

Accelerated Algebra 1/Geometry A

Unit 5: More with Exponentials, Comparing Functions and Geometric Sequences

Date	Topic/Assignment
Friday February 5	Geometric Sequences Pages 1 - 3
Monday February 8	Linear, Exponential, Quadratic or Neither! Page 4
Tuesday February 9	Linear Vs Exponential -Raking Leaves -Talk is Cheap Pages 5-7
Wednesday February 10	Help Session 10:30 -11:30 am https://cobbk12-org.zoom.us/j/91957187316?pwd=eDRYa0ZGWC83MDZKUmlCb2pGNGpoUT09 <i>-EOC review (units 1 and 2)</i>
Thursday February 11	Combining Functions Page 8 EOC review booklet (review units 3 and 4)
Friday February 12	Even, Odd or Neither? Pages 9 - 11
Monday-Friday February 15-19	WINTER BREAK!!!!!!! Be safe!
Monday February 22	Arithmetic and Geometric Sequence Practice -Review Pages 12 - 15
Tuesday February 23	TEST!!! -Geometric Sequences -Linear, Exponential, Quadratic -Combining Functions -Even, Odd Functions
Wednesday February 24	Help Session 10:30 -11:30 am https://cobbk12-org.zoom.us/j/91957187316?pwd=eDRYa0ZGWC83MDZKUmlCb2pGNGpoUT09 <i>EOC review (unit 5)</i>

Geometric Sequences

Examples of Geometric Sequences:

a) 12, 6, 3, 1.5.....

b) 1, 3, 9, 27.....

So what is a Geometric Sequence anyways?

Different type of equations:

Recursive:	Explicit:
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Examples:

a) 1, 2, 4, 8.... Recursive:	b) 27, 9, 3, 1..... Recursive:
Explicit:	Explicit:
c) 40, 10, 10/4..... Recursive:	d) -1, -2, -4, -8..... Recursive:
Explicit:	Explicit:

Geometric Sequences

Determine if the sequence is geometric. If it is, find the common ratio.

1) $-1, 6, -36, 216, \dots$

2) $-1, 1, 4, 8, \dots$

3) $4, 16, 36, 64, \dots$

4) $-3, -15, -75, -375, \dots$

5) $-2, -4, -8, -16, \dots$

6) $1, -5, 25, -125, \dots$

Given the explicit formula for a geometric sequence find the first five terms and the 8th term.

7) $a_n = 3^{n-1}$

8) $a_n = 2 \cdot \left(\frac{1}{4}\right)^{n-1}$

9) $a_n = -2.5 \cdot 4^{n-1}$

10) $a_n = -4 \cdot 3^{n-1}$

Given the recursive formula for a geometric sequence find the common ratio, the first five terms, and the explicit formula.

11) $a_n = a_{n-1} \cdot 2$
 $a_1 = 2$

12) $a_n = a_{n-1} \cdot -3$
 $a_1 = -3$

13) $a_n = a_{n-1} \cdot 5$
 $a_1 = 2$

14) $a_n = a_{n-1} \cdot 3$
 $a_1 = -3$

Given the first term and the common ratio of a geometric sequence find the first five terms and the explicit formula.

15) $a_1 = 0.8, r = -5$

16) $a_1 = 1, r = 2$

Given the first term and the common ratio of a geometric sequence find the recursive formula and the three terms in the sequence after the last one given.

17) $a_1 = -4, r = 6$

18) $a_1 = 4, r = 6$

19) $a_1 = 2, r = 6$

20) $a_1 = -4, r = 4$

Given a term in a geometric sequence and the common ratio find the first five terms, the explicit formula, and the recursive formula.

21) $a_4 = 25, r = -5$

22) $a_1 = 4, r = 5$

Given two terms in a geometric sequence find the 8th term and the recursive formula.

23) $a_4 = -12$ and $a_5 = -6$

24) $a_3 = 768$ and $a_2 = 12$

25) $a_1 = -2$ and $a_5 = -512$

26) $a_5 = 3888$ and $a_3 = 108$

Name: _____ Date: _____

Linear vs. Exponential Functions Tasks

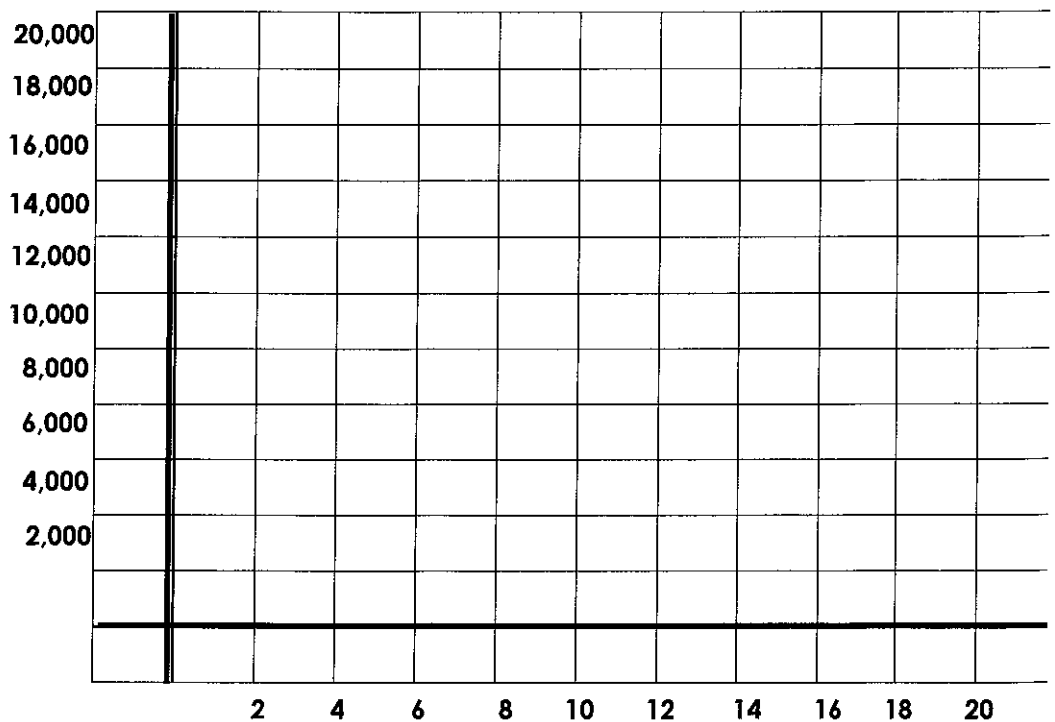
Which option would you choose and why? _____

- **Option 1:** You can have \$1000 a year for twenty years
- **Option 2:** You can get \$1 the first year, \$2 the second year, \$4 the 3rd, doubling the amount each year for twenty years.

Use the chart below to figure out how much money you would gain at the end of 20 years for option 1 and Option 2.

Graph both options to see which will give you more money.

1	\$1,000	\$1
2	\$2,000	\$1+\$2=\$3
3	\$3,000	\$3+\$4=\$7
4		
5		
6		
7		
8		
9		
10		
11		
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16		
17		
18		
19		
20		

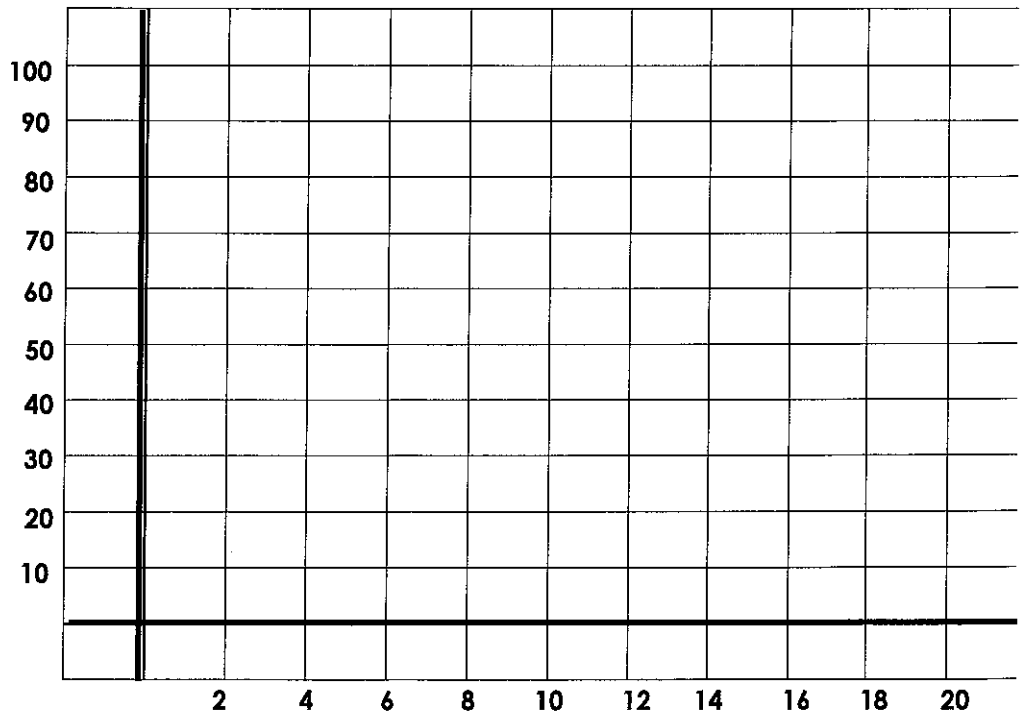


Task: Raking Leaves

Mr. Wiggins gives his daughter Celia two choices of payment for raking leaves:

- **Choice 1:** Two dollars for each bag of leaves,
- **Choice 2:** She will be paid for the number of bags she rakes as follows: two cents for one bag, four cents for two bags, eight cents for three bags, and so on with the amount doubling for each additional bag.

1	2	.02
2	4	.04
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		



1. If Celia rakes five bags of leaves, should she opt for payment method 1 or 2? What if she rakes ten bags of leaves?
2. How many bags of leaves does Celia have to rake before method 2 pays more than method 1?
3. Describe the differences in payment plans.
4. Describe the difference in the way the payment grows in the table and on the graph.
5. Is this growth situation continuous or discrete? How do you know?

HOMEWORK Task: Talk is Cheap!

To encourage communication between parents and their children and to prevent children from having extremely large monthly bills due to additional minute charges, two cell phone companies are offering special service plans for students.

Talk Fast cellular phone service charges \$0.10 for each minute the phone is used.

Talk Easy cellular phone service charges a basic monthly fee of \$18 plus \$0.04 for each minute the phone is used.

Your parents are willing to purchase for you one of the cellular phone service plans listed above. However, to help you become fiscally responsible they ask you to use the following questions to analyze the plans before choosing one.

1. How much would each company charge per month if you talked on the phone for 100 minutes in a month? How much if you talked for 200 minutes in a month?

2. Build a table, make a graph, and write a function rule, $f(x)$ or $g(x)$, to represent the cost of each cellular service in terms of the number of minutes, x .

Tables:

Talk Fast: $f(x) =$

(numbers of minutes) x								
(cost in dollars) $f(x)$								

Talk Easy: $g(x) =$

(numbers of minutes) x								
(cost in dollars) $g(x)$								

Graph:

Rule:

Use the table, graph, and/or rule to help answer the following questions:

3. Which company would be a better financial deal if you plan to use the phone for 200 minutes a month? Explain your reasoning.

4. Which company would be a better financial deal if you plan to use the phone for 500 minutes a month? Explain your reasoning.

5. Depending on the number of minutes you talk on the phone each month, explain to your parents which cellular phone plan is more economical. Include in your explanation the point at which both cellular phone plans cost the same amount of money.

6. If you know the cost of each plan for 300 minutes, can you double this cost to find the cost for 600 minutes? Explain your answer.

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Integrated Advanced Algebra

Notes: Symmetry with Even and Odd Functions

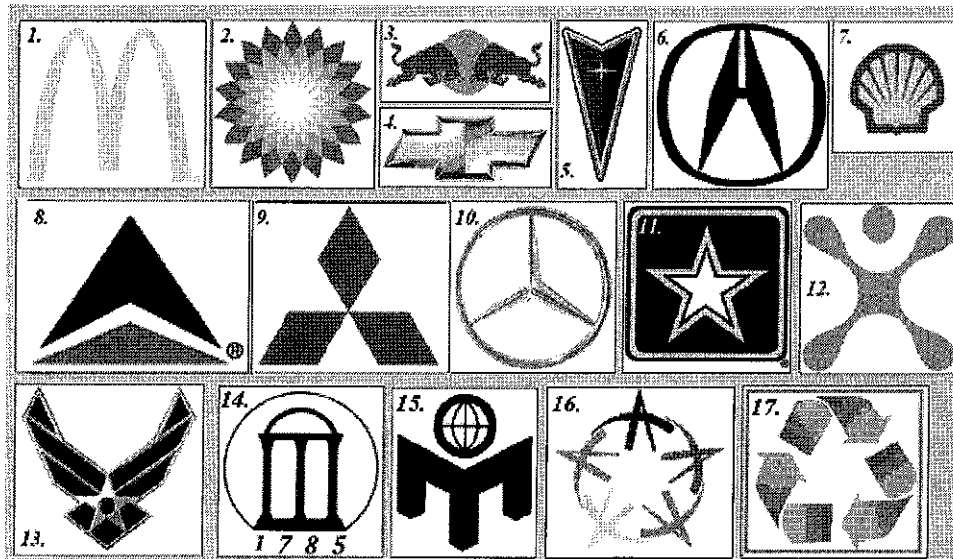
Textbook: Lesson 3.1, Pages 126 – 127

Homework: Worksheet on Graphs of Even and Odd Function

Essential Question: How do you determine if a function is even, odd, or neither from looking at a graph?

You learned about line and rotational symmetry in previous math classes. Remember, that a figure has **line symmetry** if there is a line that divides the figure into two parts that are *mirror images* of each other. A figure has **rotational symmetry** if, the figure *aligns with itself when rotated* about its center by an angle of 180° or less. A figure can also have **point symmetry**; a figure is symmetric about a single point if, when rotated about that point 180° , it aligns with itself. Rotational symmetry of 180° is point symmetry about the center.

Example 1: For each logo shown, identify and explain any symmetry that you see.



1.

7.

13.

2.

8.

14.

3.

9.

15.

4.

10.

16.

5.

11.

17.

6.

12.

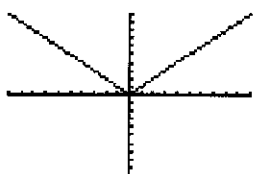
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Now, let's look at the graphs of the parent functions for symmetry.

A function is an **even function** when:

- $f(-x) = f(x)$
- Graph is symmetric about the y-axis.

Example: $y = |x|$



Trick: Can you fold the graph in half along the y-axis and it aligns perfectly? Then it is **even**.

A function is an **odd function** when:

- $f(-x) = -f(x)$
- Graph is symmetric about the origin. (or rotated 180° about the origin)

Example: $y = x^3$

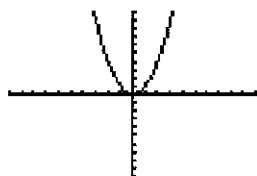


Trick: Can you rotate the graph upside down (OR, flip the graph over the y-axis and then the x-axis) and it still looks the same? Then it is **odd**.

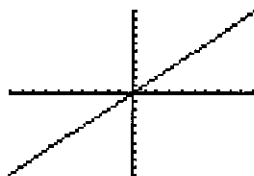
A function is **neither** even **nor** odd if it doesn't meet the requirements to be an even function or an odd function.

Example 2: Decide if the following graphs are *even*, *odd*, or *neither*. Explain.

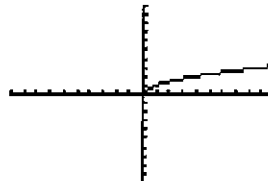
a) $y = x^2$



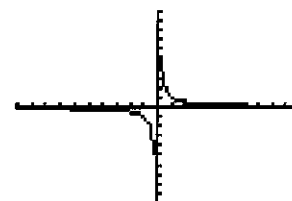
b) $y = x$



c) $y = \sqrt{x}$



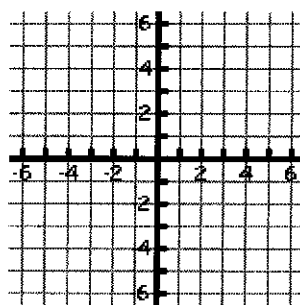
d) $y = \frac{1}{x}$



Example 3: Graph the following functions. Then, determine if the function is *even*, *odd*, or *neither*. Justify your answer by stating how the graph is or isn't symmetrical.

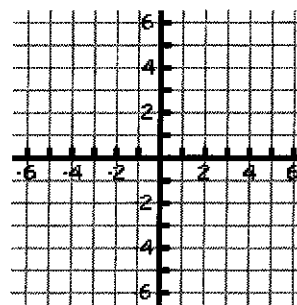
a) $f(x) = 2x^2 - 4x$

x	f(x)



b) $g(x) = -\frac{1}{2}x^3 + 4x$

x	g(x)

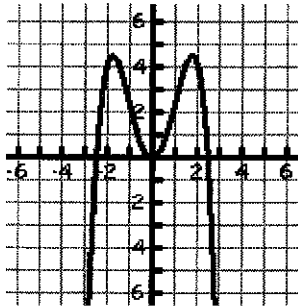


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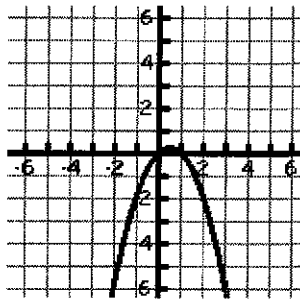
Integrated Advanced Algebra
Worksheet: Graphs of Even and Odd Function

Determine whether each of the following functions is *even*, *odd*, or *neither*. Justify your answer by stating how the graph is or isn't symmetrical.

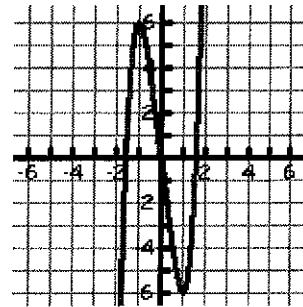
1. $f(x) = -\frac{1}{2}x^4 + 3x^2$



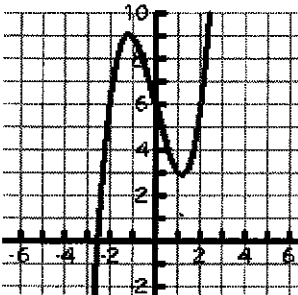
2. $g(x) = -x^2 + x$



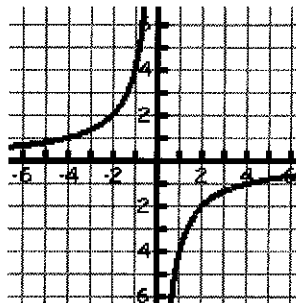
3. $h(x) = x^5 + x^3 - 8x$



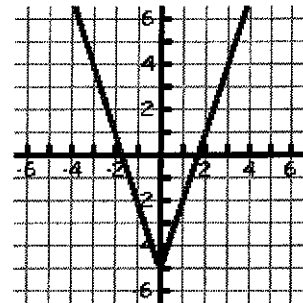
4. $f(x) = x^3 - 4x + 6$



5. $g(x) = \frac{-4}{x}$



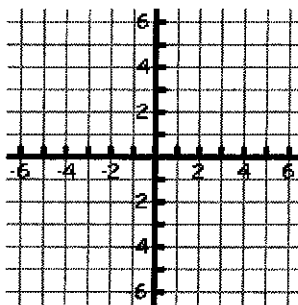
6. $h(x) = 3|x| - 5$



Graph each of the following functions. Then, determine if the function is *even*, *odd*, or *neither*. Justify your answer by stating how the graph is or isn't symmetrical.

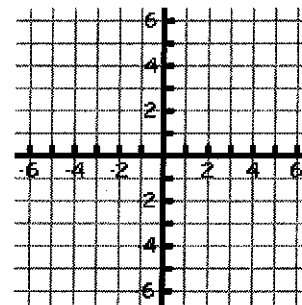
7. $f(x) = -\frac{1}{2}x^2 + 5$

x	f(x)



8. $g(x) = x^3 - 3x$

x	g(x)



Name: _____ Date: _____ Period: _____

Arithmetic and Geometric Sequences Practice

Directions: For each of the following tables:

- a) Describe how to find the next term in the sequence.
 - b) Find the next term in the table.
 - c) Write a recursive rule for the function.
 - d) Write an explicit rule for the function.
 - e) Tell whether the function is linear, exponential, or neither.
-

1)

x	y
1	10
2	20
3	40
4	?
...	...
n	?

- a) To find the next term, _____
- b) Next term in table: _____
- c) Recursive Rule: _____
- d) Explicit Rule: _____
- e) Type of function: _____

2)

x	y
1	40
2	200
3	1000
4	?
...	...
n	?

- a) To find the next term, _____
- b) Next term in table: _____
- c) Recursive Rule: _____
- d) Explicit Rule: _____
- e) Type of function: _____

3)

x	y
1	9
2	10
3	11
4	?
...	...
n	?

- a) To find the next term, _____
- b) Next term in table: _____
- c) Recursive Rule: _____
- d) Explicit Rule: _____
- e) Type of function: _____

4)

x	y
1	16
2	64
3	256
4	?
...	...
n	?

- a) To find the next term, _____
- b) Next term in table: _____
- c) Recursive Rule: _____
- d) Explicit Rule: _____
- e) Type of function: _____

5)

x	y
1	-2
2	-5
3	-8
4	?
...	...
n	?

- a) To find the next term, _____
- b) Next term in table: _____
- c) Recursive Rule: _____
- d) Explicit Rule: _____
- e) Type of function: _____

6)

x	y
1	32
2	64
3	128
4	?
...	...
n	?

- a) To find the next term, _____
- b) Next term in table: _____
- c) Recursive Rule: _____
- d) Explicit Rule: _____
- e) Type of function: _____

7)

x	y
1	3,125
2	625
3	125
4	?
...	...
n	?

- a) To find the next term, _____
- b) Next term in table: _____
- c) Recursive Rule: _____
- d) Explicit Rule: _____
- e) Type of function: _____

Name: _____ Date: _____ Per: _____

ARITHMETIC AND GEOMETRIC SEQUENCE WORD PROBLEMS PRACTICE
All final solutions MUST use the formula.

1. Edgar is getting better at math. On his first quiz he scored 57 points, then he scores 61 and 65 on his next two quizzes. If his scores continued to increase at the same rate, what will be his score on his 9th quiz? Show all work.
 - a. Write an explicit formula for the sequence. Explain where you found the numbers you are putting in the formula.
 - b. Identify the value of n and explain where you found it. Use the explicit formula to solve the problem.
 - c. Write your final answer as a sentence.

2. Suppose you drop a tennis ball from a height of 15 feet. After the ball hits the floor, it rebounds to 85% of its previous height. How high will the ball rebound after its third bounce? Round to the nearest tenth.
 - a. Write an explicit formula for the sequence. Explain where you found the numbers you are putting in the formula.
 - b. Identify the value of n and explain where you found it. Use the explicit formula to solve the problem.
 - c. Write your final answer as a sentence.

3. Viola makes gift baskets for Valentine's Day. She has 13 baskets left over from last year, and she plans to make 12 more each day. If there are 15 work days until the day she begins to sell the baskets, how many baskets will she have to sell?
 - a. Write an explicit formula for the sequence. Explain where you found the numbers you are putting in the formula.
 - b. Identify the value of n and explain where you found it. Use the explicit formula to solve the problem.
 - c. Write your final answer as a sentence.

4. In a certain region, the number of highway accidents increased by 20% over a four year period. How many accidents were there in 2006 if there were 5120 in 2002? Hint: When the percent increases, you want the original 100% plus the additional 20%.
- Write an explicit formula for the sequence. Explain where you found the numbers you are putting in the formula.
 - Identify the value of n and explain where you found it. Use the explicit formula to solve the problem.
 - Write your final answer as a sentence.
5. A house worth \$350,000 when purchased was worth \$335,000 after the first year and \$320,000 after the second year. If the economy does not pick up and this trend continues, what will be the value of the house after 6 years.
- Write an explicit formula for the sequence. Explain where you found the numbers you are putting in the formula.
 - Identify the value of n and explain where you found it. Use the explicit formula to solve the problem.
 - Write your final answer as a sentence.
6. Write about anything that you need help with on the word problems we have done so far. Be specific so we can help you. Do you need to come for tutoring?