

Linear Sequence

x	1	2	3	4	5	6
ax + b	a + b	2a + b	3a + b	4a + b	5a + b	6a + b

Diagram illustrating the general form of a linear sequence. The first term is $a + b$ (circled in green). The common difference is a (circled in red). Blue arrows show the progression from one term to the next, each adding a .

x	1	2	3	4	5	6
ax + b	1	4	7	10	13	16

Diagram illustrating a specific linear sequence. The first term is 1 (circled in green). The common difference is 3 (circled in red). Blue arrows show the progression from one term to the next, each adding 3.

So,

$$\begin{aligned} a &= 3 \\ \rightarrow a + b &= 1 \\ \rightarrow 3 + b &= 1 \\ b &= -2 \end{aligned}$$

Therefore, the rule for
The above sequence is:
 $3x - 2$

Quadratic Sequence

x	$ax^2 + bx + c$		x	$ax^2 + bx + c$
0	c		0	0
1	$a + b + c$	$a + b$	1	1
2	$4a + 2b + c$	$3a + b$	2	6
3	$9a + 3b + c$	$5a + b$	3	15
4	$16a + 4b + c$	$7a + b$	4	28
5	$25a + 5b + c$	$9a + b$	5	45
6	$36a + 6b + c$	$11a + b$	6	66

x	$ax^2 + bx + c$		x	$ax^2 + bx + c$
0	0		0	0
1	1	1	1	1
2	6	5	2	6
3	15	9	3	15
4	28	13	4	28
5	45	17	5	45
6	66	21	6	66

The diagram illustrates the decomposition of the quadratic sequence into its components. The first table shows the general form $ax^2 + bx + c$ for $x = 0$ to 6 . The constant term c is circled in pink. The first differences are shown in blue, and the second differences are shown in green. The first difference at $x=1$ is $a+b$ (circled in yellow), and the second differences are all $2a$ (circled in red).

The second table shows a specific quadratic sequence where $c=0$ (circled in pink). The first difference at $x=1$ is 1 (circled in yellow), and the second differences are all 4 (circled in red).