

Warm Up

February 18, 2019

1.) Write a linear function with a x-intercept of 2 and a y-intercept of -3.

$$m = \frac{-3 - 0}{0 - 2} = \frac{-3}{-2} = \frac{3}{2}$$

$$y = \frac{3}{2}x - 3$$

(2, 0)

2.) A function is shown in the table below.

Which interval had the smallest rate of change?

A.) 0 to 3 $m = 50$

B.) 3 to 7 $m = 12.5$

C.) 7 to 9 $m = 115$

D.) 9 to 11 $m = 30$

x	f(x)
0	1,750
3	1,900
7	1,950
9	2,180
11	2,240

4.)

$$(-6, r) (3, -4), m = 1/3$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{1}{3} = \frac{-4 - r}{3 - (-6)}$$

~~$$\frac{1}{3} = \frac{-4 - r}{9}$$~~

$$9 = 3(-4 - r)$$

$$9 = -12 - 3r$$

$$m = \frac{2}{0}$$



$$m = \frac{0}{6} = 0$$

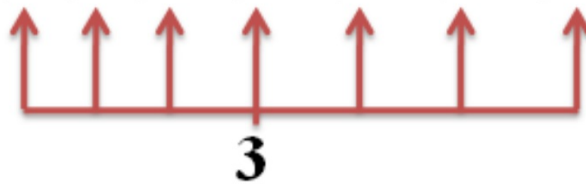
$$\begin{array}{r} 2x - 5y = 15 \\ -2x \quad -2x \\ \hline -5y = -2x + 15 \\ \frac{-5y}{-5} = \frac{-2x + 15}{-5} \\ y = \frac{2}{5}x - 3 \end{array}$$

Arithmetic Sequences

1, 3, 5, 7, 9, 11, 13, 15



2, 5, 8, 11, 14, 17, 20, 23



What is it?

Main Ideas/Questions	Notes
Arithmetic Sequence	a numerical pattern of repeated
	addition or subtraction by a
	constant
Common Difference	the number being repeatedly
	added or subtracted; d

Identifying an Arithmetic Sequence

Determine whether the sequences are arithmetic sequences. If yes, identify the common difference.

1. 1, 5, 9, 13, ...

2. 1, 3, 5, 8, ...

3. 8, 6, 4, 2, ... **yes, $d = -2$**

4. -5, -8, -11, -14, ... **yes, $d = -3$**

5. 5, 10, 20, 40, ... **no**

6. 7, 6, 5, 4, ... **yes, $d = -1$**

One Step Further....

1.) 1, 5, 9, 13

Arithmetic? **Yes** or NO

Common Difference (d) = 4

2.) 1, 3, 5, 8

Arithmetic? Yes or **NO**

Common Difference (d) = _____

Continuing
Arithmetic
Sequences

Given the arithmetic sequence, find the next three terms.

7. 9, 13, 17, 21, 25, 29, 33 $d = 4$

8. 5, 2, -1, -4, -7, -10, -13 $d = -3$

9. -8, -2, 4, 10, 16, 22, 28 $d = 6$

Arithmetic Sequences: THE EXPLICIT FORMULA

Arithmetic
Sequence
Formula

The n^{th} term of an arithmetic sequence can be found using the following formula:

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

$d =$
common
difference

$a_1 =$
first
term

$n =$
desired
term

Examples:

Examples

Write the rule for the n^{th} term, then find a_{19} .

10. 7, 13, 19, 25, ...

$$a_n = 6(n-1) + 7$$

$$a_n = 6n - 6 + 7$$

$$a_n = 6n + 1$$

$$a_{19} = 6(19) + 1$$

$$a_{19} = 115$$

$$d = 6$$

$$a_1 = 7$$

$$n = 19$$

11. 30, 26, 22, 18, ...

$$a_n = -4(n-1) + 30$$

$$a_n = -4n + 4 + 30$$

$$a_n = -4n + 34$$

$$a_{19} = -4(19) + 34$$

$$a_{19} = -42$$

$$d = -4$$

$$a_1 = 30$$

$$n = 19$$

12. -11, -8, -5, -2 ...

$$a_n = 3(n-1) - 11$$

$$a_n = 3n - 3 - 11$$

$$a_n = 3n - 14 \text{ Explicit!}$$

$$d = +3 \quad a_n = a_{n-1} + 3 \text{ Recursive!}$$

$$a_1 = -11$$

$$n = 19$$

13. -2, 0, 2, 4, ...

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

$$a_n = 2n - 2 - 2$$

$$a_n = 2n - 4 \text{ Explicit!}$$

$$a_n = a_{n-1} + 2 \text{ Recursive!}$$

$$d =$$

$$a_1 =$$

$$n =$$

14. -16, -21, -26, -31, ...

$$a_n = -5(n-1) - 16$$

$$a_n = -5n + 5 - 16$$

$$a_n = -5n - 11 \text{ Explicit!}$$

$$d = \quad a_n = a_{n-1} - 5$$

$$a_1 =$$

$$n =$$

↳ Recursive!

15. 101, 92, 83, 74, ...

$$a_n = -9(n-1) + 101$$

$$a_n = -9n + 9 + 101$$

$$a_n = -9n + 110 \text{ Explicit!}$$

$$d = \quad a_n = a_{n-1} - 9$$

$$a_1 =$$

$$n =$$

↳ Recursive!

Explicit

Explicit Formula

The formula for the EXPLICIT Arithmetic Sequence is

Where d is common difference of any 2 consecutive numbers.

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

Where a_1 is the value of the 1st term.

Where n is the position or location of the n^{th} term.

Remember what it's used for: Finding the value of any term as long as you know the TERM POSITION or LOCATION.

Finding any term.

Recursive

Recursive Formula

If you know any term of an arithmetic sequence and you know the common difference of the sequence, you can find the next term.

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

Finding next term.

Real Life Applications

Real Life Applications

16. You visit the Grand Canyon and drop a penny off the edge of the cliff. The distance the penny will fall is 16 feet for the first second, 48 feet the next second, 80 feet the third second, and so on.

a. Write a formula to represent this sequence.

b. How far will the penny have traveled after 6 seconds?

17. The total bank loan for Sarah's new car is \$15,265. The bank automatically withdraws \$295.80 each month to pay off the car.

a. Write a formula to represent this sequence.

b. What will be the balance of the loan after 2 years?