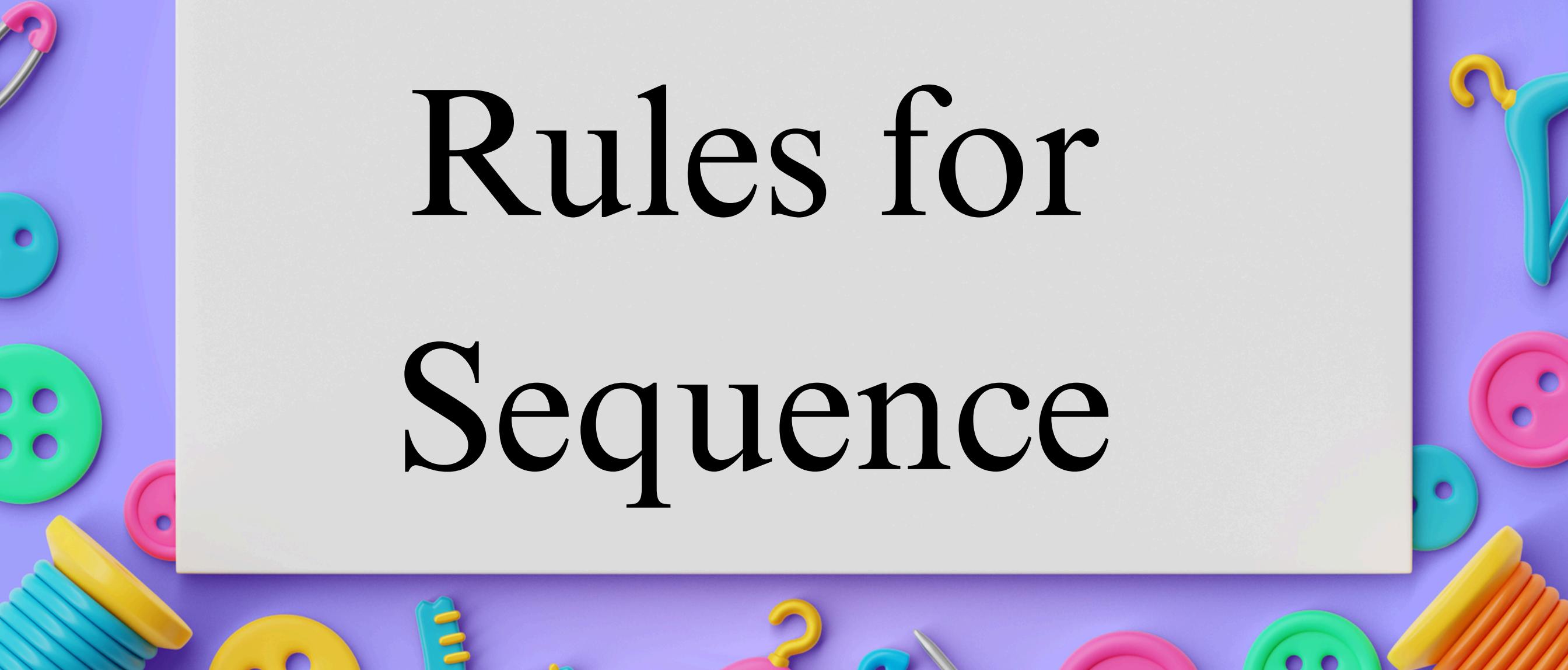


Formulating Rules for Sequence



September 2021						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
			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		

Look for the pattern in the sequence of encircled numbers

The numbers 4, 8, 12, 16, 20, 24, and 28 form a sequence.

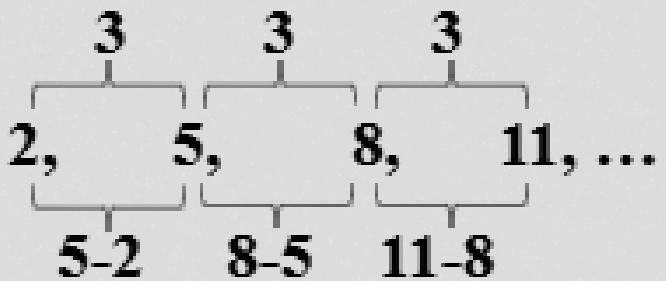
A number sequence is a list of numbers arranged so that each term follows a specific rule or pattern. Each individual number in the sequence is referred to as a **term**.

If we look at any two consecutive terms among the circled numbers on the calendar, the difference between them is

4. By adding 4 to any term, we get the next number in the sequence. Thus, the rule for the sequence 4, 8, 12, 16, 20, 24 is to add 4 to the preceding term.

Sequence	Rule	Nth term rule	Next three term
a. 3, 6, 9, 12, ...	Every term after the first is obtained by adding 3 to the number preceding it. $(0+3), (3+3), (6+3), (9+3), \dots$ or Multiples of three $(3 \times 1), (3 \times 2), (3 \times 3), (3 \times 4), \dots$	$3n$	15, 18, 21
b. 1, 4, 9, 16, ...	Multiply the counting numbers by itself or squaring counting numbers.	n^2	25, 36, 49
c. 3, 1, -1, -3,	Every term after the first is obtained by adding (-2) to the number preceding it. 3, $[3+(-2)]$, $[1+(-2)]$, $[-1+(-2)]$, ...	$-2(n-1)+3$ or $5-2n$	-5, -7, -9
d. 2, 3, 4, 5, ..	First term = $1+(1)=2$ Second term= $2+(1)=3$ Third term = $3+(1)=4$ Fourth Term= $4+(1)=5$	$n+1$	6, 7, 8
e. 2, 4, 6, 8, ...	First term= $2 \times (1)=2$ Second term= $2 \times (2)=4$ Third term= $2 \times (3)=6$ Fourth term= $2 \times (4)=8$	$2 \times n$ or $2n$	10, 12, 14

Example: 2: 2, 5, 8, 11, ...



Working backwards, you'll notice a pattern where subtracting 3 from a term gives the previous term on the left. Now, try to find a way to generate each term such that the sequence has a common difference of 3.

Using guess-and-check strategy:

Example: 2: 2, 5, 8, 11, ...

Let **n** represent a counting number.

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Guess	Check	Conclusion
$3 \times n + 1$	$3 \times 1 + 1 = 4$	This rule is wrong because the first term in the pattern 2, 5, 8, 11 is 2 not 4
$3 \times n - 2$	$3 \times 1 - 2 = 1$	This is also wrong. The first term should be 2 not 1.
$3 \times n - 1$	$3 \times 1 - 1 = 2$	The rule is exact for the first term.
	Let's also check the rule for the other three terms. $3 \times 2 - 1 = 5$ $3 \times 3 - 1 = 8$ $3 \times 4 - 1 = 11$	The rule is also exact for the other three terms.

So the n th for the sequence 2, 5, 8, 11, ... is $3 \times n - 1$ or $3n - 1$. In this example, the rule $3n - 1$ is what we call an **expression**. While $3n - 1 = 4$ is what we call an **equation**.

Let's take a look at this table:

Expression	Equation
$2 + 5$	$2 + 5 = 7$
$2y - 4$	$2y - 4 = 14$
$14 - 3$	$14 - 3 = 11$
$5n + 6$	$5n + 6 = 26$
$10 \div 2$	$10 \div 2 = 5$

In the table, the first column contains examples of **expressions**, while the second column shows examples of **equations**.

An **expression** is a combination of numbers, variables, or both, along with operation symbols. On the other hand, an **equation** is a mathematical statement that connects the values of two expressions with an **equal sign**.