Geometry Readiness
Summer Math Packet

Name _____

Dear Patriots,

It has been a good year, and you have worked hard to master the ideas we covered in Algebra I this year. I encourage you to take a refreshing break as school ends, and enjoy the things that summer brings your way; read good books, play games, and spend time with family and friends. After July 4th, it is a good idea to begin turning your thoughts toward the upcoming school year. I am sending home a summer math packet to help you prepare to start Geometry strong. It will review math skills you should have mastered, but if you get stumped please go to one of the websites listed on the next page which includes video tutorials and additional practice problems. Or I am happy to help if you need me, simply send me an email.

Show all work. Bring this packet with you on the first day of school for a grade.

Have a great summer!

Mrs. Locke
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Summer Packet

Additional Math Resources

The following is a list of websites to visit for additional help or practice material:

- Khan Academy
  - Take control of your learning by working on the skills you choose at your own pace. ... Math, science, computer programming, history, art, economics, and more.
- Algebasics
  - has video tutorials explaining the basics of algebra, equations, ratio and proportion, absolute value, polynomials, factoring, linear equations, radicals, applications, and much more.
- Algebra-Class
  - offers help with solving equations, graphing equations, writing equations, inequalities, functions, exponents and monomials, polynomials, and the quadratic equation. It also has a list of resources.
- Algebra Help
  - contains lessons on topics that include equations, simplifying, factoring, distribution, and trinomials, as well as equation calculators and worksheets. This site also has an extensive list of math resources and study tips.
- Help Algebra
  - covers topics such as fractions, percents, decimals, algebraic expressions, addition, multiplication, and word problems. Each section includes explanations and examples.
- College Cram
  - allows students to choose the algebra subject they are struggling with from a drop down menu, select the appropriate chapter, and pick your resources. The oages will feature formula solvers, bottomless worksheets, flashcards, quizzes, interactive overviews, and brief lessons and study sheets.
- Interactive Mathematics
  - has a large section on algebra, including information on factoring and fractions, the quadratic equation, exponents and radicals, systems of equations, matrices and determinants, and inequalities.
- Math Expression
  - has videos, worksheets, and lessons to help you develop your algebra skills. Math topics include algebra, exponents, symmetry, fractions, measurements, angles, and more. The site also includes a list of useful resources.
- Purple Math
  - contains lessons with explanations on everything from absolute value and negative numbers to intercepts, variables, and factoring. In addition, this site includes a forum that allows students to ask questions and receive answers, as well as a list of homework tips and guidelines.

Part I. Simplifying Expressions and Combining Like Terms

Remember:
Always use order of operations when simplifying expressions. To help you, think of the PEMDAS rule-Parenthesis, Exponents, Multiply/Divide, Add/Subtract in order from left to right.

Problem Set 1

Evaluate each expression.

1. $1+4 \cdot 6-3$
2. $2+(10-1) \div 3$
3. $\frac{15+3}{9} \cdot -5-(-2)$
4. $\frac{(-8+3) \cdot 2-(-2)}{-4}$
5. $(10-7)^2-\frac{-18}{-3}$
6. $\frac{-27-8}{5(10-9)}$
7. $-9 \cdot 5-(10-(-7)^2)$
8. $-4\left(5 \cdot -\frac{30}{6}+9\right)$

Evaluate each expression using the values given.

1. $z+y^2-\frac{x}{3}$, *if* $x=-9$, $y=-3$, *and* $z=-4$

2. $y-x+\frac{x^2}{4}$, *if* $x=2$ *and* $y=-9$

Problem Set 2

Simplify each of the following expressions.

1. $7m+1+7m+4$
2. $10-7p+p-5$
3. $6(5x+7)-7$
4. $-6(-8+9)+4a$
5. $-2(-1+6m)+8m$
6. $-3k-3(5k+7)$
7. $-7k(1-8k)+5k(-3-2k)$
8. $7a(1+8a)-8a(a+9)$
9. $(6+5n)+(4n-8)$
10. $(5x-3x^2)-(7x+8x^2)$
11. $(k+5k^2)+(k+4-7k^{2)}$
12. $(5v^2+7v^3)-(6v^3-2v^2-8)$
13. $(3n-2-8n^2)+(7-8n-7n^2)$
14. $-5(2u-h)$
15. $(1-4a-5a^3)-(6+a^3+4a)$

Problem Set 3

Simplify each of the following expressions using the FOIL method.

Remember:

When multiplying two polynomials, you must distribute every term in the first expression to every term in the second expression. For binomials, it is helpful to remember the FOIL method, which reminds you to multiply the first terms together first, then the outer terms, then the inner terms, then the last terms. Finally, simplify by putting like terms together. When multiplying larger polynomials, you can follow the same pattern.

1. $(2x-7)(x+6)$
2. $(2x-6)(8x-1)$
3. $(x+6)(8x-3)$
4. $(b+1)(3b-8)$
5. $(7x+8y)(8x+y)$
6. $(7x-6y)(2x+8y)$
7. $(5p+6)((3p^2+p+6)$
8. $(7x+5)(4x^2+8x+5)$
9. $(3c-5)(2c^2-c+8)$

Remember:

Rules for exponents

Product Rule ~ $a^x + a^y = a^{x+y}$

When terms with the same base are multiplied, you add the exponents.

Quotient Rule ~ $\frac{a^x}{a^y} = a^{x-y}$

When terms with the same base are divided, you subtract the exponents.

Power Rule ~ $(a^x)^y = a^{x \cdot y}$

When a term is raised to another exponent, you multiply the exponents.

Zero Exponent ~ $a^0 = 1$

Anything raised to the zero power is equal to one.

Negative exponents ~ $\left(\frac{a}{b}\right)^{-x} = \left(\frac{b}{a}\right)^x$

A negative exponent is equivalent to taking the reciprocal of the base number, and applying the absolute value to the exponent

Problem Set 4

Simplify each of the following expressions. Your answer should include only positive exponents.

1. $(4xy)^{2}$
2. $\frac{y^{3}}{4x^{2}y^{-1}}$
3. $4u^{-2}v^{0}2u^{-2}$
4. $\left(y^{4}\right)^{-1}$
5. $(x^{3}) \cdot \left(2x^{-1}\right)^{0}$
6. $\left(\frac{2x^{3}}{2x^{-4}y^{-4}}\right)^{2}$
7. $\frac{(b^{2})^{3}}{a^{0} \cdot 2a^{-3}b^{2}}$
8. $\frac{(2ab)^{3}}{2a^{2}b^{4} \cdot a^{3}b^{3}}$
9. $a^{-2}b^{3} \cdot (2b)^{4}$
10. $\frac{4x^{4}}{3x^{4}y^{-3}}$
11. $\frac{(a^{4}b^{-3})^{0}}{2ba^{-2}}$
12. $x^{-4}y^{2} \cdot \left(x^{0}y^{0}\right)^{-3}$

Part II. Solving Linear Equations and Systems of Equations

Remember:

Rules for solving equations with one variable

1. Distribute if necessary
2. Combine all like terms
3. Isolate the variable

Problem Set 5

1. $-5 = 2 - 4n + 1$
2. $-x - 2x = -24$
3. $117 = -3(5r - 4)$
4. $-2(8m - 3) = 86$
5. $x + 16 = -8(5x - 2)$
6. $-9 + 4m = 3(m - 5)$
7. $2x + 6x = -10$
8. $\frac{2}{5} = -p + \frac{7}{5}p$
9. $-\frac{7}{2}n - 2n = -\frac{29}{4}$

Problem Set 6

Solve each of the following proportions.

1. $\frac{2}{6} = \frac{m}{4}$
2. $\frac{4}{5} = \frac{b}{4}$
3. $\frac{x-2}{5} = \frac{2}{6}$
4. $\frac{6}{5} = \frac{10}{k-1}$
5. $\frac{17d}{25} = \frac{51}{125}$
6. $\frac{x-4}{x} = \frac{7}{9}$
7. $\frac{3w}{10w+2} = \frac{2}{7}$
8. $\frac{8a-5}{5a-4} = \frac{13}{8}$

Problem Set 7

Solve each system of equations using the substitution method.

1. $3x + y = 5$
   $y = 2x$
2. $m - 3n = -4$
   $2m + 6n + 5$

Solve each system of equations using the addition-or-subtraction method.

3. $6r + 5y = -8$
   $2r - 5y = -16$
4. $12m + 3n = 51$
   $7m - 3n = 44$

Solve each system of equations using multiplication with the addition-or-subtraction method.

5. $3x - y = 3$
   $x + 3y = 11$
6. $3x + 4y = -25$
   $2x - 3y = 6$

Part III. Linear Equations and Graphing

Remember:

Slope-Intercept Form is $y = mx + b$, where m is the slope, and b is the y-interecept.

Slope can also be understood as $\frac{rise}{run}$.

The slope can be found from 2 points using the formula $\frac{y_2 - y_1}{x_2 - x_1}$.

Problem Set 8

Write an equation in slope-intercept form that satisfies each of the following requirements.

1. Slope = -2, y-intercept=1

2. slope= $\frac{2}{3}$, passes through the point $(-3, 2)$

Write the following equations in slope-intercept form.

3. $5x + y = 30$

4. $x - y = 7$

5. $-4x + 3y = 12$

Find the slope of the line that passes through each pair of points.

6. $(10, 10)$, $(-4, 17)$

7. $(0, 9)$, $(-2, -1)$

Remember:

Lines are parallel if the slopes are the same.

Lines are perpendicular if the slopes are the negative inverse of each other, such as $\frac{2}{3}$ and $-\frac{3}{2}$

Problem Set 9

State whether each pair of lines is parallel, perpendicular, or neither.

1. $y = 6x - 4$
   $y = 6x - 3$

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

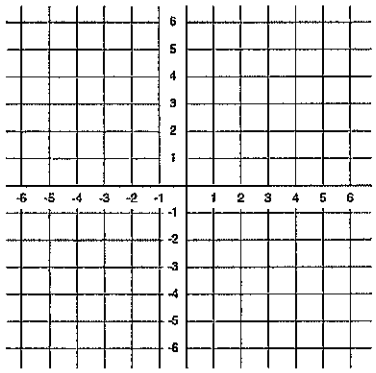
3. $2x - 3y = -6$
   $2x - y = 2$

Problem Set 10

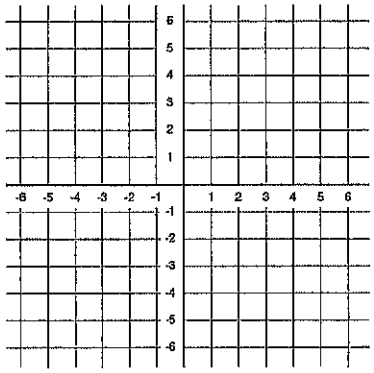
Remember:
When graphing a line from an equation, make sure it is in slope-intercept form, then plot the y-intercept and use the slope to find additional points.

Graph each of the following equations in the provided grid.

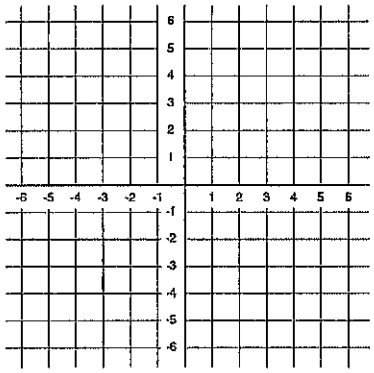
1. $y = 5$



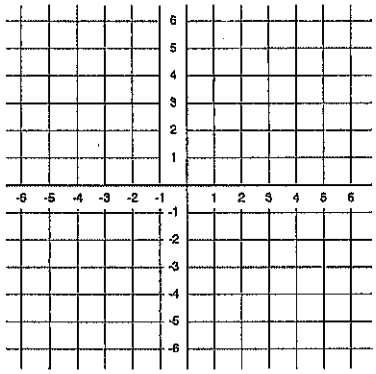
2. $y = -\frac{1}{4}x + 1$



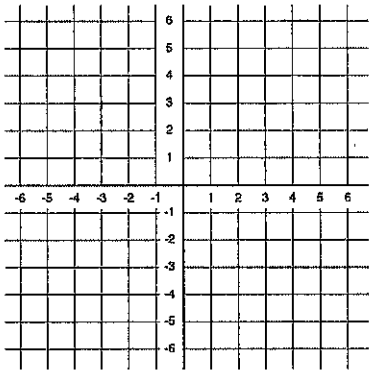
3. $y = \frac{1}{2}x + 5$



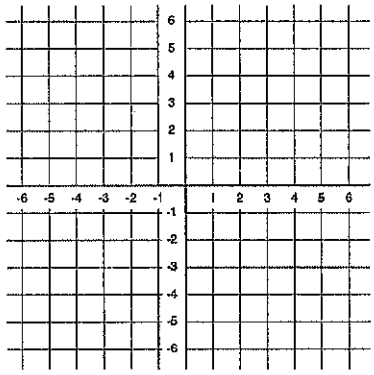
4. $15 - 3y = -x$



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



6. $x - y = 4$



Part V. Geometry Review

Remember:

Perimeter is defined as the distance around a 2D figure.

-Usually, the perimeter is found by adding the lengths of all the sides of the figure.

-The length around a circle is called the circumference and has a unique formula.

Area is defined as the space inside a 2D figure.

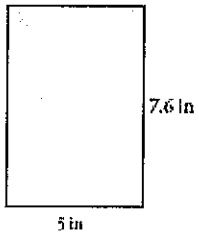
Formulas:

Rectangle/Square	Triangle	Circle
$P = 2l + 2w$ or $P = 4s$	$P = a + b + c$	$C = 2\pi r$
$A = l \times w$	$A = \frac{1}{2}bh$	$A = \pi r^2$

Problem Set 12

Find the area and perimeter/circumference of each of the following figures. Round your answers to the nearest hundredth.

1.



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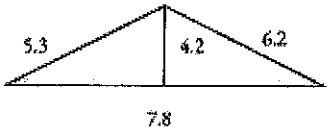

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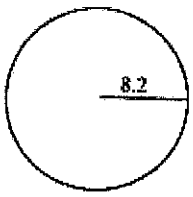

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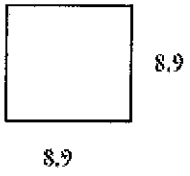

Part IV. Factoring Polynomials

Remember:

1. Is there a GCF? Factor that out first.
2. Is this a difference of squares? Does it follow the pattern $a^2 - b^2$? If so, factor it as a difference of squares.
3. Is this a perfect square? Does it follow the pattern $a^2 +/- 2ab + b^2$? If so, factor it as a perfect square.
4. Does this polynomial have a 1 in the "a" spot? Use a product/sum chart to factor.
5. Does it have a number greater than 1 in the "a" spot? Use "busting the b".

*When you are finished, make sure it can't be factored again! Check your work with FOIL.

Problem Set 11

Completely factor each expression.

1. $3x^2 + 6x$
2. $x^2 - 25$
3. $n^2 + 8n + 15$
4. $g^2 - 9g + 20$
5. $d^2 + 3d - 28$
6. $z^2 - 7z - 30$
7. $4y^3 - 36y$
8. $5k^2 + 30k - 135$
9. $m^2 + 18m + 81$