

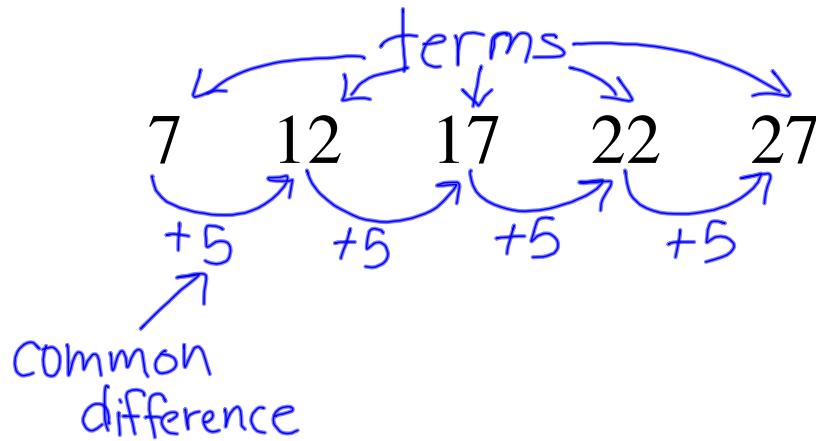


Algebra I

Lesson 4-7

- I can recognize arithmetic sequences.
- I can extend and write formulas for arithmetic sequences.

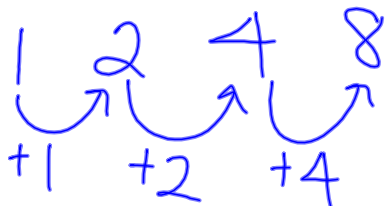
A sequence is a set of numbers in a specific order. The numbers in the sequence are called terms. If the difference between successive terms is constant, then it is called an arithmetic sequence. The difference between the terms is called the common difference.

**Key Concept:**

An arithmetic sequence is a numerical pattern that increases or decreases at a constant rate or value called the common difference.

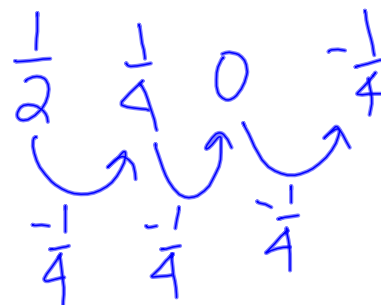
Determine whether each sequence is arithmetic.

1, 2, 4, 8, ...



not an arithmetic sequence because there isn't a common difference.

$\frac{1}{2}, \frac{1}{4}, 0, -\frac{1}{4}, \dots$



is an arithmetic sequence because there is a common difference of $\frac{1}{4}$.

Term	Symbol	In Terms of a_1 and d	Numbers
first term	a_1	a_1	8
second term	a_2	$a_1 + d$	$8 + 3 = 11$
third term	a_3	$a_1 + 2d$	$8 + 2(3) = 14$
fourth term	a_4	$a_1 + 3d$	$8 + 3(3) = 17$
⋮	⋮	⋮	⋮
n th term	a_n	$a_1 + (n-1)d$	$8 + (n-1)3$

The n th term a_n of an arithmetic sequence with first term a_1 and common difference d is given by

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

where n is a positive integer.

Find the 14th term in the arithmetic sequence 9, 17, 25, 33, ...

$$a_1 = 9$$

$$d = 8$$

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

$$a_{14} = 9 + (14-1)(8)$$

$$= 9 + (13)(8)$$

$$= 9 + 104$$

$$a_{14} = 113$$

Consider the arithmetic sequence 12, 23, 34, 45, ...

- a. Write an equation for the n th term of the sequence.

$$a_1 = 12$$

$$d = 11$$

$$a_n = 12 + (n-1)(11)$$

$$a_n = 12 + 11(n-1)$$

$$a_n = 12 + 11n - 11$$

$$\rightarrow a_n = 11n + 1$$

- b. Find the 10th term in the sequence.

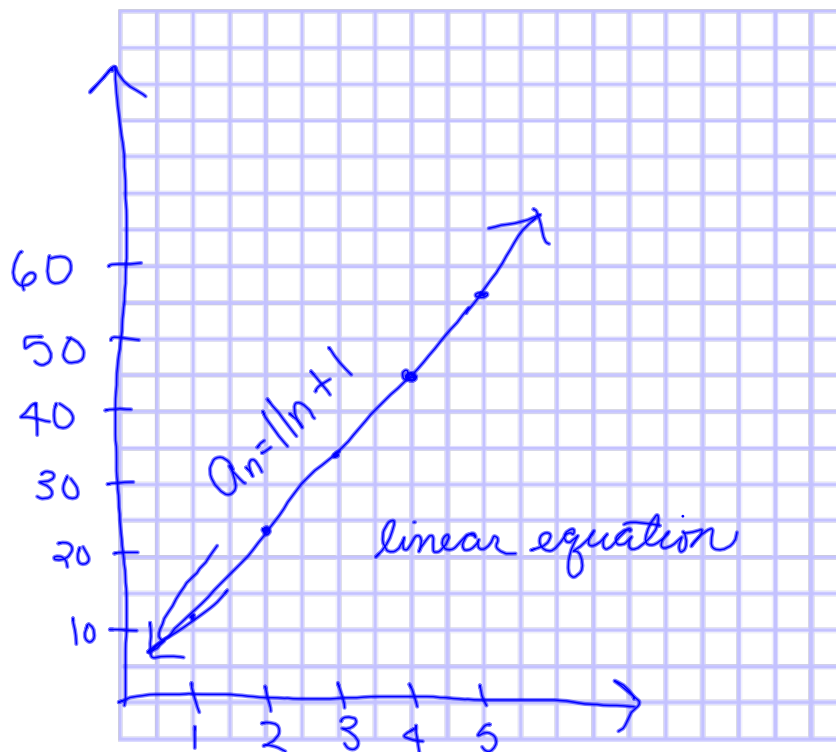
$$a_{10} = 11 \cdot 10 + 1$$

$$= 110 + 1$$

$$a_{10} = 111$$

- c. Graph the first five terms of the sequence.

n	$a_n = 11n + 1$	a_n	(n, a_n)
1	$11 \cdot 1 + 1$	12	(1, 12)
2	$11 \cdot 2 + 1$	23	(2, 23)
3	$11 \cdot 3 + 1$	34	(3, 34)
4	$11 \cdot 4 + 1$	45	(4, 45)
5	$11 \cdot 5 + 1$	56	(5, 56)



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Assignment

Pgs 236-237 #16-42 even; 50-53 all