Name:
Date: Class Period:

Arithmetic Sequences

An Arithmetic sequence is one that has a common difference.

In other words, you Add or Subtract the same number to get to the next term.

There are 2 different ways you can write a sequence.

Recursive Formula

RULE

A recursive formula finds the next term of a sequence by using the previous term.

Formula:

$a_1 = ?$

$a_n = a_{n-1} + d$

a_1 = 1st term

a_n = desired term

n = term #

a_{n-1} = previous term

d = common difference

Example: Given the sequence, write the recursive formula:

+6

2, 8, 14, 20,…

RULE

$a_1 = 2$

$a_n = a_{n-1} + 6$

Explicit Formula

An explicit formula uses a formula that will find each term.

* SPECIFIC *

Formula:

$a_n = a_1 + (n-1)d$ → Formula Sheet

$a_n = a_1 + d(n-1)$

a_n =

a_1 =

n =

d =

Example: Given the sequence, write the explicit formula:

2, 8, 14, 20,…

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

* SIMPLIFY *

$a_n = 2 + 6n - 6$

$\boxed{a_n = 6n - 4}$ $y = mx + b$

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4.2B Explicit and Recursive Equations From Arithmetic Sequences

Find the next three terms of each arithmetic sequence, write the explicit and recursive formula:

1. 9, 16, 23, 30, 37, 44, 51

+7

d = 2nd term − 1st term

Explicit: $a_n = 9 + 7(n-1)$
$= 9 + 7n - 7$
$\boxed{a_n = 7n + 2}$

Recursive: $a_1 = 9$
$a_n = a_{n-1} + 7$

2. 31, 24, 17, 10, 3, −4, −11

−7

Explicit: $a_n = 31 - 7(n-1)$
$= 31 - 7n + 7$
$\boxed{a_n = -7n + 38}$

Recursive: $a_1 = 31$
$a_n = a_{n-1} - 7$

3. -6, -2, 2, 6, 10, 14, 18

Explicit: $a_n = -6 + 4(n-1)$
$a_n = -6 + 4n - 4$
$\boxed{a_n = 4n - 10}$

Recursive: $a_1 = -6$
$a_n = a_{n-1} + 4$

4. -8, -5, -2, 1, 4, 7, 10

Explicit: $a_n = -8 + 3(n-1)$
$= -8 + 3n - 3$
$\boxed{a_n = 3n - 11}$

Recursive: $a_1 = -8$
$a_n = a_{n-1} + 3$

5. 12, 16, 20, 24, 28, 32, 36

Explicit: $a_n = 12 + 4(n-1)$
$= 12 + 4n - 4$
$\boxed{a_n = 4n + 8}$

Recursive: $a_1 = 12$
$a_n = a_{n-1} + 4$

6. 3, 1, -1, -3 −5, −7, −9

Explicit: $a_n = 3 - 2(n-1)$
$= 3 - 2n + 2$
$\boxed{a_n = -2n + 5}$

Recursive: $a_1 = 3$
$a_n = a_{n-1} - 2$

7. 14, 12, 10, 8, 6, 4, 2

Explicit: $a_n = 14 - 2(n-1)$
$= 14 - 2n + 2$
$\boxed{a_n = -2n + 14}$

Recursive: $a_1 = 14$
$a_n = a_{n-1} - 2$

Arithmetic Sequences

Name_____

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Determine if the sequence is arithmetic. If it is, find the common difference.

1) 35, 32, 29, 26, ...

2) −3, −23, −43, −63, ...

3) −34, −64, −94, −124, ...

4) −30, −40, −50, −60, ...

5) −7, −9, −11, −13, ...

6) 9, 14, 19, 24, ...

Given the explicit formula for an arithmetic sequence find the first five terms and the term named in the problem.

7) $a_n = -11 + 7n$ → common difference

Find a_{34}

−4, 3, 10, 17, 24

$a_{34} = -11 + 7(34)$

$a_{34} = 227$

My 34th term is 227

8) $a_n = 65 - 100n$ d

Find a_{39}

−35, −135, −235, −335, −435

$a_{39} = 65 - 100(39)$

$a_{39} = -3{,}835$

9) $a_n = -7.1 - 2.1n$

Find a_{27}

10) $a_n = \frac{11}{8} + \frac{1}{2}n$

Find a_{23}

Given the first term and the common difference of an arithmetic sequence find the first five terms and the explicit formula. $a_n = a_1 + d(n-1)$

11) $a_1 = 28,\ d = 10$

28, 38, 48, 58, 68

$a_n = 28 + 10(n-1)$

$= 28 + 10n - 10$

$\boxed{a_n = 10n + 18}$

12) $a_1 = -38,\ d = -100$

13) $a_1 = -34,\ d = -10$

14) $a_1 = 35,\ d = 4$