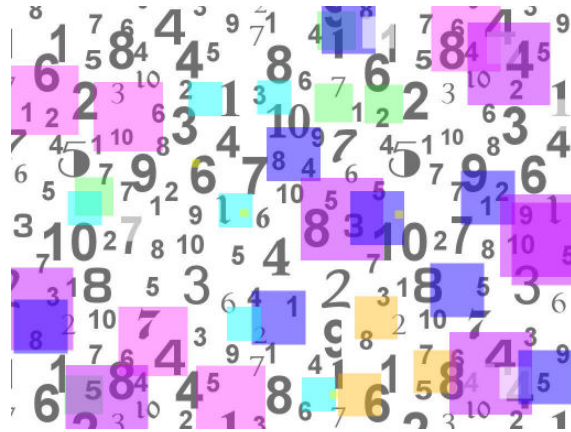# ARITHMETIC PATTERNS

Unit Overview

This unit focuses on patterns in numbers. We will look at various tools to help us identify arithmetic patterns.

How to Identify Arithmetic Patterns

The arithmetic pattern is one of the simplest sequences to learn about. It involves adding or subtracting from a common difference to create a string of numbers that is related to one another. For example, the sequence 3, 5, 7, 9, has a common difference of 2, and it progresses by adding the common difference.

It may be difficult to determine the common difference and identify the arithmetic pattern in the sequence just by looking at the string of numbers. Therefore, there are a few tools you can use to ease the process of finding the common difference and the entire sequence.

Hundreds Chart

Below is a chart that counts from 1 to 100, separated into columns and rows of 10. For example, you are asked to look for the next number for the sequence 8, 18, 28. Looking at the chart, you could make the assumption that the common difference for this sequence is 10 and the next number to appear in the sequence should be 38. You can determine the necessary components for the sequence by referring to the chart horizontally, vertically, and also, diagonally.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Click here to print the hundreds chart.

Addition Chart

It is important to note that the order of the addends has no effect on the resulting sum. You can use the addition chart to predict the outcome of the sum.

+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3	3	4	5	6	7	8	9	10	11	12	13
4	4	5	6	7	8	9	10	11	12	13	14
5	5	6	7	8	9	10	11	12	13	14	15
6	6	7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

Click here to print the addition chart.

There are three principles you should keep in mind to ease the process of addition:

1. When you add **two even numbers** together, the resulting sum is **always even**. For *example:*

$$6 + 2 = 8$$

$$4 + 8 = 12$$

Therefore,

$$\text{Even} + \text{Even} = \text{Even}$$

2. When you add **two odd numbers** together, the resulting sum is **always even**. For *example*:

$$3 + 7 = 10$$

$$1 + 5 = 6$$

Therefore,

$$\text{Odd} + \text{Odd} = \text{Even}$$

3. When you add **an odd number and an even number** together, the resulting sum is **always odd**. For *example*:
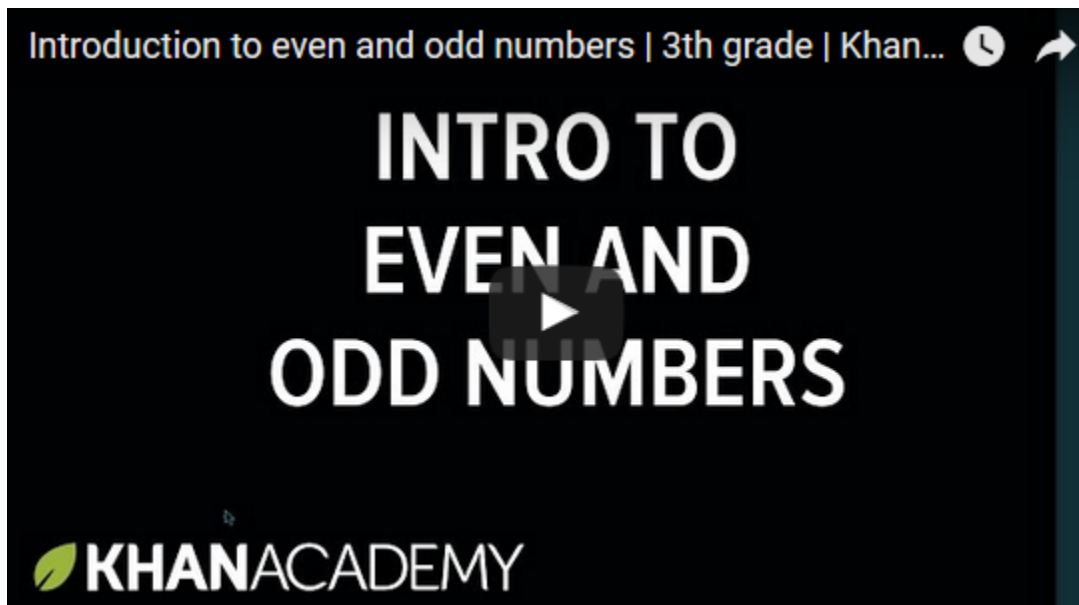
$$1 + 6 = 7$$

$$3 + 8 = 11$$

Therefore,

$$\textbf{Odd} + \textbf{Even} = \textbf{Odd}$$

Click on the link to watch the video "Introduction to even and odd numbers".

Multiplication Chart

| X	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

Click here to print the multiplication chart.

Click on the link to watch the video "Patterns in multiplication tables practice".
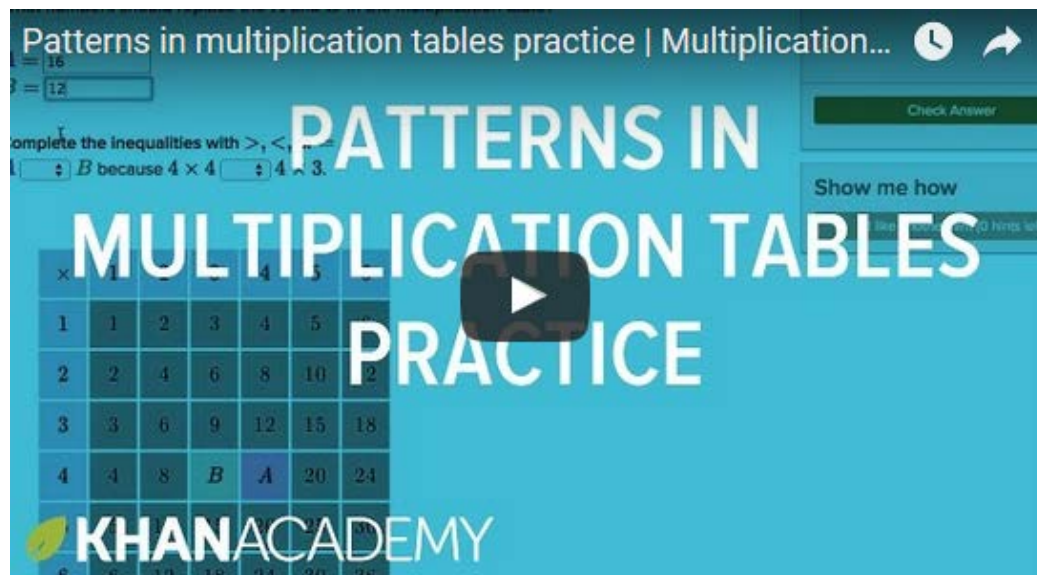
Number Line

The last method to help you identify an arithmetic pattern is using a number line. Please note that the hash tags and the labeling of the number line do not have to be completely accurate. It is merely an expressive tool that represents the intervals and numbers. While the previous charts utilize "common differences" as the intervals of the sequence, the number line uses "terms" to represent the addition or subtraction of intervals between two numbers in a sequence. For example, to find the next numbers in the sequence that begins with 87, 84, 81, you can draw out a number line and label it accordingly:
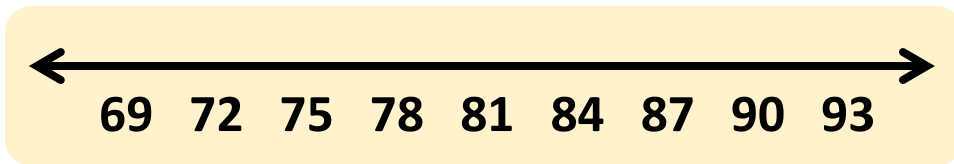
From the number line, you can determine the numbers following 81 in the sequence, which goes to 78, then 75, then 72 etc. You can also figure out what goes before 87 in the sequence. This example shows that the term of the sequence is 3.

Click on the link to watch the video "Practice finding patterns in numbers".