FOR ALL STUDENTS TAKING COMMON CORE ALGEBRA I

2018-2019 SUMMER REVIEW PACKET

CCHS MATH DEPARTMENT

Dear Student and Parent/Guardian,

The math department at Catholic Central High school wants you to be successful in CC AlgebraII. This summer packet is designed to help you review necessary skills. Be sure to follow the key information below when completing this packet:

- The packet is due when you return to school in September.
- **Every problem must be completed. None left blank.**
- The packet is worth 10 times a regular homework grade.
- Work must be shown to receive credit – no work, no points. Show the work on the packet pages. Do NOT add additional pages.
- Final answers must be shown on the answer pages at the back of the packet.
- A quiz covering the material from the packet may be given at the end of the first week of school. These topics also tie in with the first few units of CC Algebra II
- All topics covered in the packet should be completed without the aid of a calculator. If it is decided to give a quiz on the summer packets, no calculator will be allowed on the quiz.
- When you return in September, you will have an opportunity to ask questions. Math help will also be available during the first week.

We hope that you have an enjoyable summer and return to school ready to be successful in CC Algebra II

Order of Operations

When several operations are indicated in a numerical expression, proceed in the following order: work within the parentheses, expand each power, multiply and divide (whichever comes first), and finally, add or subtract (whichever comes first).

PEMDAS ("**P**lease **E**xcuse **M**y **D**ear **A**unt **S**ally") is an acronym that provides a good way to remember your order of operation.

- **P**: Parentheses
- **E**: Exponents
- **MD**: Multiply or Divide, whichever comes first
- **AS**: Add or Subtract, whichever comes first

Simplify.

1. $2^4 - 3(3^2 - 8)$

2. $(4^2 + 10)4 - 10(5^2 - 20)$

3. $4^2 - 4(5^2 - 32 \div 8 \cdot 4)$

4. $(8 \cdot 5 \div 10 + 2)(2^5 - 8^2 \div 2)$

5. $5^2 - 3\left[6 + (-2)\left(20 + (-15)\right)\right]$

6. $[4^3 + (-10)(30 - 8 \cdot 5)]$

7. $[15 - 3(4^2 - 10) + 25 \div 5 \cdot 15]$

8. $\{10 - 5[20 - 2(3^2 + 1)]\}$

9. $|-32| + 32$

10. $\frac{48-24\div 2^3}{3+2\cdot 6}$

Working with Integers

Adding and Subtracting:

1st: Rewrite all subtraction as addition then…

- If the integers have the same signs, add their absolute values. The sum will have the same sign of the addends.
- If the integers have different signs, subtract their absolute values. The sum has the sign of the addend with the greater absolute value.

Multiplying and Dividing:

- The product or quotient of two integers having the same sign is positive.
- The product or quotient of two integers having different signs is negative.

Find each sum, difference, product, or quotient.

1.	$-13 + 19$	**2.**	$37 + (-13)$	**3.**	$-18 + (-29)$
4.	$-27 - 93$	**5.**	$-46 - (-32)$	**6.**	$9 - 83$
7.	$-45 \div 9$	**8.**	$-84 \div -12$	**9.**	$\frac{132}{-11}$
10.	$8(-17)$	**11.**	$-24 \cdot -6$	**12.**	$-62(8)$

13. There is a 6° drop in temperature over the past hour. If it is 55° now, what was the temperature an hour ago?

14. It is −9° now. The temperature will drop 5° in two hours. What will the temperature be in two hours?

Fractions

(Addition, Subtraction, Multiplication, and Division)

Miscellaneous

Write the fractions in lowest terms.

1. $\frac{8}{24}$

2. $\frac{18}{24}$

3. $\frac{15x^2y}{20xy}$

4. $\frac{36abc^4}{45a^3bc^2}$

Solve for x.

5. $\frac{16}{48} = \frac{x}{12}$

6. $\frac{12}{42} = \frac{4}{x}$

7. $\frac{20}{32} = \frac{x}{16}$

8. $\frac{6}{9} = \frac{12}{x}$

Write as fractions.

9. $2\frac{1}{3}$

10. $-4\frac{6}{7}$

Write as mixed numbers.

11. $-\frac{9}{4}$

12. $\frac{38}{3}$

Addition and Subtraction

Find each sum or difference. Write your answer in simplest form.

13. $-\frac{2}{3}+\frac{1}{4}$

14. $3\frac{5}{9}+2\frac{1}{6}$

15. $\frac{3}{10}-\frac{4}{5}$

16. $6\frac{7}{10}+\left(-1\frac{1}{5}\right)$

17. $5\frac{4}{11}-2\frac{2}{3}$

18. $2\frac{7}{12}-9\frac{2}{3}$

Multiplication and Division

Find each product or quotient. Write your answer in simplest form.

19. $-\frac{5}{6}\cdot\frac{6}{15}$

20. $-\frac{3}{4}\div\left(-\frac{9}{16}\right)$

21. $2\frac{2}{5}\cdot\left(-3\frac{3}{4}\right)$

22. $-3\frac{3}{4}\div 4\frac{2}{3}$

23. $\frac{2}{9}\cdot\frac{3}{16}\cdot\frac{3}{6}$

24. $6\frac{3}{4}\div 4$

Central Tendencies
(Mean, Median, Mode, and Range)

Mean is the sum of the values in a set of data divided by the number of values.

Median is the middle value of a set of data written in ascending order. If there are two middle values, the median is the mean of those values.

Mode is the most frequent value in a set of data.

Range is the difference between the greatest and least value in a set of data.

Exercises:

Find the mean, median, mode, and range of each set of data.

1. 108, 93, 426, 766, 518, 210

2. 21.5, 35.5, 49.5, 16.3, 35.5

Solving Multi-Step Equations

Procedure: To solve multi-step equations...

1. Fully simplify both sides of the equation
2. Get all variables to one side of the equation.
3. Use inverse operations to isolate the variable

undo addition and subtraction first

Ex.

$$2x+3=7$$
$$-3 \quad -3$$
$$\frac{2x}{2} = \frac{4}{2}$$
$$\boxed{x = 2}$$

Ex.

$$2(x + 5) = 3x - 5$$
$$2x + 10 = 3x - 5$$
$$-2x \qquad -2x$$
$$10 = x - 5$$
$$+5 \qquad +5$$
$$\boxed{x = 15}$$

Exercises

Solve and check each equation.

1. $-2x + 7 = 25$

2. $3 - 8x = -141$

3. $15 - 2(w + 5) = 11$

4. $12 - 4r = 6r + 2$

5. $-4(n + 5) = -32$

6. $12 - 2x + 5 = -1$

7. $3 - 2x = 15$

8. $\frac{z}{2} - 7 = 12$

9. $17 + 3x = 4x - 9$

10. $-3(6f - 12) = 36 - 18f$

Solving Multi-Step Inequalities

Note: Solve a multi-step inequality just like you would solve a multi-step equation. However, if you multiply or divide both sides of an inequality by a negative number, then the inequality sign reverses.

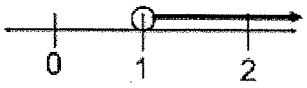
Ex.

$2x + 5 > 7$

$-5 \quad -5$

$\frac{2x}{2} > \frac{2}{2}$

$\boxed{x > 1}$



Ex.

$10 \leq -2(x - 4)$

$10 \leq -2x + 8$

$-8 \quad -8$

$\frac{10}{-2} \leq \frac{-2x}{-2}$

$\boxed{-5 \geq x \text{ or } x \leq -5}$

Exercises

Find and graph the solution set of each inequality.

1. $3x + 8 > 17$

2. $-6y + 3 > 9 - 7y$

3. $2v + 7 \geq 11$

4. $7 > 3 + \frac{b}{3}$

5. $\frac{c-2}{3} \leq 4$

6. $4b + 4 < 4(5 - 3b)$

7. $2z - 5 < -21 - 2z$

8. $8b - 10 \geq 6(3 - a)$

9. $3x - 5 > 6x + 13$

1. $7(y + 5) - 10 \leq 2y$

Translating Algebraic Expressions

Addition	Subtraction	Multiplication	Division	Exponents
Plus Increased by More than Sum of	Minus Decreased by Fewer than Less than Difference of	Multiplied by Times Product Twice, One-half, etc. Of (*usually with fractions)*	Divided by Quotient of Into	Square of (2^{nd} *power*) Cube of (3^{rd} *power*) Power of

Write each phrase as an algebraic expression.

1. 12 more than a number

2. The quotient of a number and 9.

3. The difference of a number cubed and twelve.

4. Three less than 5 times a number.

5. A number decreased by 8.

6. One-third the square of b.

7. Twice the sum of 15 and a number.

8. Seven less than a number to the power of 5.

9. Seven more than twice the difference of a number and five.

10. The product of x and 4 increased by y.

Translate each sentence into an equation.

11. Fifty-three plus four times c is 21.

12. The sum of five times h and twice g is equal to 23.

13. One fourth the sum of r and ten is identical to r minus 4.

14. Three plus the sum of the squares of w and x is 32.

15. The area A of a circle is pi times the radius r squared.

Write and solve an equation for each.

16. Aiden borrows a book from a public library. He read a few pages on day one. On day two, he reads twice the number of pages than he read on day one. On the third day, he reads six pages less than what he read on the first day. If he has read the entire book that contains 458 pages, how many pages did he read on day three?

17. Linda is twice as old as Vera. Tanya is four less than four times the age of Linda. Their total age is two more than nine times the age of Vera. How old is Tanya?

18. On Monday, 222 students went on a trip to the zoo. All 4 buses were filled and 6 students had to travel in cars. How many students were in each bus ?

19. The sum of three consecutive numbers is eighty - four. What is the smallest of the three numbers ?

20. Alyssa sold half of her comic books and then bought 6 more. She now has 16. How many did she begin with?

Graphing Points on a Coordinate Plane

For each equation, use the given x-coordinates to complete the table. Show your work in the spaces provided. Then, graph the ordered pairs and line on the coordinate plane provided on the answer page.

1. $y = 3x - 1$

x	y
-2	
-1	
0	
1	
2	

2. $y = -x + 2$

x	y
-6	
-5	
-1	
4	
7	

3. $y = -2x - 7$

x	y
-7	
-5	
-2	
0	
1	

4. $y = \frac{1}{2}x + 3$

x	y
-4	
-2	
0	
2	
4	

5. $y = \frac{2}{3}x + 4$

x	y
-6	
-3	
0	
3	
6	

Systems of Equations

Substitution

Ex: $y = x - 1 \quad y = 2x + 2$

$x - 1 = 2x + 2$

$-x \quad -x$

$-1 = x + 2$

$-2 \quad -2$

$-3 = x$

$\downarrow$

$y = 2x + 2$

$y = 2(-3) + 2 = -4$

Solution: $(-3, -4)$

Ex: $y = x + 1 \quad 2y = 3x$

$\downarrow$

$2y = 3x$

$2(x + 1) = 3x$

$2x + 2 = 3x$

$-2x \quad -2x$

$2 = x$

$\downarrow$

$y = x + 1$

$y = 2 + 1 = 3$

Solution: (1, 3)

1. $2x - 3y = -1$
$y = x - 1$

2. $y = -2$
$4x - 3y = 18$

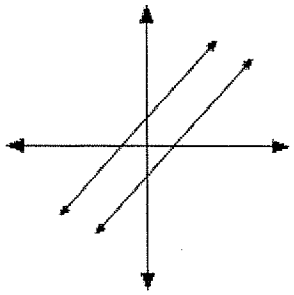
3. $-7x - 2y = -13$
$x - 2y = 11$

4. $y = 5x - 7$
$-3x - 2y = -12$

Graphing

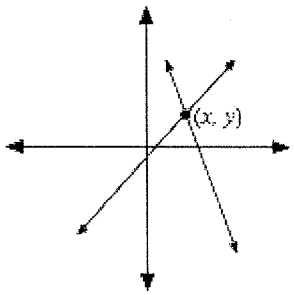
Graph each system of equations on the answer page. Label the intersection point.

Parallel Lines



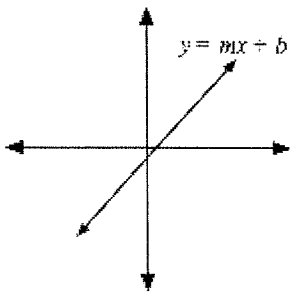
No points in common.
Solution: $\varnothing$

Intersecting Lines



One point in common.
Solution: (x, y)

Coincident Lines



Infinitely many points in common.
Solution: $\{(x, y): y = mx + b\}$

1. $y = \frac{1}{2}x + 2$
   $y = 3x - 3$

2. $y = \frac{3}{4}x - 1$
   $x = -4$

3. $y = \frac{4}{3}x - 3$
   $y = 1$

4. $x - 2y + 8 = 0$
   $-6 - 2y = -x$

5. $-2x = y = 1$
   $-6x = 3y + 3$

Mixed Review

Name: _____ **Date:** _____

1. The cost of airing a commercial on television is modeled by the function $C(n) = 110n + 900$, where n is the number of times the commercial is aired. Based on this model, which statement is true?

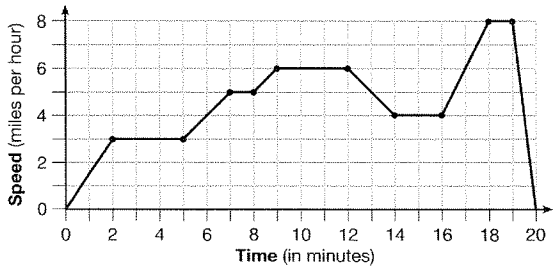
   A. The commercial costs \$0 to produce and \$110 per airing up to \$900.

   B. The commercial costs \$110 to produce and \$900 each time it is aired.

   C. The commercial costs \$900 to produce and \$110 each time it is aired.

   D. The commercial costs \$1010 to produce and can air an unlimited number of times.

2. The graph below represents a jogger's speed during her 20-minute jog around her neighborhood.



   Which statement best describes what the jogger was doing during the 9–12 minute interval of her jog?

   A. She was standing still.

   B. She was increasing her speed.

   C. She was decreasing her speed.

   D. She was jogging at a constant rate.

3. Which table represents a function?

   A.

x	2	4	2	4
$f(x)$	3	5	7	9

   B.

x	0	−1	0	1
$f(x)$	0	1	−1	0

   C.

x	3	5	7	9
$f(x)$	2	4	2	4

   D.

x	0	1	−1	0
$f(x)$	0	−1	0	1

4. Mo's farm stand sold a total of 165 pounds of apples and peaches. She sold apples for \$1.75 per pound and peaches for \$2.50 per pound. If she made \$337.50, how many pounds of peaches did she sell?

   A. 11 B. 18 C. 65 D. 100

5. Joey enlarged a 3-inch by 5-inch photograph on a copy machine. He enlarged it four times. The table below shows the area of the photograph after each enlargement.

Enlargement	0	1	2	3	4
Area (sq in)	15	18.8	23.4	29.3	36.6

What is the average rate of change of the area from the original photograph to the fourth enlargement, to the *nearest tenth*?

A. 4.3 B. 4.5 C. 5.4 D. 6.0

6. The distance a free falling object has traveled can be modeled by the equation $d = \frac{1}{2}at^2$, where a is acceleration due to gravity and t is the amount of time the object has fallen. What is t in terms of a and d?

A. $t = \sqrt{\frac{da}{2}}$ B. $t = \sqrt{\frac{2d}{a}}$

C. $t = \left(\frac{da}{d}\right)^2$ D. $t = \left(\frac{2d}{a}\right)^2$

7. Alex is selling tickets to a school play. An adult ticket costs \$6.50 and a student ticket costs \$4.00. Alex sells x adult tickets and 12 student tickets. Write a function, $f(x)$, to represent how much money Alex collected from selling tickets.

8. Determine the smallest integer that makes $-3x + 7 - 5x < 15$ true.

9. Albert says that the two systems of equations shown below have the same solutions.

First System	**Second System**
$8x + 9y = 48$	$8x + 9y = 48$
$12x + 5y = 21$	$-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer.

ORDER OF OPERATIONS

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

WORKING WITH INTEGERS

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
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8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____

FRACTIONS

1. _____
2. _____
3. _____
4. _____
5. _____
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16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____

CENTRAL TENDENCIES

1. Mean: _____

   Median: _____

   Mode: _____

   Range: _____

2. Mean: _____

   Median: _____

   Mode: _____

   Range: _____

SOLVING MULTI-STEP EQUATIONS

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

SOLVING MULTI-STEP INEQUALITIES

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

TRANSLATING ALGEBRAIC EXPRESSIONS

1. _____
2. _____
3. _____
4. _____
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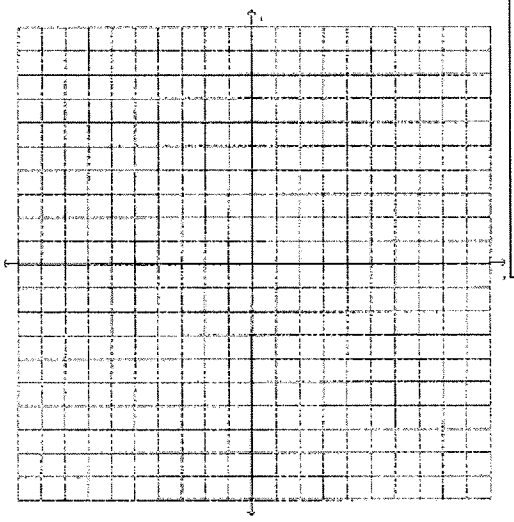
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

GRAPHING POINTS ON A COORDINATE PLANE

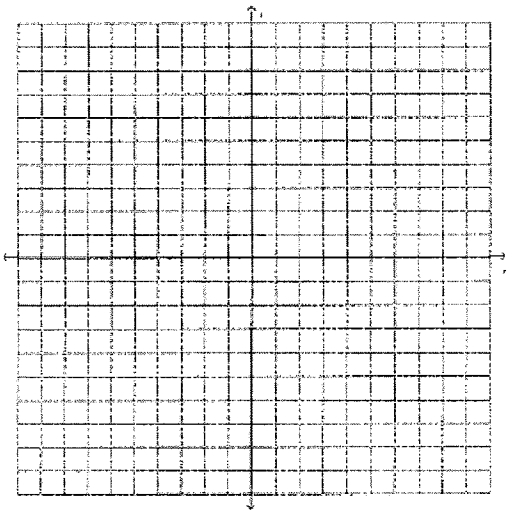
1. $y = 3x - 1$

x	y
-2	
-1	
0	
1	
2	



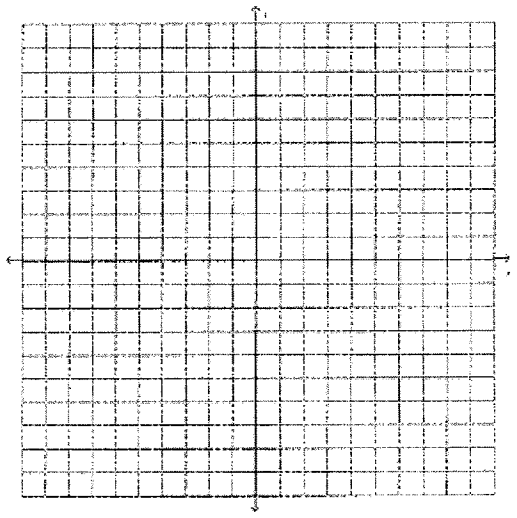
2. $y = -x + 2$

x	y
-6	
-5	
-1	
4	
7	



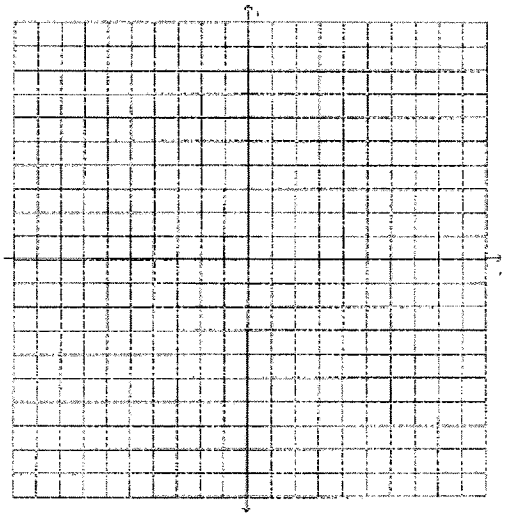
3. $y = -2x - 7$

x	y
-7	
-5	
-2	
0	
1	



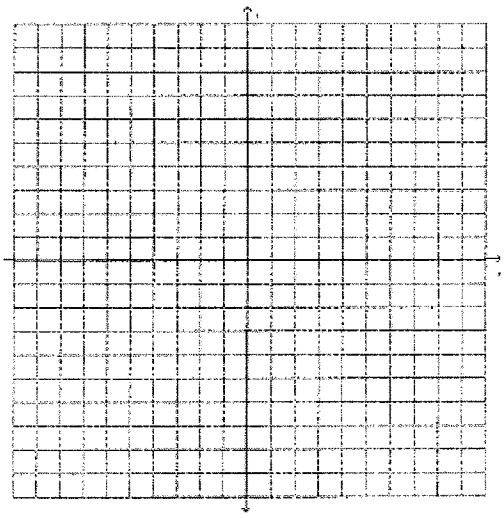
4. $y = \frac{1}{2}x + 3$

x	y
-4	
-2	
0	
2	
4	



5. $y = \frac{2}{3}x + 4$

x	y
-6	
-3	
0	
3	
6	



SYSTEMS OF EQUATIONS

Substitution

1. _____

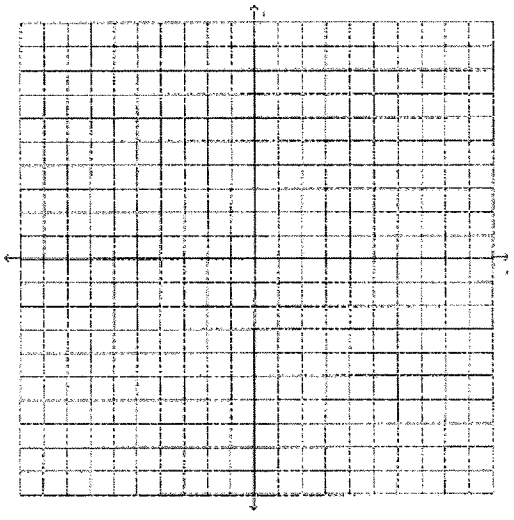
3. _____

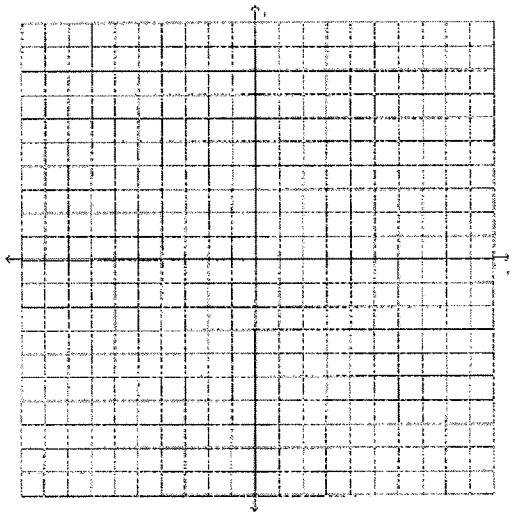
2. _____

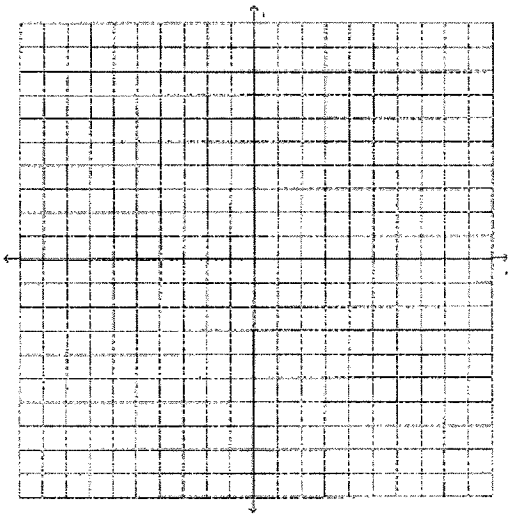
4. _____

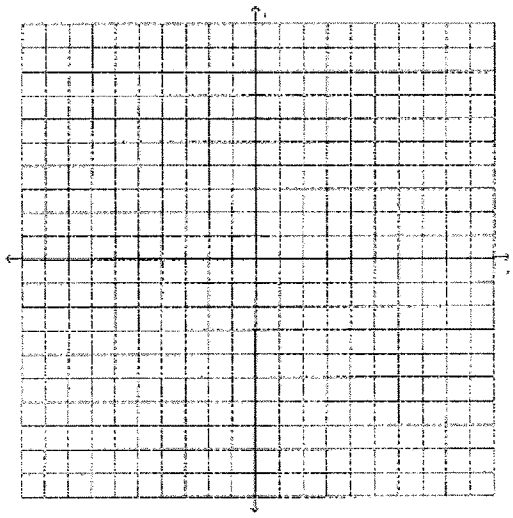
SYSTEMS OF EQUATIONS

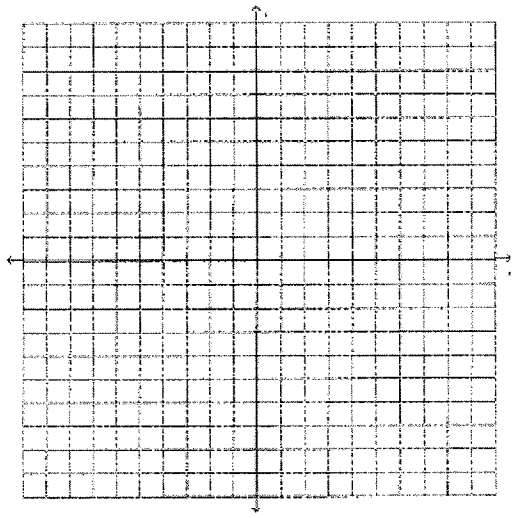
Graphing











MIXED REVIEW

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____