

date: _____
name: _____
period: _____ : A

Directions: Try to be clear and precise with your responses. Support each solution by showing all your thinking for maximum credit. Each question is worth 5 points unless noted. "Tell the truth all the time."

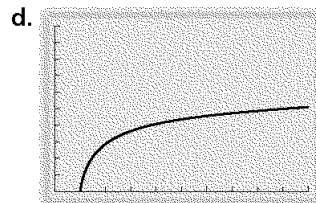
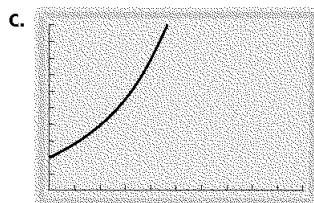
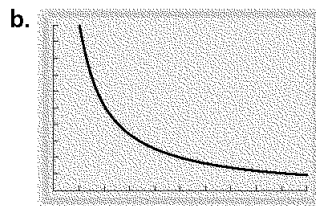
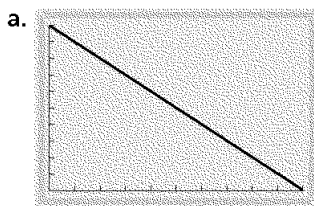
TWMM Unit Test Algebra 8r (Mazzeo 2013)

1. While graphing data at the center, Mr. Rabinowitz and the students found many linear relationships. They wanted to write equations for some of the lines. Find equations for lines that meet these conditions by showing your thinking symbolically/algebraically.

a. Rhea found one parallel to $y = \frac{-5}{9}x + 43$ and passing through the point $(3, -7)$.

b. Matt found one passing through points $(3, 7)$ and $(8, -4)$. **(10 points)**

2. Regis drew the following graph patterns. Which would you expect to see if you were told that variables x and y are related by inverse variation? Explain your reasoning.



3. Joey created the following table. Study the patterns begun in this table.

X	Y ₁	Y ₂	Y ₃	Y ₄
1	1	16	2	21
2	4.5	16	4	10.5
3	8	16	8	7
4	11.5	16	16	5.25
5	15	16	32	4.2
6				
			256	
	36			
16				

- Fill in the missing numbers, round two places if needed, for each column/row in ways that seem to fit patterns begun in the first several rows. Briefly describe each pattern in the margin next to the table. *(20 points)*
- Are any of the patterns linear? Explain your reasoning.
- Do any of the patterns exhibit inverse variation? Explain your reasoning..

4. Mr. Chute and the WMS Green Team gives student groups experience in studying nature and helping to restore the environment for fish, birds, and animals. The budget for the WMS Green Team Center assumes a linear relationship between the number of student visitors and daily operating cost. Some sample (*number of students, operating cost*) values are given in the next table

Number of Students	x	2	8	12	17
Daily Operating Cost (\$)	C	224	296	344	404

- a. Use the given data to write an equation showing how operating cost, C , depends on number of students, x . Explain or show how you arrived at the equation. **(10 points)**

Write equations or inequalities that match each of the following questions. Then use your equations to do the required calculation to find each answer and write a complete sentence explaining what it means.

- b. For what number of student visitors will daily operating cost be \$536?
- c. What will be the operating cost on a day with 16 student visitors?
- d. How many students can visit the center if the operating cost is to be **at most** \$1,100?

5. Maya created the table below.

<i>x</i>	2	3	7	14	21
<i>y</i>	42	28	12	6	4

- a. Describe the pattern you see in the table and then identify the type of relationship.

- b. Write an equation to describe the relationship between x and y .

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6. Solve the following equation found in a bottle washed ashore in San Diego by Claudia .Show transformation lines, properties of equality when used and check solution. **(15 points)**

$$47 + 12k - 16 = 83k - 22 - 19k$$

7. Bonus:

24×			12+	
12+	2−			
	2−		2÷	
	11+		1−	
		2−		5

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Answer Section

SHORT ANSWER

1. **a.** $y = \frac{5}{4}x + 8$

b. $y = -3x + 7$

c. $y = 4x - 3$

2. b; Inverse variation yields a graph that is decreasing and nonlinear. OR b, because inverse variation yields a graph that is decreasing at a decreasing rate.

3. **a.**

X	Y₁	Y₂	Y₃	Y₄
1	0	1	2	1
2	0	4.5	4	$\frac{1}{2}$
3	0	8	8	$\frac{1}{3}$
4	0	11.5	16	$\frac{1}{4}$
5	0	15	32	$\frac{1}{5}$
6	0	18.5	64	$\frac{1}{6}$
10	0	32.5	1024	$\frac{1}{10}$
11	0	36	2048	$\frac{1}{11}$
N	0	$3.5N - 2.5$	$2N^*$	$\frac{1}{N}$

* Students may represent this as $2 \times 2 \times 2 \times \dots \times 2$ N times

b. Y_1 and Y_2 are linear, because the rate of change is constant.

c. Y_4 exhibits an inverse relationship since the X value times the Y_4 is always 1.

4. **a.** $C = 12x + 200$
 b. Equation: $536 = 12x + 200$.
 28 students
 c. Equation: $C = 12(16) + 200$
 \$392
 d. Inequality: $1100 = 12x + 200$
 at most 75 students
5. **a.** The relationship is not linear, since the constant increment of 7 for x does not result in a constant change in y . The relationship is inverse because x and y make a constant product, 84.
 b. $y = \frac{84}{x}$ or $x = \frac{84}{y}$ or $xy = 84$
6. $x = -8$
7. .