RAMAPO-INDIAN HILLS SCHOOL DISTRICT

Dear Ramapo-Indian Hills Student:

Please find attached the summer packet for your upcoming math course. The purpose of the summer packet is to provide you with an opportunity to review prerequisite skills and concepts in preparation for your next year's mathematics course. While you may find some problems in this packet to be easy, you may also find others to be more difficult; therefore, you are not necessarily expected to answer every question correctly. Rather, the expectation is for students to put forth their best effort, and work diligently through each problem.

To that end, you may wish to review notes from prior courses or on-line videos (www.KhanAcademy.com, www.glencoe.com, www.youtube.com) to refresh your memory on how to complete these problems. We recommend you circle any problems that cause you difficulty, and ask your teachers to review the respective questions when you return to school in September. Again, given that math builds on prior concepts, the purpose of this packet is to help prepare you for your upcoming math course by reviewing these prerequisite skills; therefore, the greater effort you put forth on this packet, the greater it will benefit you when you return to school.

Please bring your packet and completed work to the first day of class in September. Teachers will plan to review concepts from the summer packets in class and will also be available to answer questions during their extra help hours after school. Teachers may assess on the material in these summer packets after reviewing with the class.

If there are any questions, please do not hesitate to contact the Math Supervisors at the numbers noted below.

Enjoy your summer!

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Previous Math Course: _____

Ramapo- Indian Hills High School
Summer Math Packet

Geometry CP/CPE

To the students:
The following set of review problems were designed to prepare you for your Geometry CP/CPE course. You can either print out the problems or complete them on a separate piece of paper. Please bring the packet and your completed work on the first day of school in September.

Thank you.

Simplifying Algebraic Expressions

PEMDAS – the order in which you evaluate expressions	
P – Parenthesis	
E – Exponents	
M – Multiplication	**(from left**
D – Division	**to right)**
A – Addition	**(from left**
S – Subtraction	**to right)**

Simplify the following expressions using order of operations.

1. $1 + 7 + (24 \cdot 2) \div (2 \cdot 4))$

2. $(7 \cdot 2 - 4) \div ((5 - 4) \cdot 10)$

Evaluate each expression if $a = 2, b = -3, c = -1$, and $d = 4$.

3.) $\frac{2d-a}{b}$

4.) $\frac{3b}{5a+c}$

5.) $(c + b)^2$

6.) $c + b^2$

Solving Linear Equations

Example **Solve $5x + 3 = 23$.**

$5x + 3 = 23$	Original equation
$5x + 3 - 3 = 23 - 3$	Subtract 3 from each side.
$5x = 20$	Simplify.
$\frac{5x}{5} = \frac{20}{5}$	Divide each side by 5.
$x = 4$	Simplify.

Solve each equation.

7.) $r + 11 = 3$

8.) $\frac{8}{5}a = -6$

9.) $\frac{m}{10} + 15 = 21$

10.) $9n + 4 = 5n + 18$

11.) $-2y + 17 = -13$

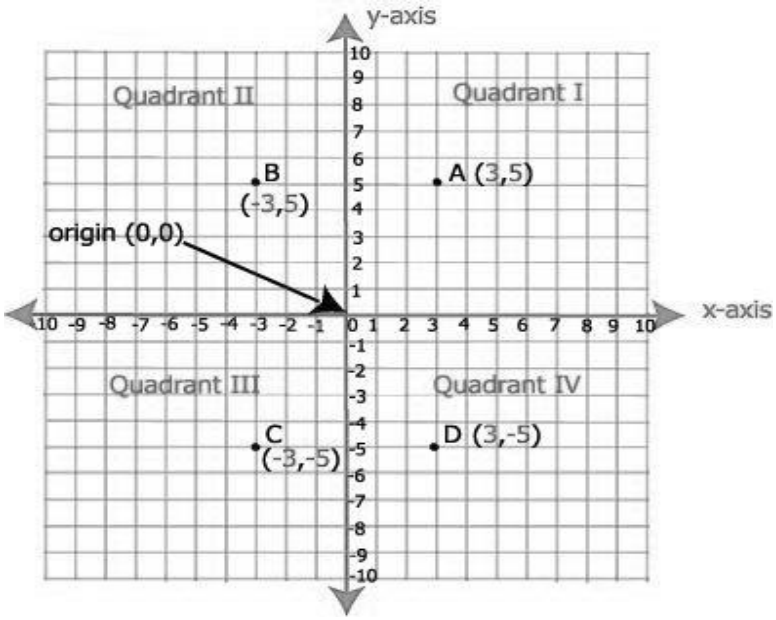
12.) $-2(n + 7) = 15$

Important Notes:

Points in the coordinate plane are known as **ordered pairs**.
Ordered pairs are written in the form .
The x-axis and y-axis divide the coordinate plane into four quadrants.
The point of intersection of the axes is the **origin**.
The origin is located at .

Example:

- Quadrant I
- Quadrant II
- Quadrant III
- Quadrant IV



Ordered Pairs

Write the ordered pair for each point shown in the coordinate plane. Name the quadrant the point is in.

13.) B = (,)

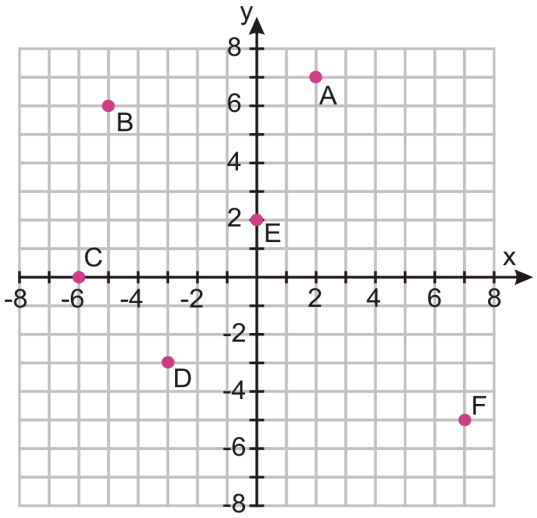
14.) C = (,)

15.) E = (,)

16.) A = (,)

17.) D = (,)

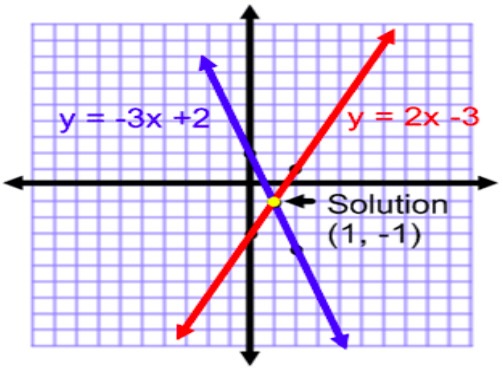
18.) F = (,)



Solving Systems of Linear Equations By Graphing

$y = -3x + 2$
$y = 2x - 3$

Step 1: Graph each equation.



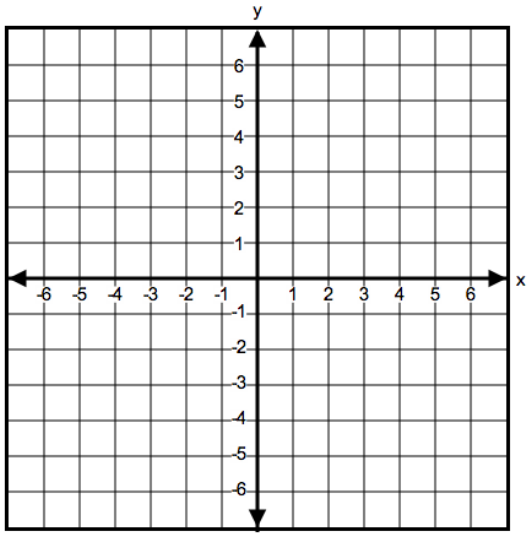
Step 2: Find the point of intersection. This is your solution.

The solution to this system of equations is (1, -1).

Solve by graphing.

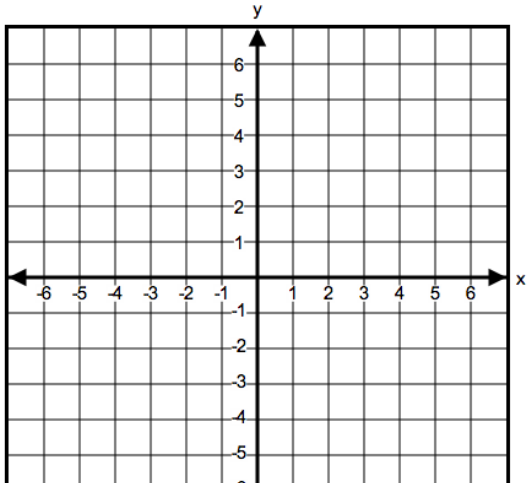
19.) $y = -x + 2$

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



20.) $y - 2x = 1$

$2y - 4x = 1$



Solving Systems of Equations bySubstitution

Steps to solving Systems of Equations by Substitution:

$x + 3y = 6$
$2x + 8y = -12$

1. Isolate a variable in one of the equations. (Either y = or x =).

$x + 3y = 6$
$x = 6 - 3y$

2. Substitute the isolated variable in the other equation.

$2x + 8y = -12$
$2(6 - 3y) + 8y = -12$

3. This will result in an equation with one variable. Solve the equation.

$12 - 6y + 8y = -12$
$2y = -24$
$y = -12$

4. Substitute the solution from step 3 into another equation to solve for the other variable.

$x + 3(-12) = 6$
$x = 42$

5. Recommended: Check the solution.

$42 = 6 - 3(-12)$

Solve by substitution.

21.) $-5x + 3y = 12$
$x + 2y = 8$

22.) $x - 4y = 22$
$2x + 5y = -21$

Solving Systems of Equations by Elimination

Solve $\begin{cases} 3x + 4y = 18 \\ -2x + 4y = 8 \end{cases}$ **by elimination.**

Step 1

$3x + 4y = 18$
$-(-2x + 4y = 8)$

$3x + 4y = 18$
$+ 2x - 4y = -8$

Add the opposite of each term in the second equation.

Step 2

$5x + 0 = 10$ *Eliminate the y-term.*

$5x = 10$ *Simplify and solve for x.*

$x = 2$

Step 3

$-2x + 4y = 8$ *Write one of the original equations.*

$-2(2) + 4y = 8$ *Substitute 2 for x.*

$-4 + 4y = 8$

$+4 \quad +4$ *Add 4 to both sides.*

$4y = 12$ *Simplify and solve for y.*

$y = 3$

Step 4

$(2, 3)$ *Write the solution as an ordered pair.*

Solve by elimination.

23.) $-3x + y = 7$
$3x + 2y = 2$

24.) $-4x + 5y = -11$
$2x + 3y = 11$

Square Roots and Simplifying Radicals

Product Property: For two numbers *a* and *b* ≥0, $\sqrt{ab}=\sqrt{a}\cdot\sqrt{b}$
Example: $\sqrt{45}=\sqrt{(3\cdot 3\cdot 5)}=\sqrt{(3^2\cdot 5)}=\mathbf{3\sqrt{5}}$

Quotient Property: For any numbers *a* and *b*, where a ≥ 0 and b ≥ 0, $\sqrt{\frac{a}{b}}=\frac{\sqrt{a}}{\sqrt{b}}$

Example: $\sqrt{\frac{7}{3}}=\frac{\sqrt{7}}{\sqrt{3}}, \frac{\sqrt{7}}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}=\frac{\sqrt{21}}{\sqrt{9}}=\frac{\sqrt{21}}{3}$

Simplify the following radicals. ***Remember, no radicals can be left in the denominator.***

25.) $\frac{2}{\sqrt{3}}$

26.) $\sqrt{32}$

27.) $\sqrt{50}\cdot\sqrt{10}$

28.) $\sqrt{16}\cdot\sqrt{25}$

29.) $\sqrt{\frac{81}{49}}$

30.) $\frac{\sqrt{10}}{\sqrt{27}}$

Ratios and Proportions

Solve Proportions If a proportion involves a variable, you can use cross products to solve the proportion. In the proportion $\frac{x}{5} = \frac{10}{13}$, x and 13 are called **extremes.** They are the first and last terms of the proportion. 5 and 10 are called **means**. They are the middle terms of the proportion. In a proportion, the product of the extremes is equal to the product of the means.

Means-Extremes Property of Proportions	For any numbers a, b, c, and d, if $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$.

Example 1:

$$\frac{x}{5} = \frac{10}{13}$$

$$x \cdot 13 = 5 \cdot 10$$

$$13x = 50$$

$$\frac{13x}{13} = \frac{50}{13}$$

$$x = \frac{50}{13}$$

Example 2:

$$\frac{x+1}{4} = \frac{3}{4}$$

$$4(x+1) = 3 \cdot 4$$

$$4x + 4 = 12$$
$$-4 \quad -4$$

$$4x = 8$$

$$\frac{4x}{4} = \frac{8}{4}$$

$$x = 2$$

Solve each proportion.

31.) $\frac{x}{21} = \frac{3}{63}$

32.) $\frac{-3}{x} = \frac{2}{8}$

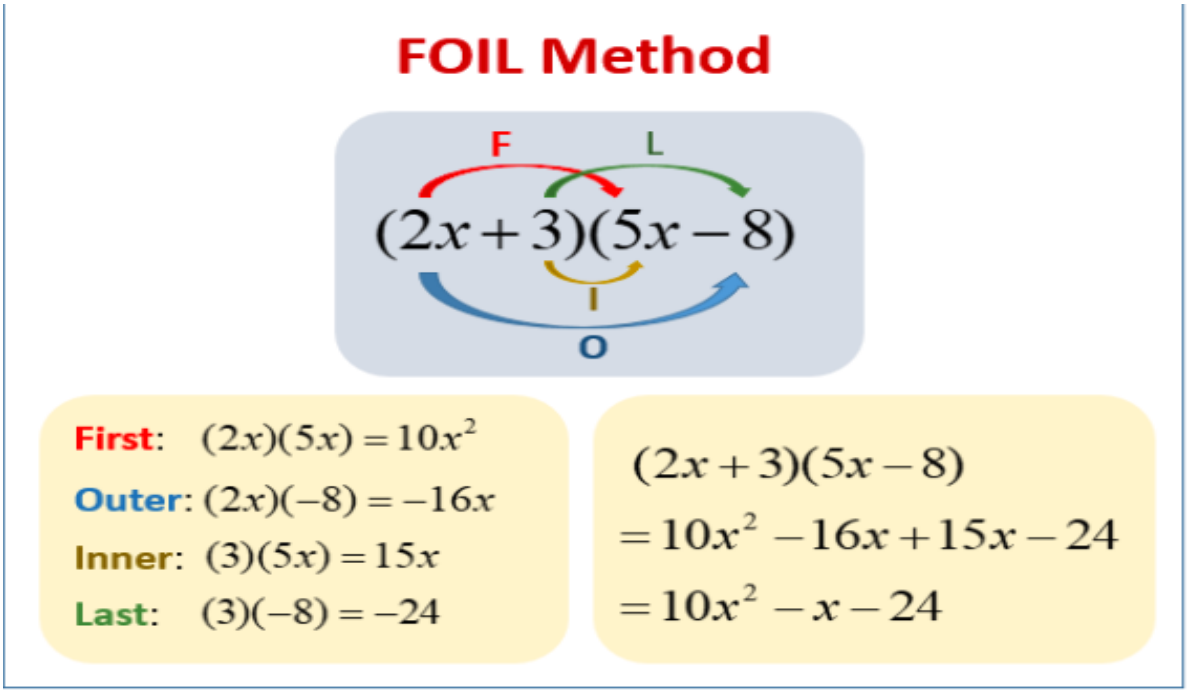
33.) $\frac{0.1}{2} = \frac{0.5}{x}$

34.) $\frac{9}{y+1} = \frac{18}{54}$

35.) $\frac{a-8}{12} = \frac{15}{3}$

36.) $\frac{3+y}{4} = \frac{-y}{8}$

Multiplying Polynomials



Find each product.

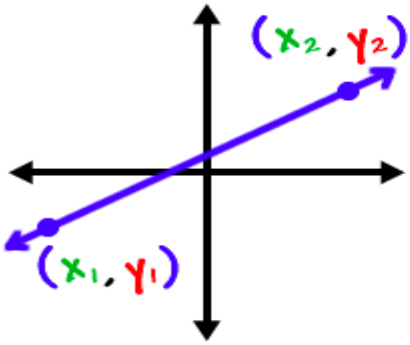
37.) $(n+8)(n+2)$

38.) $(x-3)(x+3)$

39.) $(4h+5)(h+7)$

40.) $(5m-6)(5m-6)$

Slope: The steepness of a line represented by the change in the y-value over the change in x-value.



If you're given two points (x_1, y_1) and (x_2, y_2)

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

Example: Given the points (-2, -1) & (4, 3) find the slope.

$(-2, -1)$ $(4, 3)$

x_1 y_1 x_2 y_2

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - (-1)}{4 - (-2)} = \frac{4}{6} = \frac{2}{3}$$

Find the slope of the line given the following points.

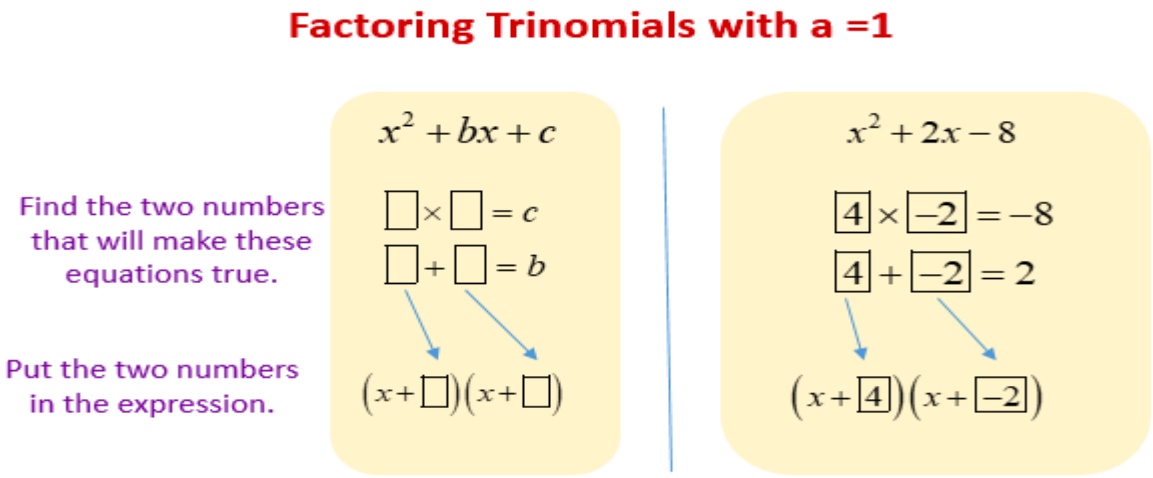
41.) (1, -3) and (3,5)

42.) (8, 11) and (24, -9)

Factoring by Greatest Common Factor (GCF)

Take out the GCF	EX: $15xy^2 - 10x^3y + 25xy^3$
How: Find what is in common in each term and put in front. See what is left over. Check answer by distributing out.	Solution: $5xy(\ 3y - 2x^2 + 5y^2\ )$

Factoring Trinomials When a=1



Solve each equation.

43.) $20x^2 + 15x = 0$

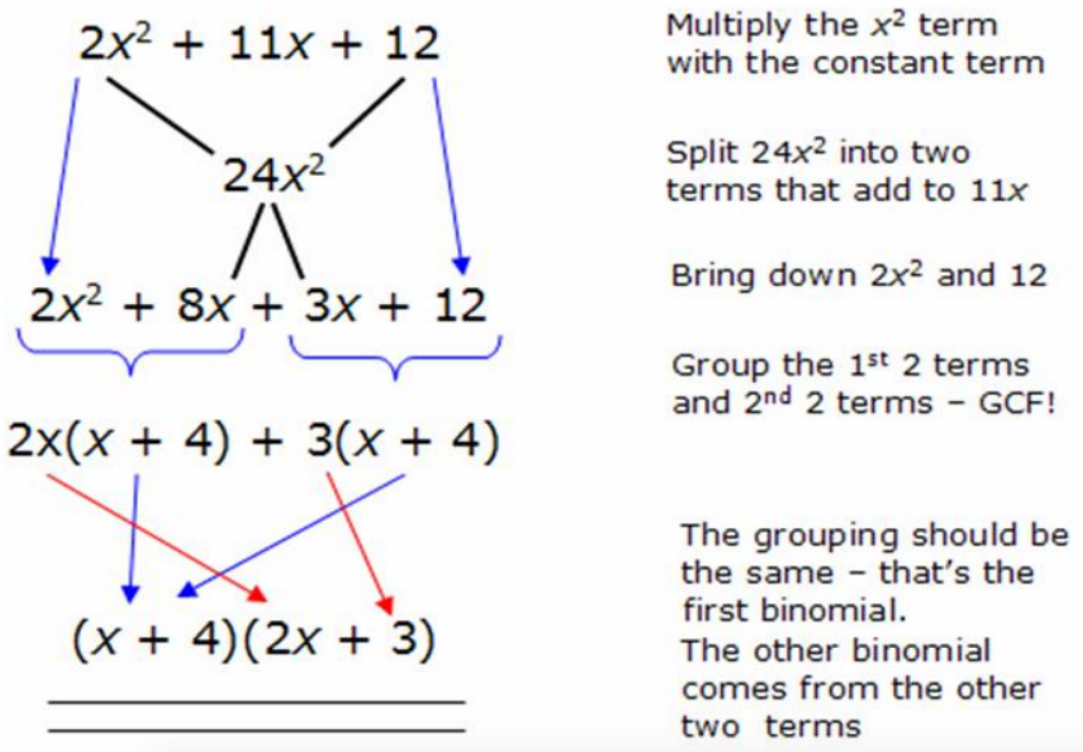
44.) $6x^5 + 18x^4 = 0$

45.) $x^2 - 16x + 64 = 0$

46.) $x^2 - 11x + 30 = 0$

47.) $x^2 - 4x - 21 = 0$ **48.)** $x^2 - 6x - 16 = 0$

Factoring Trinomials when a>1



Solve the following by factoring.

49.) $15x^2 - 8x + 1 = 0$ **50.)** $3x^2 + 2x - 5 = 0$