Arithmetic Sequences Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period \_\_\_\_\_\_\_

***Look at the sequence and write the next three terms.***

1. 5, 10, 15, 20…. \_\_\_\_\_, \_\_\_\_\_\_\_, \_\_\_\_\_\_\_ 2. 7, 10, 13, … \_\_\_\_\_\_\_, \_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_
2. 6, 1, -4, \_\_\_\_\_\_\_, \_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_ 4. 47, 37, 27, \_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_

Why was that so easy to do?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What you noticed about the sequences is called the **common difference. The distance between each term in an arithmetic sequence is the same (or common).**

***Find the common difference in the following sequences.***

1. 118, 127, 136… Common Difference \_\_\_\_\_\_\_\_
2. – 23, --17, -- 11… Common Difference\_\_\_\_\_\_\_\_\_
3. -7, 4, 15… Common Difference\_\_\_\_\_\_\_\_

Each number in a sequence is called a **term** and terms are numbered. Use the Common Difference to fill out the rest of the table.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Term number, n | 1 | 2 | 3 | 4 | 5 | 6 |  |  |  |  |  |
| Sequence  value | 2 | 4 | 6 | 8 | 10 | 12 |  |  |  |  |  |

You can use the Common Difference to find terms before the first term.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Term number, n | 0 | 1 | 2 | 3 | 4 | 5 |  |  |  |  |  |
| Sequence  value |  | -31 | -45 | -59 |  |  |  |  |  |  |  |

What is the most important thing you need to know about Arithmetic Sequences? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Developing a sequence’s formula **RECURSIVELY. (Recurring, or happening over and over)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Term | Sequence |  | Using *a1* (the first term) and *d* (the common difference) |  |
|  |  |  |  |  |
| 1 | 6  3 | *First term a*1 | *a*1 | 6 |
| 2 | 9 | *Second Term a*2 | *a*1 + *d* | 6 + 3 = 9 |
| 3 | 12 | *Third Term a*3 | *a*1 + *d*+ *d = a*1 + *(2)* *d* | 6 + 3 + 3 = 6 + 2(3) = 12 |
| 4 | 15 | *Fourth Term a*4 | *a*1 + *d*+ *d*+ *d = a*1 + *(3)* *d* | 6 + 3 + 3 + 3 = 6 + 3(3) = 15 |
| 5 | 18 | *Fifth Term a*5 | *a*1 + *d*+ *d*+ *d*+ *d = a*1 + *(4)* *d* | 6 + 3 + 3 + 3 + 3= 6 + 4(3) = 18 |
| n |  | *nth term a*n | *a1* *+ ( n – 1 ) d* | 6 + ( n – 1 )3 |

Evaluate the 35th term 6 + (35 – 1 )3 = \_\_\_\_\_\_\_. Evaluate the 100th term \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

You try it. What is the value of *d* (the common difference) in the sequence below\_\_\_\_\_\_?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Term | Sequence |  | Using *a1* (the first term) and *d* (the common difference) | Fill in this column |
|  |  |  |  |  |
| 1 | 4  ? | *First term a*1 | *a*1 |  |
| 2 | 8 | *Second Term a*2 | *a*1 + *d* |  |
| 3 | 12 | *Third Term a*3 | *a*1 + *d*+ *d = a*1 + *(2)* *d* |  |
| 4 | 16 | *Fourth Term a*4 | *a*1 + *d*+ *d*+ *d = a*1 + *(3)* *d* |  |
| 5 | 20 | *Fifth Term a*5 | *a*1 + *d*+ *d*+ *d*+ *d = a*1 + *(4)* *d* |  |
| n |  | *nth term a*n | *a1* *+ ( n – 1 ) d* |  |

Evaluate the 25th term \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Evaluate the 75th term \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Keep going.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Term | Sequence |  | Using *a1* (the first term) and *d* (the common difference) | Fill in this column |
|  |  |  |  |  |
| 1 | 10  ? | *First term a*1 | *a*1 |  |
| 2 | 2 | *Second Term a*2 | *a*1 + *d* |  |
| 3 | -6 | *Third Term a*3 | *a*1 + *d*+ *d = a*1 + *(2)* *d* |  |
| 4 | -14 | *Fourth Term a*4 | *a*1 + *d*+ *d*+ *d = a*1 + *(3)* *d* |  |
| 5 | -22 | *Fifth Term a*5 | *a*1 + *d*+ *d*+ *d*+ *d = a*1 + *(4)* *d* |  |
| n |  | *nth term a*n | *a1* *+ ( n – 1 ) d* |  |

Evaluate the 25th term \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Evaluate the 75th term \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.