Name: _____ Date: _____

Honors Algebra I & Honors Geometry - Summer Math Review Packet

All students entering Honors Algebra I & Honors Geometry are expected to be proficient in their previously learned mathematical skills. The St. Agnes mathematics department has prepared the following packet to help you review basic skills needed for your next course. Each skill listed in the packet contains several examples, links to online tutorials, practice problems and/or review websites, followed by practice problems for which you are responsible for completing.

Since the use of this material is intended for review, you are responsible for completing this packet on your own. **Print out the packet, show all work directly on these pages and highlight your answers.** If you need further assistance with any problems, we have provided helpful web links for additional instruction:

http://coolmath.com/algebra/Algebra1/index.html

http://www.algebra.com/

http://mathforum.org/dr.math/

http://www.regentsprep.org/Regents/math/ALGEBRA/math-ALGEBRA.htm

Due: The **first day of school**, this packet will be collected and graded by your teacher to evaluate your effort to recall this vital information. You will also be tested over this material the first week of your classes, date to be decided by your teacher.

Be sure to show all work to receive credit.
No work = No Credit

(I.) Fractions, Decimals, and Percents

Conversions - the following table displays how to change each of the form of a fraction to a decimal, and a percent.

Examples:

Fraction	Decimal	Percent
$\frac{1}{2}$	Divide the numerator by the denominator 0.5	Move the decimal point two places to the right 50%
Since 5 is the last digit in the thousandths place, put 875 over 1000 and simplify the fraction $\frac{875}{1000} = \frac{7}{8}$	0.875	Move the decimal point two places to the right 87.5%
Since 2 is the last digit in the hundredths place, put 2 over 100 and simplify the fraction $\frac{2}{100} = \frac{1}{50}$	Move the decimal two places to the left 0.02	2%

Tutorial: http://www.purplemath.com/modules/percents.htm

Video: www.mathplayground.com/howto_perfracdec.html

Complete the following table.
Convert fractions, decimals, and percents.

	Fraction	Decimal	Percent
1	$\frac{5}{8}$		
2		0.8	
3			70%
4	$\frac{8}{3}$		
5			3.5%
6		0.04	
7		0.54	
8			23.8%
9	$4\frac{1}{3}$		
10			0.5%

Conversions - (<, >, =)
Compare each statement using the <, >, or = .

www.mathplayground.comhowto_comparefractions.html

11) 3.398 _____ 3.349

12) $\frac{1}{5}$ _____ $\frac{1}{6}$

13) $\frac{2}{8}$ _____ $\frac{1}{4}$

14) $\frac{5}{8}$ _____ $\frac{4}{6}$

15) $-\frac{3}{2}$ _____ $-\frac{4}{6}$

Percent Problems
http://amby.com/educate/math/4-2_prop.htm

http://www.virtualnerd.com/pre-algebra/percents/equation/equation-examples/percent-equation-definition

There are 2 ways to solve a percent problem. You can use a proportion or write an equation. Look below to see both methods. You should use what you are comfortable with.

Percent Proportion	Percent Equation
$\frac{\text{part}}{\text{whole}} = \frac{\%}{100}$ $\frac{\text{is}}{\text{of}} = \frac{\%}{100}$	$P = RB$ P is the percentage (part) R is the rate (%) as a decimal B is the base (whole)

Percent Proportion	Percent Equation
Example: What is 90% of 45? $\frac{x}{45} = \frac{90}{100}$ $100x = 4050$ $\frac{100x}{100} = \frac{4050}{100}$ $x = 40.5$	Example: 65% of what number is 78? $78 = .65x$ $\frac{78}{.65} = \frac{.65x}{.65}$ $x = 120$

Write an equation or proportion for each problem and solve.

1) What percent of 56 is 14?

2) 36 is what percent of 40?

3) 80 is 40% of what number?

4) What is 110% of 80?

5) 30% of 70 is what number?

6) 6% of what number is 21?

II. Fraction Operations

Adding and Subtracting Fractions- To add and subtract fractions, you must have a common denominator. Preferably a least common denominator (LCD).

Example 1: $\frac{1}{2} + \frac{7}{8}$ The least common denominator for 2 and 8 is 8.

$\frac{1}{2}\,(4) + \frac{7}{8}$ Multiply the denominator of the first fraction by 4 to create the common denominator of 8 and multiply the numerator by 4 also. (What you do to the top you must do to the bottom)

$\frac{4}{8} + \frac{7}{8} = \frac{11}{8}$ Add the numerators.

Example 2: $\frac{4}{5} - \frac{2}{3}$ The least common denominator for 5 and 3 is 15.

$\frac{4}{5}(3) - \frac{2}{3}(5)$ Multiply the numerator and denominator of the first fraction by 3 to create the common denominator. Multiply the numerator and denominator of the second fraction by 5 to create the common denominator.

$\frac{12}{15} - \frac{10}{15} = \frac{2}{15}$ Subtract the numerators

Multiplying Fractions- To multiply fractions, multiply the numerator and multiply the denominators. Then simplify the result. (reduce)

Example1	Example 2
$\frac{1}{2} \bullet \frac{4}{5}$ Multiply the numerators and the denominators $\frac{4}{10}$ Simplify the fraction $\frac{2}{5}$	$\frac{8}{9} \bullet 6$ Rewrite 6 as $\frac{6}{1}$ $\frac{8}{9} \bullet \frac{6}{1}$ Multiply the numerators and the denominators $\frac{48}{9}$ Simplify the fraction $\frac{16}{3}$

<u>Dividing Fractions</u>- To divide two fractions, rewrite the problem as multiplication by the reciprocal. Follow the rules for the multiplying fractions.

Example1 $\frac{7}{10} \div \frac{5}{6}$ Rewrite as multiplication by the reciprocal.

$\frac{7}{10} \bullet \frac{6}{5}$ Multiply the numerators and the denominators

$\frac{42}{50}$ Simplify the fraction. $\frac{21}{25}$

Perform the indicated operation.

1) $\frac{2}{7} + \frac{3}{4}$

2) $\frac{5}{12} - \frac{1}{5}$

3) $\frac{10}{17} - \frac{1}{2}$

4) $\frac{3}{8} \bullet \frac{2}{7}$

5) $\frac{3}{14} \div \frac{6}{7}$

6) $\frac{16}{3} \div 8$

7) $2\frac{1}{3} + 5\frac{4}{5}$

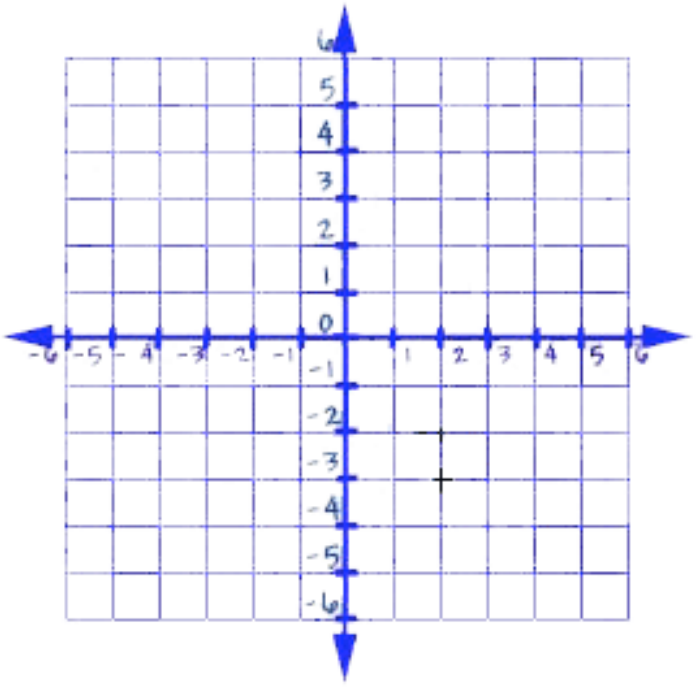
8) $3\frac{1}{2} - 5$

9) $2\frac{3}{4} \bullet \frac{2}{3}$

III. Integers - Plotting on the coordinate plane:

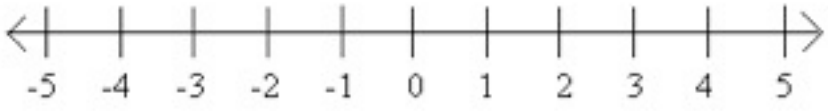
Tutorial : http://www.math.com/school/subject2/lessons/S2U4L1GL.html

1) Plot each of the following points on the coordinate plane. Label each point with the correct letter after you plot them.

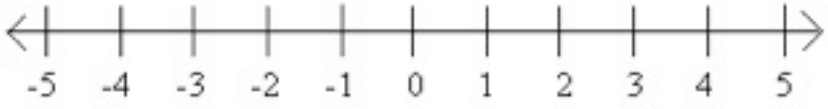
1) plot each point	
A(3,6) B(-2,5) C(-4,-2) D(5, -3) E(0,5) F(2, 0) G(-3, 0) H(0, -4)	

2) Plot the given set on the number line.

a) { -3, -1.3, 0, 1.5, 4 }



b) { -2.3, - 5, 1, 4.03 }



Integers on the Number Line

Tutorials: http://www2.ccsd.ws/sbfaculty/team8e/jecole/Math/Graphing%20Points.htm

3) Evaluate the following absolute value problems.

a. |- 16.5 | b. - | 18 | c. - | -13 | d. | 8 - 17|

Operations with Integers

Tutorials: http://www.regentsprep.org/Regents/math/Albebra/AOP3/Smixed.htm

4) Evaluate the following using your knowledge of positive and negative numbers.

a. -13 + 18 = _____ b. (-6)(-2)(3) = _____
c. 8 - (-4) -19 = _____ d. 6 + (-2)(-6) = _____

e. $3(-2)(-1)(-1)(4) =$ _____

f. $-3 - 12 + (-8) =$ _____

g. $-8 - 3 + 10 =$ _____

h. $(-2/3)(3/5) + (1/2) =$ _____

i. $16 - 3(2) - 20 + 5 =$ _____

j. $\frac{-12 + 18a}{-6} =$ _____

Graphing Inequalities

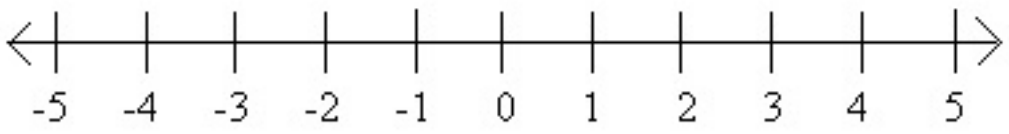
Tutorials: http://www.purplemath.com/modules/ineqlin.htm

http://www.onlinemathlearning.com/algebra-inequalities.html

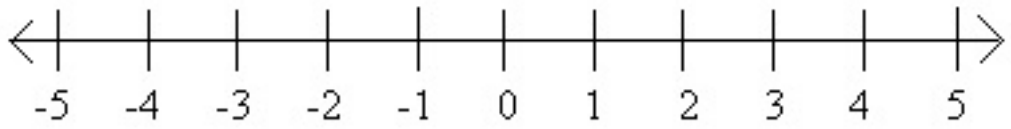
5) Graph each of the following inequalities on a number line.

Recall: Use an open or closed circle and the shade correctly.

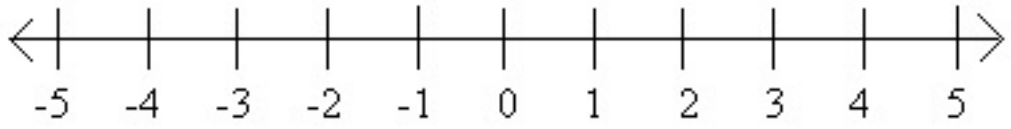
a) $x \leq 3$



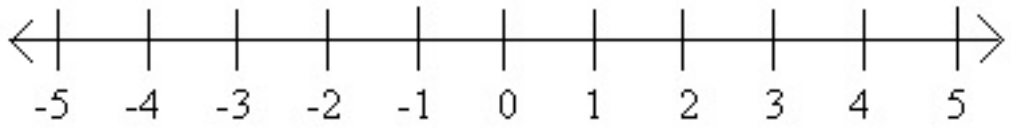
b. $x \geq -1$



c. $3x \geq 12$



d. $-5x > 10$



IV. Exponents

An exponent indicates how many times a base is used as a factor. For example,

$5^3 = 5 \bullet 5 \bullet 5 = 125$ and $2^4 = 2 \bullet 2 \bullet 2 \bullet 2 = 16$

When dealing with a variable, the same notation applies.

$x \bullet x \bullet x \bullet x \bullet x = x^5$

Operations with Exponents

1) When multiplying like bases, add the exponents

Example 1 $x^7 \bullet x^2 = x^9$ because the bases are the same base (x), you can add the exponents (7 + 2)

Example 2 $y^{11} \bullet y = y^{12}$ because the bases are the same base (y), you can add the exponents (11 + 1)

Example 3 $h^5 \bullet n^3 = h^5n^3$ because the bases are different, you must express the product of the two factors.

2) When raising a power to a power, you multiply the exponents.

Example 1 $\mathbf{(x^7)^2 = x^{14}}$ because $7 \bullet 2 = 14$

Example 2 $\mathbf{(y^3)^{11} = y^{33}}$ because $3 \bullet 11 = 33$

Tutorial:
http://www.regentsprep.org/Regents/math/ALGEBRA/AO5/PracExpShort.htm

1) Evaluate each of the following.

a) 4^3 b) 6^2 c) 10^4 d) 8^5

2) Simplify each of the following.

a) $x^4 \bullet x^{11}$ b) $n \bullet n^6$ c) $(c^5)^4$ d) $(m^2)^7$

V. Order of Operations (PEMDAS)

Parentheses- and other grouping symbols
Exponents
Multiplication & Division - in order from left to right
Addition & Subtraction- in order from left to right

Tutorial: http://www.math.com/school/subject2/lessons/S2U1L2GL.html

Simplify using order of operations. Show all work!

1) $24 \div 4 + 3^2$ 2) $13 + (3 \bullet 2)^2 - 8$ 3) $14 \div 7 \bullet 5 - 3^2$

4) $[\ 8 \bullet 2 - (3 + 9)] + [\ 8 \div 2 \bullet 3]$ 5) $5 + [\ 30 - (\ 6 - 1\ )^2\ ]$

Evaluate - find the value of an expression. To evaluate, replace the variable with the given number and simplify using order of operations. Show all work!

6) Evaluate $x^2 - 4x + 9$, when $x = -3$

7) Evaluate $g^2 - (h^3 - 4j)$ when $g = 7$, $h = 3$ and $j = -5$

8) Evaluate $\frac{20 - c}{b}$ when $b = 4$, and $c = -8$

9) Evaluate $\frac{2(5ab)}{c}$ when $a = 3$, $b = 2$, and $c = -12$

10) Evaluate $\frac{3y + x^2}{z}$ when $x = 6$, $y = 8$, and $z = 3$

VI. Simplifying Variable Expressions

Tutorials: Distributive Property

Video:
http://www.mathwarehouse.com/dictionary/D-words/distributive-property-definition-and-examples.php

Explanation:
http://www.algebrahelp.com/lessons/simplifying/distribution/

Combine Like Terms:
http://www.algebrahelp.com/lessons/simplifying/combiningliketerms/

Examples

1) 6x + 9y - 2x -12y

6x -2x +9y -12y organize like term (make sure to grab the sign in front of each term)

(6-2)x (+9 -12)y Combine like terms

4x - 3y

2) 7(8x + 3) Multiply both terms inside the parentheses by the outside multiplier.

$7 \bullet 8x + 7 \bullet 3$

$56x + 21$

Simplify each expression by distributing and combining like terms.

1) $4x + 7y - 14x + 2y$

2) $-13 - 4y - 5z + 15 - (-4z) + 11y$

3) $20xy + 3x^2 - 10x^2 - 30xy$

4) $5(x + 3)$

5) $7(4y - 8m)$

6) $-3(2x - 5y)$

7) $3(7x - 4) + 3x$

8) $9(6 + 2y) - 5 + 2y$

9) $2(3x -1) + 3(x + 7)$

10) $9(2x + 4) - 2(3x - 1)$

VII. Equations

Tutorials:

Lesson:

http://www.mathplayground.com/howto_solvevariable.html

Practice:
http://www.regentsprep.org/Regents/math/ALGEBRA/AE2/LSolvEq.htm

Interactive Practice:
http://www.coolmath.com/algebra/06-solving-equations/index.html

Solve and check each equation. (Show all work)

1. $y - 4 = 3$

2. $13 + b = 17$

3. $c + \frac{2}{3} = \frac{5}{6}$

4. $3x = 48$

5. $8a = -64$

6. $\frac{n}{9} = 5$

7. $\frac{3}{5}x = 12$

8. $\frac{1}{3}x = -8$

9. $3x + 4 = 4$

10. $6x - 3 = 21$

11. $7 = 9m - 47$

12. $\frac{x}{2} - 4 = 6$

13. $2(4x - 5) = 26$

14. $3(x + 4) + 2 = -10$

15. $-3(2x + 5) + 7 = 16$

VIII. Solve the following variety of algebra problems.

Interactive Practice: http://www.aaamath.com/pct61ax2.htm

Video: http://www.ehow.com/video_7155405_percent-number.html

1. What is 25% of 16?

2. 60 is 75% of what number?

3. 6 is what percent of 5?

4. The regular price of a television is $500. If it's on sale for 15% off, what's the sale price?

Use the rules of exponents to evaluate each expression if; x = 5, y = 10, z = -2.

1. $\frac{xz^2}{y^2}$

2. $7xy^5$

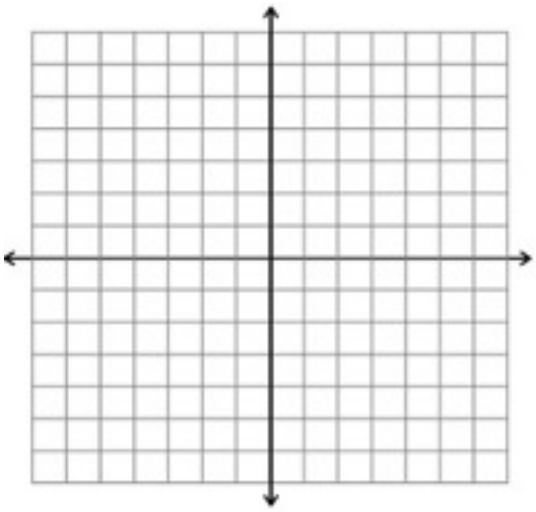
video:
http://www.virtualnerd.com/pre-algebra/factors-fractions-exponents/powers/exponent-examples/evaluate-exponents-expression-example

The temperature was 72° F and then it dropped 2° per hour for the next eight hours, use the table below to graph the line.

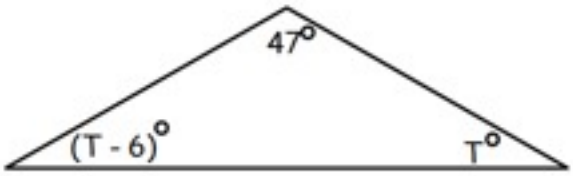
video: http://cstl.syr.edu/fipse/GraphA/Unit2/Unit2.html

Table

Time	Temperature
1	70
2	68
4	64
6	60
8	56

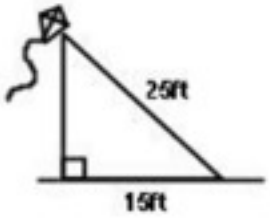


Write and solve an equation to find the value of T. (Note, the measures of interior angles of a triangle add to 180°.



Practice:
http://www.regentsprep.org/Regents/math/geometry/GP5/LIntAng.htm

The Pythagorean Theorem. Find the length of the missing side of the right triangle. (Note: $a^2 + b^2 = c^2$, where a and b are the legs of the triangle.)



What is the height of the kite in the diagram?

How long is the guy-wire?

Practice: http://www.mathsisfun.com/pythagoras.html

http://www.purplemath.com/modules/pythagthm.htm