Luther Jackson Middle School  
Algebra 1 Honors Summer Mathematics Packet

Dear Students: The purpose of this packet is to review algebra concepts as you look forward to Algebra 1 Honors next year at Luther Jackson. Please show all your work for each problem. You may use a calculator for every section except part 1. This packet will be due the first week of school in September.

Part 1. Number Sense
You will find help on these topics at the following websites:

http://www.math.com/homeworkhelp/PreAlgebra.html

Order of Operations—Simplify each of the following mathematical expressions. These should be done without a calculator.

1)  $-14 ÷ 7 + 3^2$  
2)  $42 ÷ -2(-12 + 9)$  
3)  $\sqrt{49}$  
4)  $|14-8|$  
5)  $18 - 30 ÷ -5$  
6)  $48 ÷ (-5 + 7) - 9$  
7)  $-4^3 - 5(-2) + 13$

Adding/Subtracting/Multiplying/Dividing Positive and Negative Numbers-- This is also is done without a calculator.

8)  $-2 + \frac{7}{8} - 7$  
9)  $5 - 3 + 12 - 9$  
10)  $\frac{-4}{\frac{3}{4}}$  
11)  $(-2)(\frac{4}{5})(-5)(-1)$  
12)  $-4 + -9 -3(-6)$  
13)  $\left(\frac{3}{5}\right)\left(-\frac{7}{12}\right)$
Evaluating Expression—you may use a calculator on this.

14) \(3(n - 1) + 2n\), when \(n = -5\)

15) \(7b - 2a\), when \(a = -3\) and \(b = 4\)

16) \(3x^2 + 5x + 1\), when \(x = -2\)

17) \(\frac{2r}{t} + 7\), when \(r = -12\) and \(t = 3\)

18) \((3x)^2 - 7y^2\), when \(x = 3\) and \(y = -2\)

19) \(4(3d + 6) - 2d\), when \(d = -6\)

Part 2: Solving Equations & Inequalities
You will find help on these topics at the following websites:

http://www.math.com/homeworkhelp/Algebra.html

Here are some examples:

\[
\begin{array}{c|c|c}
-2y + 9 &= 7 \\
\hline
-9 & -9 \\
\hline
-2y &= -2 \\
\hline
-2 & -2 \\
\hline
y &= 1 \\
\hline
\end{array}
\]

\[
\begin{array}{c|c|c}
2x + 3 &= x + 10 \\
\hline
-3 & -3 \\
\hline
2x &= x + 7 \\
\hline
-x & -x \\
\hline
x &= 7 \\
\hline
\end{array}
\]

\[
\begin{array}{c|c|c}
3b + 2 &= 6(3 - b) \\
\hline
3b + 2 &= 18 - 6b \\
\hline
-2 & -2 \\
\hline
3b &= 16 - 6b \\
\hline
+6b & +6b \\
\hline
9b &= 16 \\
\hline
9 & 9 \\
\hline
b &= 16/9 \\
\hline
\end{array}
\]

Solve the equation or inequality.

20) \(3x - 5 = 13\)

21) \(\frac{1}{4}d + 2 = 3\)

22) \(-21 - 5x = 64\)
23) \(4x + 1 < 7x - 5\) \hspace{1cm} 24) \(4(-3x + 1) = -10(x - 4) - 14x\)

25) \(4(3x - 5) = -2(-x + 8)\) \hspace{1cm} 26) \(3y + 2y > 81 - 6\)

27) \(-18y - 21 < 15y + 3\) \hspace{1cm} 28) \(\frac{2a}{7} = \frac{2}{3}\)

29) \(2(x - 4) = 12\) \hspace{1cm} 30) \(3(y - 4) = -2y - 12\)

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**Properties**

Name the property that is illustrated.

31) \(4 + (9 + 6) = (4 + 9) + 6\) \hspace{1cm} ________________________

32) \(x + 12 = 12 + x\) \hspace{1cm} ________________________

33) \((3 + y) + 0 = 3 + y\) \hspace{1cm} ________________________

34) \(x \times 1 = x\) \hspace{1cm} ________________________

35) \(5(x + y) = 5x + 5y\) \hspace{1cm} ________________________
Distributive Property

Example: \(4(x + 5) = 4(x) + 4(5) = 4x + 20\)

36) \(-3(b + 9)\)  
37) \(5(2x - 3)\)  
38) \(-3(4x - 9)\)

39) \(-x(2x + 4)\)  
40) \(\frac{1}{2}(4r - 12)\)

Part 3. Patterns, Functions, and Algebra

41. Find the next three numbers in the pattern.

\[3, 7, 11, 15, 19, \quad \ldots, \quad \ldots, \quad \ldots\]

42. Find the next three numbers in the pattern.

\[1, 2, 4, 8, 16, \quad \ldots, \quad \ldots, \quad \ldots\]

Use the function tables given to find the function rule.

43. \[
\begin{array}{c|c}
   x & \ ? \\
   \hline
   4 & -12 \\
   5 & -15 \\
   6 & -18 \\
   7 & -21 \\
   8 & -24 \\
\end{array}
\]

44. \[
\begin{array}{c|c}
   x & \ ? \\
   \hline
   1 & 1 \\
   2 & 4 \\
   3 & 7 \\
   4 & 10 \\
   5 & 13 \\
\end{array}
\]

You may get help on these and other pre-algebra skills on the following websites.

1. [http://www.regentsprep.org](http://www.regentsprep.org) - use the Math A site
2. [http://www.math.com](http://www.math.com) - use both Algebra and Pre-Algebra
3. [http://library.thinkquest.org](http://library.thinkquest.org)
4. [http://www.mathgoodies.com/lessons/toc_vol5.html](http://www.mathgoodies.com/lessons/toc_vol5.html) - there are others on here, but this is the integer site