

LESSON 5.3
1. { ARITHMETIC SEQUENCES
Recursive Rule

Goal: To solve equations/inequalities in math and real world context and to write rules for arithmetic sequence.

Obj: SWBAT write a recursive rules for an arithmetic sequence.

Obj: SWBAT generate an arithmetic sequence given a recursive rule.

EXPLORING RECURSIVE RULE FOR ARITHMETIC SEQUENCES.

What does $f(n)$ mean? output

Sequence

n	$f(n)$
1	10
2	15
3	20
4	25

$$f(n) = 5 + f(n-1)$$

$$f(1) = 5 + 10$$

$$f(1) = 15$$

$$f(2) = 5 + f(2-1)$$

$$5 + f(1)$$

$$5 + 10$$

$$f(2) = 15$$

$$f(4) = 5 + f(4-1)$$

$$5 + f(3)$$

$$5 + 20$$

$$f(4) = 25$$

$$f(3) = 5 + f(3-1)$$

$$5 + f(2)$$

$$5 + 15$$

$$f(3) = 20$$

$$f(1) = 10$$

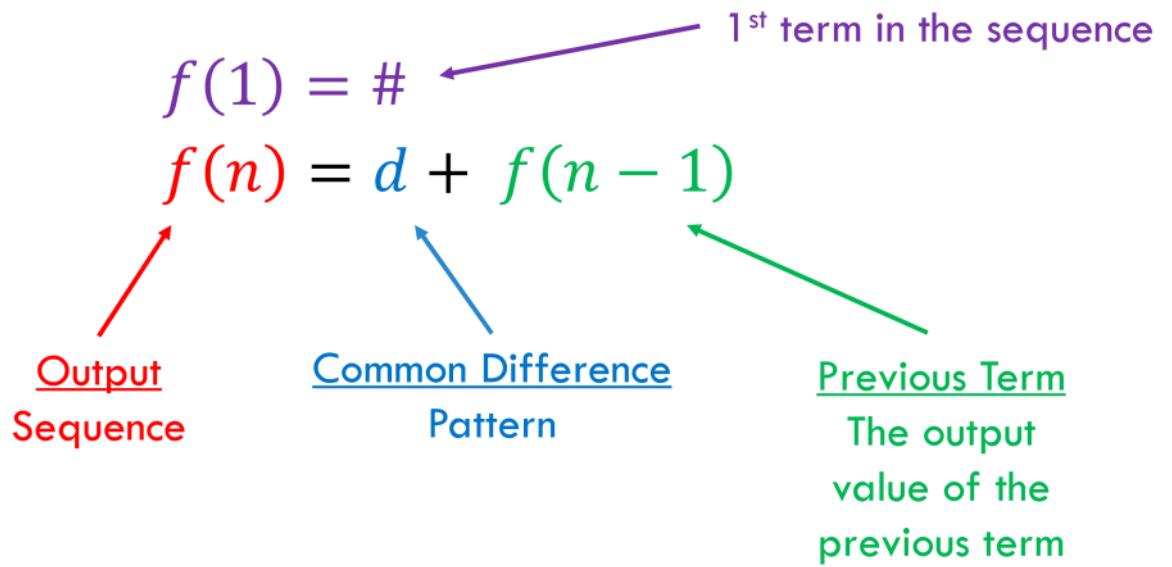
$$f(n) = 5 + f(n-1)$$

EXPLORING RECURSIVE RULE FOR ARITHMETIC SEQUENCES.

Given $f(n) = 6 + f(n - 1)$ make an arithmetic sequence.

$$f(2) = 6 + f(2 - 1)$$
$$6 + \underline{f(1)}$$

RECURSIVE RULE



PROBLEM 1:

Given the arithmetic sequence, write a recursive rule.

30, 27, 24, 21, 18, ...

$f(1)$

$-3 = d$

$$f(1) = \#$$

$$f(n) = d + \underline{f(n-1)}$$

$$f(1) = 30$$

$$f(n) = -3 + f(n-1)$$

PROBLEM 2A:

Given the arithmetic sequence, write a recursive rule.

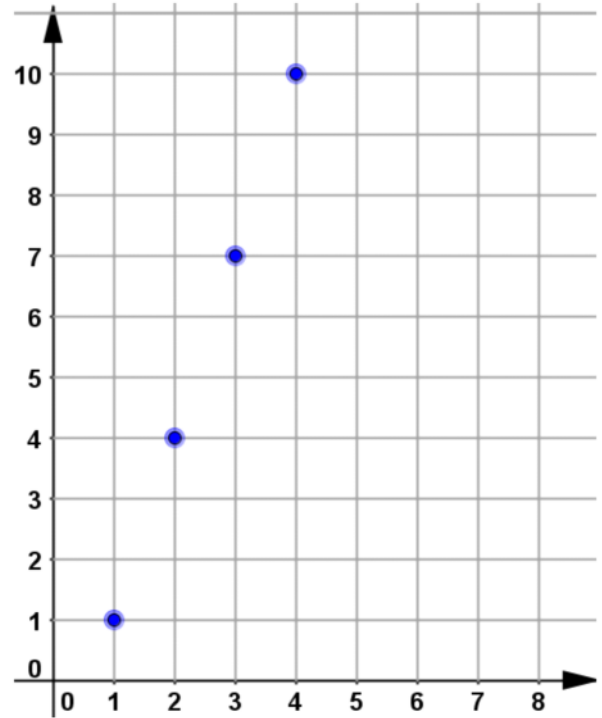
n	$f(n)$
1	-2
2	4
3	10
4	16
5	22

$$f(1) = \#$$
$$f(n) = d + f(n-1)$$

$$f(1) = -2$$
$$f(n) = 6 + f(n-1)$$

PROBLEM 1B:

Given the arithmetic sequence,
write a recursive rule.



PROBLEM 1C:

Given the arithmetic sequence, write a recursive rule.

$-10, -15, -20, -25, \dots$

PROBLEM 1D:

Given the arithmetic sequence, write a recursive rule.

n	$f(n)$
1	15
2	24
3	33
4	42

PROBLEM 2:

Find the 15th term of the sequence given the explicit rule

$$f(n) = 3n - 10$$

$$f(15) = 3(15) - 10$$

$$45 - 10$$

$$f(15) = 35$$

15th term is 35

PROBLEM 2A:

Find the 10th term of the sequence given the explicit rule

$$f(n) = 2(n - 1) + 6$$

$$f(10) = 2(10 - 1) + 6$$

$$2(9) + 6$$

$$18 + 6$$

$$f(10) = 24$$

10th term is 24

PROBLEM 2B:

Find the 4th term of the sequence given the recursive rule
 $f(1) = 45; f(n) = -3 + f(n - 1)$

n	$f(n)$
1	45
2	42
3	39
4	36

$$\begin{aligned} f(2) &= -3 + f(2-1) \\ &= -3 + f(1) \\ &= -3 + 45 \\ f(2) &= 42 \end{aligned}$$

PROBLEM 3:

Given the explicit rule $f(n) = 2n + 50$

The sequence is 52, 54, 56, ... 130

What is the term number(position) for 130 in this sequence?

$$\begin{array}{cccc} 52, & 54, & 56, & \dots & 130 \\ f(1) & f(2) & f(3) & \dots & f(n) \\ & & & & \uparrow \\ & & & & f(40) \end{array}$$

$$\begin{array}{r} 130 = 2n + 50 \\ -50 \qquad \qquad -50 \\ \hline 80 = 2n \\ \frac{80}{2} = \frac{2n}{2} \\ 40 = n \end{array}$$