

February 11, 2019, Monday

List 5 characteristics of the following graph.

1) $8x + 5y = 20$

$x\text{-intercept} = 2.5$
 $y\text{-intercept} = 4$
 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)....)

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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): increases or decreases
- End Behavior: what the y-value approaches as x → ∞, then -∞
- x-intercept(s): where the graph crosses the x-axis
- y-intercept: where the graph crosses the y-axis

Examples:

Example 1: Domain: All real numbers; Range: \mathbb{R} ; Interval: increases $(-\infty, \infty)$; End Behavior: As $x \rightarrow -\infty, f(x) \rightarrow -\infty$; As $x \rightarrow \infty, f(x) \rightarrow \infty$; x-intercept: $x=4$ or $(4,0)$; y-intercept: $y=-3$ or $(0,-3)$

Example 2: Domain: \mathbb{R} ; Range: \mathbb{R} ; Interval: decreases $(-\infty, \infty)$; End Behavior: As $x \rightarrow -\infty, f(x) \rightarrow \infty$; As $x \rightarrow \infty, f(x) \rightarrow -\infty$; x-intercept: $(4,0)$; y-intercept: $(0,3)$

Example 3: Domain: \mathbb{R} ; Range: \mathbb{R} ; Interval: increasing $(-\infty, \infty)$; End Behavior: As $x \rightarrow -\infty, f(x) \rightarrow -\infty$; As $x \rightarrow \infty, f(x) \rightarrow \infty$; x-intercept: $(-3,0)$; y-intercept: $(0,-1)$

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

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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 Δy) to the horizontal (change Δx) between any two points on the line.

Example 1: Find the slope between $(2, 4)$ and $(4, 8)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 4}{4 - 2} = \frac{4}{2} = 2$$

Example 2: The table shows the amount of water evaporating from a swimming pool on a hot day. Find the rate of change between 2 hours and 6 hours.

Time (hours)	Water evaporated (gallons)
2	13.5
6	4.5

$$m = \frac{4.5 - 13.5}{6 - 2} = \frac{-9}{4} = -2.25$$

Example 3: Find all rates of change between the points, then determine which has the greatest rate of change?

What is the value?

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

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

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

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

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Algebra 1 - Day 2, 2/9/2018

Characteristics of Linear Functions HW

Name _____

Graph 1: Domain: \mathbb{R} ; Range: \mathbb{R} ; Interval: 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

Graph 2: Domain: \mathbb{R} ; Range: \mathbb{R} ; Interval: 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: $(0,7)$

Graph 3: Domain: \mathbb{R} ; Range: \mathbb{R} ; Interval: 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: $(0, -1)$

Graph 4: Domain: \mathbb{R} ; Range: \mathbb{R} ; Interval: 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: $(0, 2)$

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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.

a) $x = -2$ to $x = -1$: $m = \frac{1 - 0.5}{-1 - (-2)} = \frac{0.5}{1} = 0.5$
 $m = \frac{1 - 0.5}{-1 - (-2)} = \frac{0.5}{1} = 0.5$
 b) $x = -1$ to $x = 0$: $m = \frac{2 - 1}{0 - (-1)} = \frac{1}{1} = 1$
 $m = \frac{2 - 1}{0 - (-1)} = \frac{1}{1} = 1$
 c) $x = 0$ to $x = 1$: $m = \frac{3 - 2}{1 - 0} = \frac{1}{1} = 1$
 d) $x = -2$ to $x = 1$: $m = \frac{3 - 0.5}{1 - (-2)} = \frac{2.5}{3} = 0.83$

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

x	y
1	3
2	6
3	10
4	15

a) $x = 2$ to $x = 1$: $m = \frac{6 - 3}{1 - 2} = \frac{3}{-1} = -3$
 $m = \frac{6 - 3}{1 - 2} = \frac{3}{-1} = -3$
 b) $x = 0$ to $x = 4$: $m = \frac{15 - 3}{4 - 0} = \frac{12}{4} = 3$
 $m = \frac{15 - 3}{4 - 0} = \frac{12}{4} = 3$
 c) $x = 2$ to $x = 3$: $m = \frac{10 - 6}{3 - 2} = \frac{4}{1} = 4$
 $m = \frac{10 - 6}{3 - 2} = \frac{4}{1} = 4$
 d) $x = -1$ to $x = 4$: $m = \frac{15 - 3}{4 - (-1)} = \frac{12}{5} = 2.4$

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February 12, 2019 Tuesday

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

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Algebra 1 - Even/Odd Functions In-Class Assignment Name _____

1. Describe the symmetry of an EVEN function. 2. Describe the symmetry of an ODD function.

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

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

a. $f(x) = x^2 + 5$ b. $g(x) = x^4 - 2x$

c. $h(x) = x^3 - 4$ d. $m(x) = x^4 + 3x^2 + 2$

e. $p(x) = x$ f. $q(x) = 3$

If the partially graphed function below is EVEN then finish what the rest of the graph should look like.

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Evens and Odd Functions Notes

GRAPHICALLY:
 A function is _____ if _____
 A function is _____ if _____

Draw an example of an odd and even function.

ODD EVEN

Neither Even nor Odd:

ALGEBRAICALLY
 A function is _____ all _____
 A function is _____ all _____
 A function is _____ all _____

BE CAREFUL because -8 is an EVEN EXPONENT. (-8) can be written with a variable $\rightarrow -8x^2$ which makes it an even exponent!

Examples:

Even	Odd	Neither

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

Arithmetic Sequences are _____

The recursive formula is _____ & helps you find _____

The explicit formula is _____ & helps you find _____

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

Common Difference	Recursive Formula	Explicit Formula
27, 31, 35, 39, ...		
4, -3, -10, -17, ...		

Find the first five terms of the arithmetic sequence defined as follows:
 $a_n = 2.7n + 0.5$

Find the first five terms of the arithmetic sequence defined as follows:
 $a_n = a_{n-1} - 22; a_1 = 18$

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.

b. Write the explicit formula to represent the number of pages you will read after n nights.

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.

b. For how many days can you spend \$15 each day?

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February 13, 2019 Wednesday

even, odd or neither?

1)

2)

3) $f(x) = x^3 - 4x$

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

1) 107, 1077, 10777, 107777, ... 2) 35, 15, -5, -25, ...

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Algebra 1 - Day 3, 2/12/2018 Arithmetic Sequences HW Name _____

1. Write the recursive and the explicit formula for the sequence: 4, 7, 10, 13, 16, 19

2. What is the common difference for the following sequence: -5, -12, -19, -26

3. The first five terms of a sequence are 2, 12, 22, 32, ...

a) What is the recursive formula for the sequence?

b) Write the explicit formula for the sequence.

c) What is the 30th term in the sequence? $a_{30} =$ _____

4. You have donated \$100 to a charity. You plan to donate an additional \$15 each month.

a) Write the first five terms of the sequence.

b) Write an explicit formula to represent the sequence.

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

n	1	2	3	4	5
a_n	7	10	13	16	19

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.

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Evens/Odd Functions HW/Practice Tell whether the function is even, odd, or neither.

$f(x) = x^2 - x^2$	$f(x) = -x^2 + 2x$	$f(x) = x^4 + 4x + 1$
$f(x) = \frac{1}{2}x^4 + 9$	$f(x) = 5x + 1$	$f(x) = 5$

Can a linear function ever be even or odd? If so, sketch an example.

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Algebra 1 Unit 2B Test - Study Guide Name _____

Functions

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

a. $f(-2) = 11$
 b. $f(-2) = 3$
 c. $f(-2) = -3$
 d. $f(-2) = 18$

2. For the given function $f(x) = 4x - 6$, which x value would make $f(x) = 30$?

a. $x = 6$
 b. $x = 9$
 c. $x = 7$
 d. $x = 30$

3. In the following table, find the domain when the range is 1.

x	-3	-2	-1	0	1	2	3
$f(x)$	0	1	1	1	1	1	1

a. 1
 b. 0
 c. -2
 d. 4

Linear Characteristics

4. Graph the function and determine the key characteristics.

$f(x) = 2x + 4$

Domain: _____
 Range: _____
 x-intercept: _____
 y-intercept: _____
 Increasing or Decreasing? _____
 Where? _____
 End Behavior: _____
 $As x \rightarrow \infty, y \rightarrow$ _____
 $As x \rightarrow -\infty, y \rightarrow$ _____

Use the graph below to answer questions 5 - 8.

5. What is x when $f(x) = 5$?

6. What is the domain of the function?

7. What is the end-behavior, as x approaches positive infinity of the function modeled?

8. Write the function being modeled by the above graph.

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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	2n
0	
1	
2	
3	
4	

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

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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, ...
 common difference: 2

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

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

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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_6 for the sequence $a_n = 2n - 12$

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

16. $f(x) = -5x^2 + 3x - 1$ 17. $f(x) = 2x^6 + x$ 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 p-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?
 b) What is the domain?
 c) What is the range?
 d) What is the rate of change?

26. Determine if the following are functions:

a)

b)

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Algebra 1 Name _____ ID: 1
 Practice with Arithmetic Sequences Date _____ Period _____

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, ...

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13) -2, 1, 9, 17, ... 14) -34, -39, -44, -49, ...

15) 16, 6, -4, -14, ... 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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Determine if the sequence is arithmetic. If it is, find the recursive formula.

25) -16, -8, 4, 14, ... 26) -36, -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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Determine if the sequence is arithmetic. If it is, find the recursive formula.

25) -16, -8, 4, 14, ... 26) -36, -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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NAME: _____
DATE: _____

Function Notation

1. Evaluate the following expressions given the functions below:

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

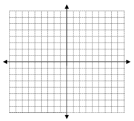
a. $g(0) =$ b. $f(3) =$ c. $h(-2) =$

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

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

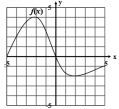
2. Change the following statements into coordinate points and then plot them!

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



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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.

$S(t) = 5t - 4$

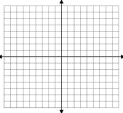
a. Find $S(4)$.

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

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

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

e. Graph the function.



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February 15, 2019, Friday

...test (buddy?)

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February 15, 2019, Friday

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