

February 11, 2019, Monday

List 5 characteristics of the following graph.

1)  $8x + 5y = 20$

$x$ -intercept = 2.5  
 $y$ -intercept = 4  
 rate of change = negative  
 $m = -\frac{3}{2}$   
 point on the line: (5, -4)

(hint:  $x$ -intercept,  $y$ -intercept, end behavior, rate of change (slope)....)

Feb 6-3:47 PM

Algebra 1 - U2B Day 2, 2/9/2018

Characteristics of Linear Functions Notes

Words to know:

- Domain: the values where the graph exists for  $x$
- Range: the values where the graph exists for  $y$
- Interval of Increase (↑) slope & Decrease (↓) slope: 1 in terms of  $y$
- End Behavior: what the  $y$ -value approaches as  $x \rightarrow \infty$ , then  $-\infty$
- $x$ -intercept(s): where the graph crosses the  $x$ -axis
- $y$ -intercept: where the graph crosses the  $y$ -axis

Examples:

For a linear graph, domain & range are  $\mathbb{R}$

Feb 6-3:49 PM

Average Rate of Change (ARC) Notes

Today's Question: How do we find the rate of change of a function? (SMAA)g

Rate of Change

- The rate of change is the ratio of the change of one quantity to a change in another quantity.
- Positive  $m = 3$
- Negative  $m = -4$
- Which function has a constant rate of change? linear function, line
- Horizontal Lines  $\rightarrow$  0 rate of change
- Vertical Lines  $\rightarrow$  undefined (und.) rate of change

Constant Rate of Change

The slope of a non-vertical line is the ratio of the vertical (change  $y$ ) to the horizontal (change  $x$ ) between any two points on the line.

Example 1: Find the slope between (2, 4) and (6, 5).

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 4}{6 - 2} = \frac{1}{4} = 0.25$$

Example 2: Find all rates of change between the points, then determine which has the greatest rate of change?

What is the value?

Interval  $-6 \rightarrow -4 \Rightarrow \frac{-5 - 0}{-4 - 0} = \frac{-5}{-4} = 1.25$

$-4 \rightarrow 3 \Rightarrow \frac{5 - 0}{-4 - 3} = \frac{5}{-7} = -0.71$

$3 \rightarrow 6 \Rightarrow \frac{7 - 0}{6 - 3} = \frac{7}{3} = 2.33$

$6 \rightarrow 8 \Rightarrow \frac{7 - 0}{8 - 6} = \frac{7}{2} = 3.5$

Feb 6-3:49 PM

Algebra 1 - Day 2, 2/9/2018

Characteristics of Linear Functions HW

Domain:  $\mathbb{R}$ , Range:  $\mathbb{R}$ , Interval:  $\uparrow$  increases  $(-\infty, \infty)$ , End Behavior: As  $x \rightarrow -\infty, f(x) \rightarrow \infty$ ; As  $x \rightarrow \infty, f(x) \rightarrow \infty$ . x-intercept:  $-1$ , y-intercept:  $1$ .

Domain:  $\mathbb{R}$ , Range:  $\mathbb{R}$ , Interval:  $\downarrow$  decreases  $(-\infty, \infty)$ , End Behavior: As  $x \rightarrow -\infty, f(x) \rightarrow \infty$ ; As  $x \rightarrow \infty, f(x) \rightarrow -\infty$ . x-intercept:  $(3, 0)$ , y-intercept:  $(0, 7)$ .

Domain:  $\mathbb{R}$ , Range:  $\mathbb{R}$ , Interval:  $\uparrow$  increases  $(-\infty, \infty)$ , End Behavior: As  $x \rightarrow -\infty, f(x) \rightarrow \infty$ ; As  $x \rightarrow \infty, f(x) \rightarrow \infty$ . x-intercept:  $(0.5, 0)$ , y-intercept:  $(0, -1)$ .

Domain:  $\mathbb{R}$ , Range:  $\mathbb{R}$ , Interval:  $\downarrow$  decreases  $(-\infty, \infty)$ , End Behavior: As  $x \rightarrow -\infty, f(x) \rightarrow \infty$ ; As  $x \rightarrow \infty, f(x) \rightarrow -\infty$ . x-intercept:  $(-3, 0)$ , y-intercept:  $(0, 2)$ .

Feb 6-3:50 PM

Average Rate of Change HW

Directions: Identify the average rate of change for the given intervals.

1) Using the given graph, identify the average rate of change over the given intervals.

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - 0.5}{-1 - (-2)} = \frac{0.5}{1} = 0.5$   
 $m = \frac{2 - 1}{0 - (-1)} = \frac{1}{1} = 1$

2) Using the given table, identify the average rate of change over the given intervals.

$x_1 = 2$ to $x = 1$	$x = 0$ to $x = 4$
$m = \frac{6 - 3}{1 - 2} = -3$	$m = \frac{34 - 4}{4 - 0} = 7.5$
$x = 2$ to $x = 3$	$x = -1$ to $x = 4$

Feb 6-3:50 PM

February 12, 2019 Tuesday

Give an equation  $y = -9x + 4$  identify the  $x$  &  $y$  intercepts, state the domain and range

$x$ -intercept: 0.5  
 $y$ -intercept: 4  
 domain:  $\mathbb{R}$   
 range:  $\mathbb{R}$   
 All real #s

Feb 6-3:55 PM

Algebra 1 - Even/Odd Functions in Class Assignment Name \_\_\_\_\_

1. Describe the symmetry of an **EVEN** function. **(180°)**  
 graph: **y-axis symmetry** graph: has **origin symmetry**  
 algebraic: **all exponents are even** algebraic: **all exponents are odd**

2. Describe each graph as **EVEN**, **ODD**, or **NEITHER**

3. Describe each function below as **EVEN**, **ODD**, or **NEITHER**

a.  $f(x) = 2x^2$  **even**  
 b.  $g(x) = x^3 - 2x^1$  **ODD**  
 c.  $h(x) = x^2 + 3x^2 + 2x$  **NEITHER**  
 d.  $m(x) = x^4 + 3x^2 + 2$  **even**  
 e.  $p(x) = x^3$  **ODD**  
 f.  $q(x) = 5x^2$  **even**

If the partially graphed function below **(EVEN)** then finish what the rest of the graph should look like.  
 If the partially graphed function below **(ODD)** then finish what the rest of the graph should look like.

Feb 6-3:52 PM

Even and Odd Functions Notes

**GRAPHICALLY:**  
 A function is **even** if **the function has y-axis**  
 A function is **odd** if **the function has 180° symmetric origin symmetry**

**ALGEBRAICALLY**  
 A function is **even** all exponents are even  
 A function is **odd** all exponents are odd  
 A function is **NEITHER** all exponents are a mixture of even and odd  
 \*BE CAREFUL\* because **-8** is an **EVEN EXPONENT**. (-8 can be written with a variable -8x which makes it an even exponent)  
 $2^7 = 128x^0$

Examples:

Even	Odd	Neither
$y = 10$	$y = x + x^3$	$y = x + x^2$
$y = 5x^0$	$y = x^2 + x^3$	$y = x^2 + x^3$
$y = 4x^0$	$y = x^5$	$y = x + 5x^2$

Feb 6-3:57 PM

Algebra 1 - Day 3, 2/12/2018 Arithmetic Sequences Notes

Arithmetic Sequences are **a function with a common diff**  
 The recursive formula is  $a_n = a_{n-1} + d$  & helps you find **small n's**  
 The explicit formula is  $a_n = a_1 + d(n-1)$  & helps you find **large n's**

Examples: Find the common difference, then write the recursive formula & the explicit formula.

Sequence	Common Difference (d)	Recursive Formula	Explicit Formula
31, 35, 39	4	$a_n = a_{n-1} + 4$	$a_n = 27 + 4(n-1)$
3, -10, -17	-7	$a_n = a_{n-1} - 7$	$a_n = 4 - 7(n-1)$

Find the first five terms of the arithmetic sequence defined as follows:  
 $a_1 = 2.7n + 0.5$   
 $n = 1$  (first term)  $a_1 = 2.7(1) + 0.5 = 3.2$   
 $n = 2$  (2nd term)  $a_2 = 2.7(2) + 0.5 = 5.9$   
 $n = 3$   $a_3 = 2.7(3) + 0.5 = 8.6$   
 $n = 4$   $a_4 = 2.7(4) + 0.5 = 11.3$   
 $n = 5$   $a_5 = 2.7(5) + 0.5 = 14$

Find the first five terms of the arithmetic sequence defined as follows:  
 $a_1 = -2$ ;  $a_2 = 18$   
 $n = 2$   $a_2 = a_1 + d$   
 $18 = -2 + d$   
 $d = 20$   
 $a_1 = 25$   $a_2 = 35$   $a_3 = 45$   $a_4 = 55$   $a_5 = 65$

You have read 25 pages of a book. You plan to read an additional 10 pages each night.  
 a. List the first five terms of the sequence.  
 $a_1 = 25$   $a_2 = 35$   $a_3 = 45$   $a_4 = 55$   $a_5 = 65$

b. Write the explicit formula to represent the number of pages you will read after n nights.  
 $a_n = a_1 + d(n-1)$   
 $a_n = 25 + 10(n-1)$

You are going on vacation. You have \$105 to bring with you. You expect to spend \$15 each day. You want to have \$30 remaining at the end of the vacation.  
 a. Write an explicit formula to represent this scenario.  
 $a_n = a_1 + d(n-1)$   
 $a_n = 105 + 5(n-1)$

b. For how many days can you spend \$15 each day?  
 $a_1 = 105$   $a_4 = 40$   
 $a_2 = 90$   $a_5 = 45$   
 $a_3 = 75$   $a_6 = 30$  days = 6

Feb 6-3:56 PM

Find the first five terms of the arithmetic sequence defined as follows:

$a_n = a_{n-1} - 22$ ;  $a_1 = 18$

$n = 1$   $a_1 = 18$   
 $n = 2$   $a_2 = a_1 - 22$   
 $a_2 = 18 - 22$   
 $a_2 = -4$   
 $n = 3$   $a_3 = a_2 - 22$   
 $a_3 = -4 - 22$   
 $a_3 = -26$   
 $n = 4$   $a_4 = a_3 - 22$   
 $a_4 = -26 - 22$   
 $a_4 = -48$

Feb 12-9:59 AM

February 13, 2019 Wednesday

even, odd or neither?

1) **Even**

2) **Neither**

3)  $f(x) = x^3 - 5x^5$  **Odd**

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

1) 107, 100, 107, 107, 107  
 $-107$   $10777$   $10777$   
 $-107$   $-1077$   
 $970$   $9700$  **NO**

2) 35, 15, -5, -25, -45  
 $15 - 5 = -25$   
 $-35 - 15 = -50$   
 $-20 - 20 = -20$  **d = -20**

Feb 6-3:54 PM

Algebra 1 - Day 3, 2/12/2018 Arithmetic Sequences HW Name \_\_\_\_\_  $d = 7 - 4 = 3$

1. Write the recursive and the explicit formula for the sequence:  
 $R: a_1 = 4$   $a_n = a_{n-1} + 3$   $E: a_n = 4 + (n-1)3$

2. What is the common difference for the following sequences: -5, -12, -19, -26  
 $d = -12 - (-5) = -7$

3. The first four terms of a sequence are 2, 12, 22, 32...  
 $a_1 = 2$   $a_2 = 12$   $a_3 = 22$   $a_4 = 32$   $d = 10$

a) What is the recursive formula for the sequence?  
 $a_1 = 2$   $a_n = a_{n-1} + 10$

b) Write the explicit formula for the sequence.  
 $a_n = 2 + (n-1)10$

c) What is the 30th term in the sequence?  $a_{30} = ?$   
 $n = 30$   
 $a_{30} = 2 + (30-1)10$   
 $a_{30} = 292$

4. You have donated \$100 to a charity. You plan to donate an additional \$17 each week.  
 a) Write the first five terms of the sequence.  
 $a_1 = 100$   $a_2 = 117$   $a_3 = 134$   $a_4 = 151$   $a_5 = 168$

b) Write an explicit formula to represent the sequence.  
 $a_n = 100 + (n-1)17$

5. An arithmetic sequence is given by the following table. Write the recursive formula and the explicit formula for the sequence.

n	1	2	3	4
$a_n$	10	13	16	19

$d = 10 - 10 = 3$   $d = 13 - 10 = 3$   
 $R: a_1 = 10$   $a_n = a_{n-1} + 3$   $E: a_n = 10 + (n-1)3$

6. An arithmetic sequence is given by the following formula:  $a_n = a_{n-1} + 7$ ,  $a_1 = 2$

a) Find the first 5 term of the sequence.  
 $a_1 = 2$   
 $a_2 = 9$   
 $a_3 = 16$   
 $a_4 = 23$   
 $a_5 = 30$

Feb 6-3:57 PM

Even/Odd Functions HW/Practice

Tell whether the function is even, odd, or neither.

Feb 6-3:58 PM

Algebra 1 Unit 20 Test - Study Guide

1. For the given function  $f(x) = 2x + 7$ , find  $f(-2)$ .

2. For the given function  $f(x) = 4x - 6$ , which value would make  $f(x) = 10$ ?

3. In the following table, find the domain when the number is:

10	11	12	13	14	15
----	----	----	----	----	----

4. Graph the function and determine the key characteristics.

$f(x) = 2x + 4$

Domain:  $\mathbb{R}$   
 Range:  $\mathbb{R}$   
 x-intercept:  $-2$  on  $(-2, 0)$   
 y-intercept:  $4$  on  $(0, 4)$   
 Increasing/Decreasing? Increasing  
 Where?  $-\infty, +\infty$   
 End Behavior: As  $x \rightarrow \infty, y \rightarrow \infty$ ; As  $x \rightarrow -\infty, y \rightarrow -\infty$

Use the graph below to answer questions 5-8.

5. What is  $x$  when  $y = 3$ ?  $x = 3$

6. What is the domain of the function?  $\mathbb{R}$

7. What is the end behavior as  $x$  approaches positive infinity of the function modeled?  $f(x) \rightarrow \infty$  as  $x \rightarrow \infty$

8. Write the function being modeled by the above graph.  
 $y = mx + b$   
 $f(x) = mx + b$   
 $f(x) = 3x - 4$

Feb 7-9:46 AM

Rate of Change

9. Find the rate of change of the following ordered pairs:  $(10, 1)$  and  $(15, -9)$

10. Find the slope of the function:  $3x - 6y - 12$

11. The tables below model two linear functions.

x	f(x)
1	3
2	1
3	-1
4	-3

x	f(x)
1	5
2	4
3	3
4	2

Which of the linear functions below has a slope greater than the slope for Function 1 but less than the slope for Function 2?

a.  $f(x) = -1.5x - 2$     b.  $f(x) = -2x - 4$     c.  $f(x) = -2.5x + 3$     d.  $f(x) = -3x + 6$

Arithmetic Sequences

12. The table to the right shows the relationship between the number of a term in a pattern and the value of that term. Write a formula to represent the table.

Term Number	Value of Term
1	2
2	7
3	12
4	17
n	?

13. The second term of an arithmetic sequence is  $a_2 = 24$ . The common difference is  $d = -3$ . Find the first term of the sequence.

14. Pizza King sells pizza for \$6 per pizza and a \$4 delivery fee.

a. Write a function to model this situation.

b. Complete the table.

n	$a_n$
0	
1	
2	
3	
4	

c. How much money do you owe Pizza King for ordering 25 pizzas?

Feb 7-9:46 AM

February 14, 2019, Thursday

1&2) For  $f(x) = 3x + 2$ , find  $f(x)$  when  $x = 7$  and when  $x = -4$ .

3) Evaluate the following function when  $x = 0$

$f(x) = 2x + 3$

4) Evaluate the following function when  $f(x) = 5$

$f(x) = 2x - 3$

Common Difference for Arithmetic Sequence  
 Find the Common Difference  
 $2, 4, 6, 8, \dots$   
 common difference: 2

Arithmetic Recursive Formula (for small  $n$ 's)  
 $a_1 = a$   
 $a_n = a_{n-1} + d$

Arithmetic Explicit Formula (for large  $n$ 's)  
 $a_n = a_1 + (n-1)d$

Feb 6-3:59 PM

15. Find  $a_{11}$  for the sequence  $a_n = 2n + 5$ .

16. Write a function that could be used to represent the sequence: 5, 11, 17, 23, ...

17. Find  $a_{10}$  for the sequence  $a_n = 2n - 12$

Determine if the following are even, odd, or neither.

16.  $f(x) = -5x^2 + 3x - 1$     17.  $f(x) = 2x^2 + x$     18.  $f(x) = 2x^4 + 7x^2 - 7$

19.

20.

21.

22. Jalen makes \$14 per hour babysitting plus a flat rate of \$5 for gas. Write the function. Name the slope and y-intercept.

23. For the following table:

x	1	2	3	4	5	6
y	10	7	4	-2	-5	-8

a) Is the relation a function?    c) What is the range?

b) What is the domain?    d) What is the rate of change?

26. Determine if the following are functions.

a)

b)

Feb 7-9:34 AM

Algebra 1 Practice with Arithmetic Sequences

State if each sequence is arithmetic.

1) 1, 5, 25, 125, ...    2) -1, -9, -17, -25, ...

3) -1, -4, -16, -64, ...    4) -27, 3, 33, 63, ...

5) -30, -14, -6, -2, ...    6) -7, -16, -25, -34, ...

7) -40, -48, -56, -64, ...    8) -1, 1, 5, 13, ...

Find the common difference.

9) 35, 41, 47, 53, ...    10) 16, 13, 10, 7, ...

11) 29, 33, 37, 41, ...    12) 7, 1, -5, -11, ...

Feb 7-9:26 AM

13) -7, 1, 9, 17, ...      14) -34, -39, -44, -49, ...

15) 16, 6, -4, -34, ...      16) 8, 28, 48, 68, ...

Determine if the sequence is arithmetic. If it is, find the three terms in the sequence after the last one given.

17) -36, -32, -28, -24, ...      18) 42, 421, 4211, 42111, ...

19) -5, -3, 0, 4, ...      20) 32, 34, 36, 38, ...

21) 3, 1, -1, -3, ...      22) 1, 9, 25, 49, ...

23) -1, -2, -4, -8, ...      24) 16, 12, 8, 4, ...

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Feb 7-9:33 AM

Determine if the sequence is arithmetic. If it is, find the recursive formula.

25) -16, -6, 4, 14, ...      26) -30, -50, -70, -90, ...

27) 37, 30, 23, 16, ...      28) 17, 8, -1, -10, ...

29) -14, -8, -2, 4, ...      30) -40, -49, -58, -67, ...

31) 1, 10, 19, 28, ...      32) -29, -22, -15, -8, ...

Find the explicit formula.

33) -23, -25, -27, -29, ...      34) -36, 64, 164, 264, ...

35) -24, -33, -42, -51, ...      36) 4, 104, 204, 304, ...

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Feb 7-9:33 AM

Determine if the sequence is arithmetic. If it is, find the recursive formula.

25) -16, -6, 4, 14, ...      26) -30, -50, -70, -90, ...

27) 37, 30, 23, 16, ...      28) 17, 8, -1, -10, ...

29) -14, -8, -2, 4, ...      30) -40, -49, -58, -67, ...

31) 1, 10, 19, 28, ...      32) -29, -22, -15, -8, ...

Find the explicit formula.

33) -23, -25, -27, -29, ...      34) -36, 64, 164, 264, ...

35) -24, -33, -42, -51, ...      36) 4, 104, 204, 304, ...

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Feb 7-9:33 AM

NAME: \_\_\_\_\_  
DATE: \_\_\_\_\_

**Function Notation**

1. Evaluate the following expressions given the functions below:

$g(x) = -3x + 1$        $f(x) = x^2 + 7$        $h(x) = \frac{12}{x}$        $j(x) = 2x + 9$

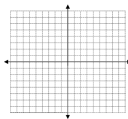
a.  $g(10) =$       b.  $f(3) =$       c.  $h(-2) =$

d.  $f(7) =$       e.  $h(a) =$       f.  $g(b+c) =$

h. Find  $x$  if  $g(x) = 16$       i. Find  $x$  if  $h(x) = -2$       j. Find  $x$  if  $f(x) = 23$

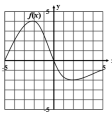
2. Change the following statements into coordinate points and then plot them!

a.  $f(-3) = 1$   
b.  $f(2) = 7$   
c.  $f(1) = -1$   
d.  $f(3) = 0$



Feb 7-11:11 AM

3. Given this graph of the function  $f(x)$ :



Find:

a.  $f(-4) =$       b.  $f(0) =$       c.  $f(3) =$       d.  $f(-5) =$

e.  $x$  when  $f(x) = 2$       f.  $x$  when  $f(x) = 0$

**APPLICATION**

4. Swine flu is attacking the North Pole. The function below determines how many elves have swine flu where  $t$  = time in days and  $S$  = the number of people in thousands.

$S(t) = 9t - 4$

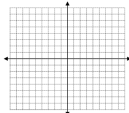
a. Find  $S(4)$ .

b. What does  $S(4)$  mean?

c. Find  $t$  when  $S(t) = 23$ .

d. What does  $S(t) = 23$  mean?

e. Graph the function.

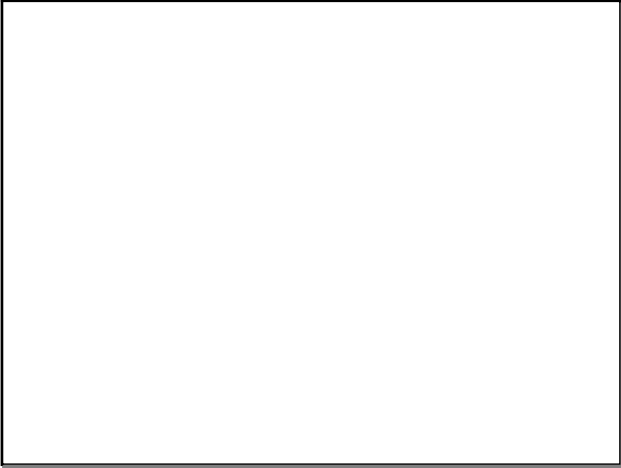


Feb 7-11:11 AM

February 15, 2019, Friday

...test (buddy?)

Feb 7-9:48 AM



Feb 7-9:48 AM