In order to review the basic concepts prior to taking Algebra I, the mathematics department has prepared this review packet. The problems in this packet are designed to help you review topics from previous mathematics courses that are important to your success in Algebra I. Because these are review topics, you are responsible for completing the work before the first day of school. There are websites listed on the last page, so you can look up topics if needed. This packet is **required**, and you need to show all your work to receive credit. Your Algebra 1 teacher will not check for completion, but instead for **accuracy**. If you use notebook paper to solve, number the pages and keep them together, then attach them to your packet. Make sure your final answer is written in your packet.

Order of Operations

ORDER OF OPERATIONS

Key Concept	Order of Operations
Step 1	Evaluate expressions inside grouping symbols (parentheses (), brackets [ ], braces { }, and fraction bars)
Step 2	Evaluate powers (exponents).
Step 3	Do all multiplication and/or division from left to right
Step 4	Do all addition and/or subtraction from left to right

1) $14 \div 7 + 3^2$ 2) $42 \div 2(-12 + 9)$ 3) $\sqrt{49}$ 4) $|-14|$

5) $18 - 30 \div 5$ 6) $48 \div (5 + 7) - 9$ 7) $43 - 5(2) + 13$

Adding/Subtracting/Multiplying/Dividing Positive and Negative Numbers

Here's How:

1.   Adding Rules:

Positive + Positive = Positive: 5 + 4 = 9

Negative + Negative = Negative: (- 7) + (- 2) = - 9

Sum of a negative and a positive number:

Use the sign of the larger number and subtract

(- 7) + 4 = -3

6 + (-9) = - 3

(- 3) + 7 = 4

5 + (-3) = 2

2.   **Subtracting Rules:**

Negative - Positive = Negative: (- 5) - 3 = -5 + (-3) = -8

Positive - Negative = Positive + Positive = Positive: 5 - (-3) = 5 + 3 = 8

Negative - Negative = Negative + Positive = Use the sign of the larger number and subtract *(Change double negatives to a positive)*

(-5) - (-3) = (-5) + 3 = -2

(-3) - (-5) = (-3) + 5 = 2

3.   **Multiplying Rules:**

Positive x Positive = Positive: 3 x 2 = 6

Negative x Negative = Positive: (-2) x (-8) = 16

Negative x Positive = Negative: (-3) x 4 = -12

Positive x Negative = Negative: 3 x (-4) = -12

8) -2 + 11 − 7

9) 5 − 3 + 12 − (-9)

10) $\dfrac{-4}{\left(\dfrac{3}{4}\right)}$

11) (-2)(4)(-5)(-1)

12) -4 + -9 − 3(-6)

13) $\left(\dfrac{3}{5}\right)\left(-\dfrac{7}{12}\right)$

14) $\dfrac{3}{4}+\dfrac{1}{6}$

15) $2\dfrac{1}{3}-\dfrac{7}{9}$

16) $\left(\dfrac{2}{3}\right)\div\left(1\dfrac{5}{9}\right)$

Evaluating Expressions

- *Substitute the given value(s) of the variable(s).*
- *Use order of operations to find the value of the resulting numerical expression.*

Tutorials:

http://www.math.com/school/subject2/lessons/S2U2L3GL.html

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

17) 3(n − 1) + 2n, when n = 5

18) 7b − 2a, when a = -3 and b = 4

19) $3x^2 + 5x + 1$, when x = -2

20) $\dfrac{2r}{t} + 7$, when r = 12 and t = 3

21) $(3x)^2 - 7y^2$, when x = 3 and y = 2

22) $4(3d + 6) - 2d$, when d = -6

Solving Equations

Here is an example:

$3b + 2 = 6(3 - b)$	Check:
$3b + 2 = 18 - 6b$ $\underline{\quad -2 \qquad -2 \quad}$ $3b = 16 - 6b$ $\underline{+6b \qquad +6b \quad}$ $9b = 16$ $\overline{\;\;9\quad\;\;}\; \overline{9}$ $b = \dfrac{16}{9}$	Does $3(\dfrac{16}{9}) + 2 = 6(3 - (\dfrac{16}{9}))$? $\dfrac{16}{3} + 2 = 6(\dfrac{11}{9})$ $\dfrac{16}{3} + \dfrac{6}{3} = \dfrac{22}{3}$ $\dfrac{22}{3} = \dfrac{22}{3}$ ✓

Solve the equation. Include a check method to make sure you are correct.

23) $14 = b + 5$

24) $5r = 22$

25) $\dfrac{x}{4} = -9$

26) $3x - 5 = 13$

27) $\dfrac{1}{4}d + 2 = 3$

28) $-21 - 5x = 64$

29) $3y + 2y = 81 - 6$

30) $18y - 21 = 15y + 3$

31) $\dfrac{2a}{7} = \dfrac{2}{3}$

32) $2x - 10 + 2 = 12$

33) $3(y - 4) = -2y - 12$

34) $\dfrac{4x}{7} = \dfrac{6}{5}$

Properties

Match each equation on the left with the property it illustrates on the right.

35) 4 + (9 + 6) = (4 + 9) + 6   A.   Identity Property of Addition

36) x + 12 = 12 + x   B.   Associative Property

37) (3 + y) + 0 = 3 + y   C.   Distributive Property

38) x • 1 = x   D.   Identity Property of Multiplication

39) 5(x + y) = 5x + 5y   E.   Commutative Property

Distributive Property

Simplify each expression using the distributive property.
Example: 4(x + 5) = 4(x) + 4(5) = 4x + 20

40) 3(b + 9)   41)   5(2x – 3)   42)   -3(4x + 9)

43) x(2x + 4)   44)   ½(4r + 12)   45)   -(6p – 11)

Subsets of Real Numbers and Number Sense

46) List all the perfect squares between 1 and 250

47) What is the smallest prime number? The smallest composite number?

48) List 4 factors of 24. List 4 multiples of 24.

49) Are both 7 and –½ integers? Why or why not?

50) Are both 7 and –½ rational numbers? Why or why not?

51) Round 43.77301 to the nearest hundredth.

52) Round -5.1982569 to the nearest hundredth.

Simplifying Expressions

Simplify each expression by distributing and combining like terms.

Algebraic expressions can be simplified like the example above by Combining Like Terms. Consider the algebraic expression below:

$12x + 7 + 5x$

As you know, 12x and 5x are like terms. Therefore the coefficients, 12 and 5, can be added. This is a simple example of Combining Like Terms.

$17x + 7$

53) $4x + 7y − 14x + 2y$

54) $-13 − 4y − 5z + 15 − (-4z) + 11y$ 59) $9(2x + 4) − 2(3x − 1)$

55) $20xy + 3x^2y − 10x^2y − 30xy$

56) $-3(2x − 5y)$

57) $9(6 + 2y) − 5 + 2y$

58) $2(3x − 1) + 3(x + 7)$

Translating Expressions and Equations

Write an algebraic expression or equation to represent each verbal expression.

Example: 18 less than the quotient of a number and 3. → $\dfrac{n}{3} - 18$

60)   The sum of six times a number and 25

61)   7 less than fifteen times a number

63)   Four times the square of a number increased by five times the same number

64)   The sum of a number and 23 is 78.

65)   The sides of a rectangle are a number and 4 less than that same numbers. The perimeter is 56. Find the dimensions of the rectangle.

66)   If a number is decreased by 6, and the result is multiplied by 3, than the answer is 15. Find the unknown number.

Consecutive Number Problems

Give an equation that represents the phrase. Include checks for each problem.
An integer is a – or + whole number.

67) The sum of two consecutive integers is 61.

68) The sum of three consecutive even integers is 144.

69) Find two consecutive odd whole numbers whose sum is 2 less than 6 times the first number.

Word Problems

Write an equation to mode each word problem. Include let statements and checks for each problem.

70) Joelle had $24 to spend on seven pencils. After buying them she had $10. How much did each pencil cost?

Example:
Let x = cost per pencil

$7x + 10 = 24$
$\underline{ -10 \quad -10}$
$\dfrac{7x}{7} = \dfrac{14}{7}$
$x = 2$

Check:
Does $7(2) + 10 = 24$?
$14 + 10 = 24$
$24 = 24$

Each pencil cost 2 dollars.

71) Marla bought seven boxes. A week later half of all her boxes were destroyed in a fire. There are now only 22 boxes left. With how many did she start?

72) Coral spent half of her weekly allowance playing mini-golf. To earn more money her parents let her wash the car for $4. What is her weekly allowance if she ended with $12?

73) 331 students went on a field trip. Six buses were filled and 7 students traveled in cars. How many students were in each bus?

74) You bought a magazine for $5 and four erasers. You spent a total of $25. How much did each eraser cost?

75) Jacki won 40 super bouncy balls playing horseshoes at her school's game night. Later, she gave two to each of her friends. She only has 8 remaining. How many friends does she have?

Radicals (answers should be simplified to a whole number or it can have a root – but no decimals!)

76. $\sqrt{1000x^3}$

77. $\sqrt{20xy^2}$

78. $-\sqrt{144a^2}$

79. $\sqrt{27a^2}$

80. $3\sqrt{3} + 9\sqrt{3} - 4\sqrt{3}$

81. $2\sqrt{5} - 2\sqrt{36} + 3\sqrt{45}$

82. $8\sqrt{7} - 9\sqrt{7}$

83. $3\sqrt{11} + 2\sqrt{44} + \sqrt{11}$

Pythagorean Theorem

84. A ladder is leaning against the side of a 10m house. If the base of the ladder is 3m away from the house, how tall is the ladder? Round your answer to the nearest hundredth. **Please draw a diagram and show all work.**

85. A baseball diamond is a square with sides of 90 feet. What is the shortest distance, to the *nearest tenth* of a foot, between first base and third base? **Please draw a diagram and show all work.**

Here are some websites you might find useful in completing your summer assignment.

1. http://www.regentsprep.org – use the Math A site
2. http://www.math.com – use both Algebra and Pre-Algebra
3. http:// library.thinkqest.org
4. http://www.mathgoodies.com/lessons/toc_vol5.html – there are others on here, but this   is the integer site
5. http://www.teacherschoice.com.au/Maths_Library/Algebra/Alg_1.htm
6. http://education.jlab.org/solquiz
7. http://w3.fiu.edu/math/cine_math/fast/pie.htm -- solving equations
8. http://www.algebrahelp.com/worksheets/
9. http://www.math.com/homeworkhelp/Algebra.html
10. http://www.math.com/homeworkhelp/PreAlgebra.html
11. https://www.youtube.com/user/FortBendTutoring - has great videos that explain topics well