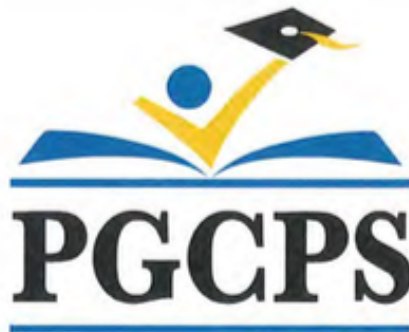


Summer Student Enrichment Packet for Students Entering Algebra I



PRINCE GEORGE'S COUNTY PUBLIC SCHOOLS
Office of Academic Programs
Department of Curriculum and Instruction

Summer Student Enrichment Packet Algebra I

Note to Student: You've learned so much in Math 8, Foundations for Algebra, or Accelerated 2! It is important that you keep practicing your mathematical knowledge over the summer to be ready for Algebra I. In this packet, you will find weekly activities for the summer break.

Directions:

- Create a personal and fun math journal by stapling several pieces of paper together or use a notebook or binder with paper. Be creative and decorate the cover to show math in your world.
- Each journal entry should:
 - ❖ Have the week number and the problem number.
 - ❖ Have a clear and complete answer that explains your thinking.
 - ❖ Be neat and organized.

Playing board and card games are a good way to reinforce basic computation skills and mathematical reasoning. Try to play board and card games at least once a week. Some suggested games to play are: Monopoly, Chess, War, Battleship, Mancala, Dominoes, Phase 10, Yahtzee, 24 Challenge, Sudoku, Connect Four, and Risk.

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Week 1

Domain: *Functions*

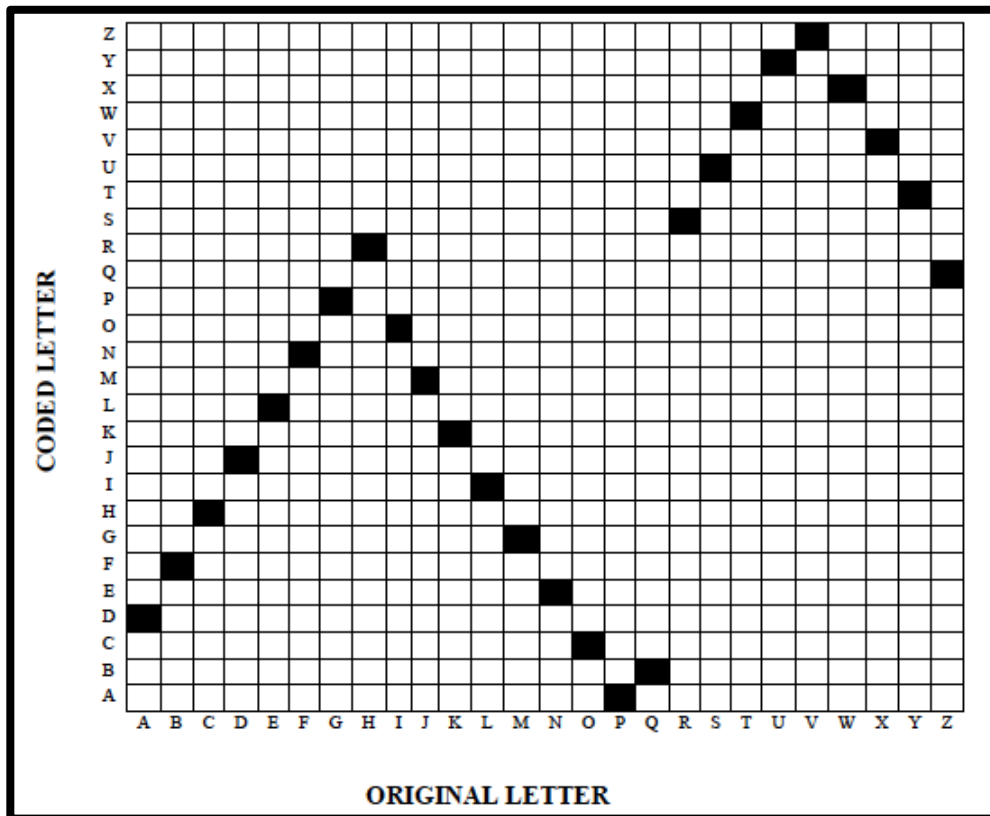
Standard: 8.F.1 – 8.F.2 – Define, evaluate, and compare functions.



Directions:

Encryptions are used by spies, secret societies, and other organizations to transfer information without other people reading their messages. Secret codes can be created by a simple scheme of replacing letters with numbers. More complex codes replace letters with other letters. The code scheme is called a ***cipher*** and can be written as a list or table.

1. A letter-to-letter code can be represented in a graph. Create a key to determine the cipher represented in the graph below.



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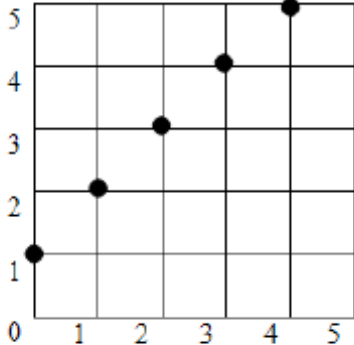
Week 2

Domain: *Functions*

Standard: 8.F.1 – 8.F.2 – Define, evaluate, and compare functions.

Directions:

As rules can be created to code a message in letters, you can write a rule that changes numbers into other numbers. Words, tables, and graphs can represent these rules. The rule “add one to each number” can be represented in other forms.

Form	Representation										
Words – verbal expression	“add one to each number”										
Equation	$y = x + 1$										
Table	<table border="1"><tbody><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>y</td><td>1</td><td>2</td><td>3</td><td>4</td></tr></tbody></table>	x	0	1	2	3	y	1	2	3	4
x	0	1	2	3							
y	1	2	3	4							
Graph											

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1. Represent the function in the other 3 forms.

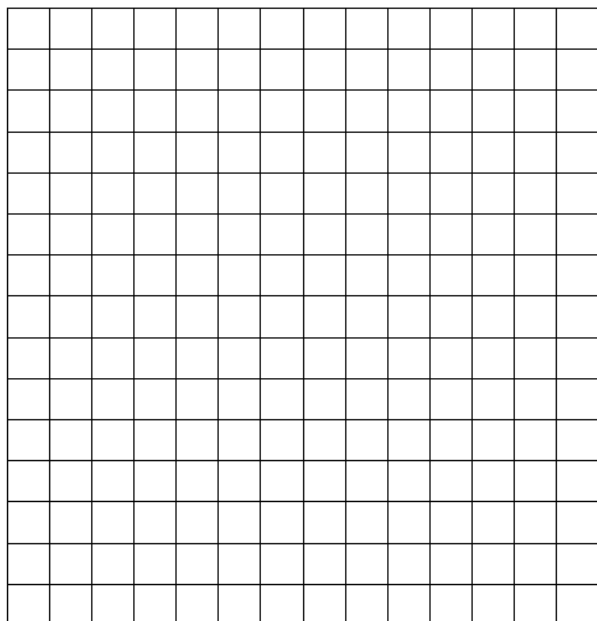
x	-4	3	5	16	25	31
y	-7	7	11	33	51	63

2. Complete the table and graph $y = x^2 + 2x + 1$.

a.

Input	-3	-2	-1	0	1	2	3
Output							

b.



c. Is it possible for two different inputs to give you the same output? Justify your answer.

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3. Use the vocabulary words below to explain how the following real-life experience is like a function.

When you pick up a phone and dial 301-555-2612, you will get the Prince George's County Zoo. When you dial 301-222-3645, you will get the Prince George's County Museum. When you pick up the phone and dial a specific number, you will get only one business/resident.

domain range input output relation function

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Week 3

Domain: *Expressions and Equations*

Standard: 8.EE.5 – 8.EE.6: Understand the connections between proportional relationships, lines, and linear equations.

Standard: 8.EE.7 – 8.EE.8: Analyze and solve linear equations and pairs of simultaneous linear equations.



Directions: Jessie likes candles. She also likes mathematics and was thinking about using algebra to answer a question that she had about two of her candles. Her taller candle is 16 centimeters tall. For each hour it burns, the candle loses 2.5 centimeters in height. Her short candle is 12 centimeters tall and loses 1.5 centimeters in height for each hour that it burns.

Jessie needs your help to determine whether these two candles would ever reach the same height at the same time if allowed to burn the same length of time. She also wants to know what height the two candles would be at that time. If it is not possible, she wants to know why it could not happen and what would need to be true in order for them to be able to reach the same height. To help Jessie understand what you are doing, be sure to use *multiple representations*, *justify* your results, and *explain* your thinking.

Time (hours)	16 cm candle height (cm)	12 cm candle height (cm)
0		
1		
2		
3		
4		
5		
6		
7		

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Week 4

Domain: *Expressions and Equations*

Standard: 8.EE.5 – 8.EE.6: Understand the connections between proportional relationships, lines, and linear equations.

Standard: 8.EE.7 – 8.EE.8: Analyze and solve linear equations and pairs of simultaneous linear equations.

Directions: You have been selected by members of Team Cheetah to participate in a one-mile race during



spirit week. A student from Team Gazelle will race against you. You are able to run 12 feet per second. Since the student from Team Gazelle runs 10 feet per second, you have been asked to let him have a 1,000-foot head start. If both of you maintain the estimated rates, would you be able to beat your opponent? Use at least 2 different methods to justify your conclusion.

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Week 5

Domain: *Statistics and Probability*

Standard: 8.SP.1 – 8.SP.4: Investigate patterns of association in bivariate data.



Directions: Is there an association between whether a middle or high school student plays a sport and whether he or she plays a musical instrument? To investigate, survey 25 people and record your results in the table below.

Student	Sport (Yes or No)	Musical Instrument (Yes or No)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

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Summarize the data below.

		<i>Instrument</i>		
		Yes	No	Total
<i>Sport</i>	Yes			
	No			
	Total			

- Of the middle and high school students you surveyed who play a sport, what proportion plays a musical instrument?
- Of the middle and high school students you surveyed who do not play a sport, what proportion plays a musical instrument?
- Based on your data, do you think there is an association between playing a sport and playing an instrument? Justify your reasoning.
- Create another visual representation that could help you determine the association, if any, between playing a sport and playing a musical instrument.

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Week 6

Domain: *Expressions and Equations*

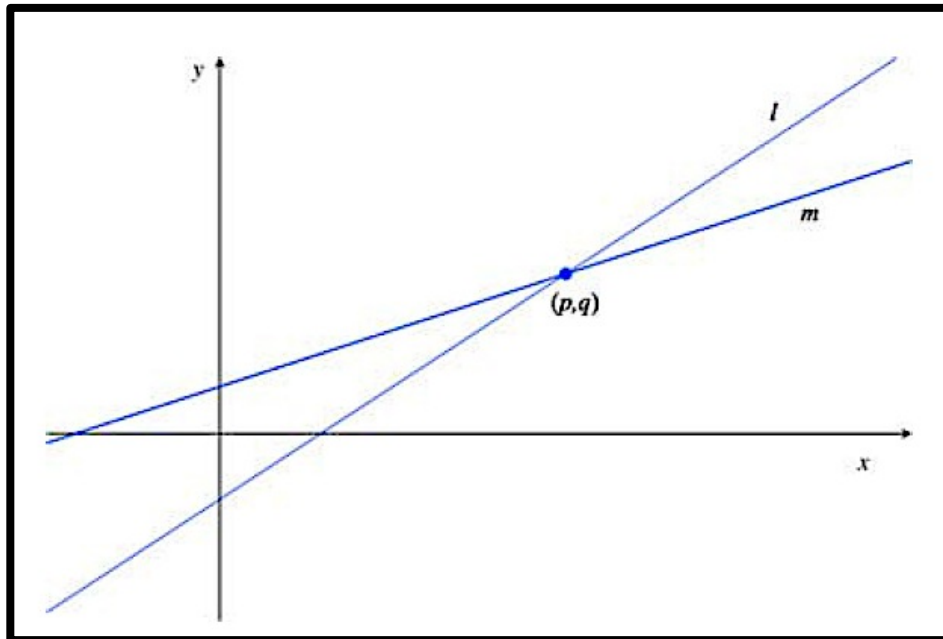
Standard: 8.EE.5 – 8.EE.6: Understand the connections between proportional relationships, lines, and linear equations.

Standard: 8.EE.7 – 8.EE.8: Analyze and solve linear equations and pairs of simultaneous linear equations.

Directions:

Read the problem below.

The figure below shows the lines l and m described by the equations $4x - y = a$ and $y = 2x + b$, respectively for some constants a and b . The two lines intersect at the point (p, q) .



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1. Interpret a and b in terms of the graphs of the equations.
2. Using a pencil, place the tip of your pencil at point (p, q) and trace line l to the point whose x-coordinate is $p + 2$. Using a pen, do the same for line m . Determine the difference between the y-coordinates for lines l and m .

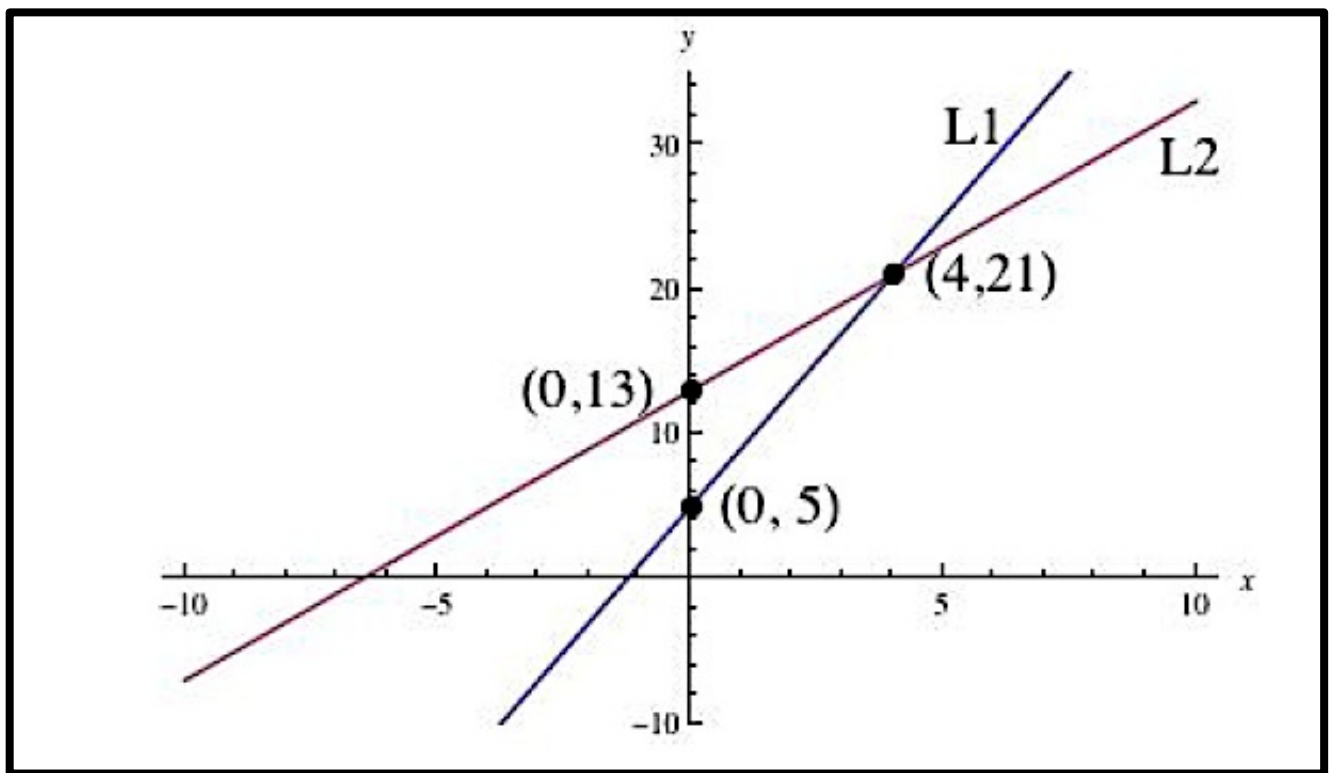
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Week 7

Domain: *Expressions and Equations*

Standard: 8.EE.5 – 8.EE.6: Understand the connections between proportional relationships, lines, and linear equations.

Standard: 8.EE.7 – 8.EE.8: Analyze and solve linear equations and pairs of simultaneous linear equations.



1. Find the linear equations for L_1 and L_2 .
2. Find two additional points, one that lies on L_1 and one that lies on L_2 .

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Algebra I – Unit 1 Preview

Domain: Number System

Standard:

A.CED.1– Create equations that describe numbers or relationships.

A.SSE.1 – Interpret the structure of expressions.

Sean has been assigned the following linear equations and inequality word problems. Help him solve each problem below by using the five-step plan below.

1. Drawing a sketch (if necessary)
2. Defining a variable
3. Setting up an equation or inequality
4. Solving the equation or inequality
5. Making sure you answer the question

1. The sum of 38 and twice a number is 124. Find the number.
2. The sum of two consecutive integers is less than 83. Find the pair of integers with the greatest sum.
3. A rectangle is 12m longer than it is wide. Its perimeter is 68m. Find the length and width of the rectangle.
4. Alex has twice as much money as Jennifer. Jennifer has \$6 less than Shannon. Together they have \$54. How much money does each have?
5. There are three exams in a marking period. A student received grades of 75 and 81 on the first two exams. What grade must the student earn on the last exam to get an average of no less than 80 for the marking period?