331

Equation: _____ **Correlation:** _____

Critical Thinking: With your neighbor complete the table and determine a pattern.



Number of rows, *n*	1	2	3	4	5
Number of dots, *y*					



What does the word "*sequence*" mean to you? Where have you seen it used?

A ***sequence*** is an ordered list of numbers.

- Each number in a sequence is called ***a term***.

i.e.

$$2,\ 5,\ 8,\ 11,\ \ldots,\ a_n$$

a_1 =_____

a_2 =_____

a_3 =_____

a_4 =_____

a_5 =_____

Core Concept

Arithmetic Sequence

In an **arithmetic sequence**, the difference between each pair of consecutive terms is the same. This difference is called the **common difference**. Each term is found by adding the common difference to the previous term.

5, 10, 15, 20, . . . Terms of an arithmetic sequence

+5 +5 +5 ← common difference

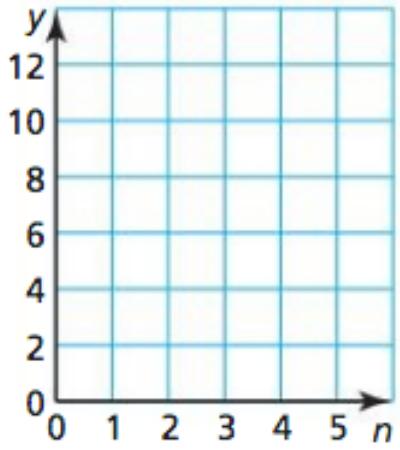
Example 1: Write the next three terms of the arithmetic sequence:

$$-7, \quad -14, \quad -21, \quad -28, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_$$

Example 2: Graphing an arithmetic sequence:

Spiral review: What is needed to plot a point on a graph?

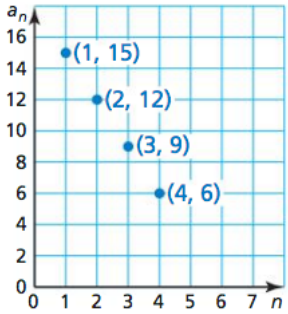
Try to graph the arithmetic sequence: **3, 6, 9, 12, ...**



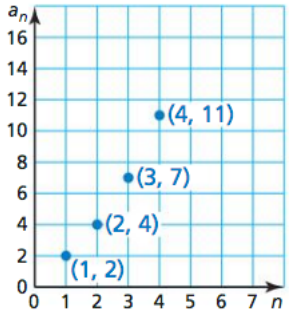
Example 3: Identifying an Arithmetic Sequence from a graph

Are the following an Arithmetic Sequence? Explain.

a)



b)



Equation for an Arithmetic Sequence

$$a_n = a_1 + (n-1)d$$

Critical Thinking:
Can you write an Arithmetic Sequence as a Function of the following?
A sequence has an initial term, a_1, of 4 and a common difference, d, of 5.

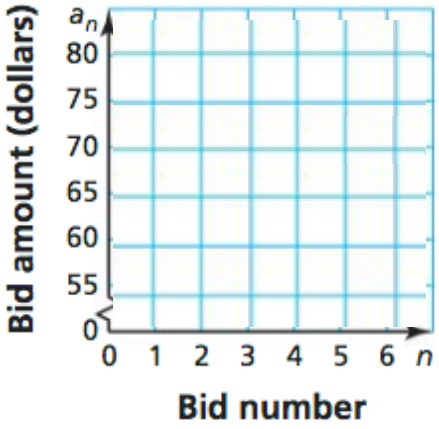
Example 4: Finding the *n*th Term of an Arithmetic Sequence.
Write an equation for the nth Term of the arithmetic sequence: 14, 11, 8, 5,…

Determine $a_{20} =$ _____

Example 5: Real world applications
Ethan is shopping online for a supreme shirt when he comes across a bidding site. The initial bid is $60 and the bids increase by $5 for each bid.

a) Write a function that represents the arithmetic sequence.

b) Graph the function.



c) If the winning bid was $115, how many bids were placed?

Check your understanding:
Joie has found a book at an auction on learning to draw a straight line. The initial bid is $15 and the bids increase by $4 for each bid.

a) Write a function to represent the arithmetic sequence.
b) If the winning bid was $67, how many bids were placed?

Homework: 11, 13, 15, 23, 25, 27, 40, 43