Luther Jackson Middle School  
Algebra 1 Summer Mathematics Packet

Dear Students: The purpose of this packet is to review algebra concepts as you look forward to Algebra 1 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) $14 \div 7 + 3^2$  
2) $42 \div 2(-12 + 9)$  
3) $\sqrt{49}$  
4) $|-14|$

5) $18 - 30 \div 5$  
6) $48 \div (5 + 7) - 9$  
7) $4^3 - 5(2) + 13$

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

8) $-2 + 11 - 7$  
9) $5 - 3 + 12 - 9$  
10) $\frac{-4}{\frac{3}{4}}$

11) $(-2)(4)(-5)(-1)$  
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
You will find help on these topics at the following websites:

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

Here are some examples:

<table>
<thead>
<tr>
<th>(-2y + 9 = 7)</th>
<th>(2x + 3 = x + 10)</th>
<th>(3b + 2 = 6(3 - b))</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-9)</td>
<td>(-3)</td>
<td>(-2)</td>
</tr>
<tr>
<td>(-2y = -2)</td>
<td>(2x = x + 7)</td>
<td>(3b = 16 - 6b)</td>
</tr>
<tr>
<td>(-2)</td>
<td>(-x)</td>
<td>(+6b)</td>
</tr>
<tr>
<td>(y = 1)</td>
<td>(x = 7)</td>
<td>(+6b)</td>
</tr>
<tr>
<td>(9b = 16)</td>
<td>(9)</td>
<td>(b = 16/9)</td>
</tr>
</tbody>
</table>

Solve the equation.

20) \(14 = b + 5\) 

21) \(5r = 22\) 

22) \(\frac{x}{4} = -9\)
23) $3x - 5 = 13$

24) $\frac{1}{4}a + 2 = 3$

25) $-21 - 5x = 64$

26) $3y + 2y = 81 - 6$

27) $18y - 21 = 15y + 3$

28) $\frac{2a}{7} = \frac{2}{3}$

29) $2(x - 4) = 12$

30) $3(y - 4) = -2y - 12$

**Properties**

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

31) $4 + (9 + 6) = (4 + 9) + 6$  
   A. Identity property of multiplication

32) $x + 12 = 12 + x$  
   B. Associative property of addition

33) If $a = b$ and $b = c$ then $a = c$.  
   C. Distributive Property

34) $x \times 1 = x$  
   D. Transitive Property

35) $5(x + y) = 5x + 5y$  
   E. Commutative property of addition

**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.

\[3, 7, 11, 15, 19, ____ , ____ , ____ \]

42. Find the next three numbers in the pattern.

\[1, 2, 4, 8, 16, ____ , ____ , ____ \]

Use the function tables given to find the function rule.

43.

<table>
<thead>
<tr>
<th>(x)</th>
<th>?</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>-12</td>
</tr>
<tr>
<td>5</td>
<td>-15</td>
</tr>
<tr>
<td>6</td>
<td>-18</td>
</tr>
<tr>
<td>7</td>
<td>-21</td>
</tr>
<tr>
<td>8</td>
<td>-24</td>
</tr>
</tbody>
</table>

Graph questions 44-50 on graph paper.

44. Graph \(y = 2x - 4\) using an input output table or by the "shortcut" method of SLOPE Intercept form. (You can look up slope intercept form on the internet.)

45. Graph \(2y = -4x + 8\) using an input output table or by the "shortcut" method of SLOPE Intercept form.

46. Graph \(y = \frac{1}{2}x\) using an input output table or by the "shortcut" method of SLOPE Intercept form.

48. Graph \(y = 2x - 2\)
49. Graph \( y = -2x - 2 \)

50. Compare your graphs from 48 and 50. What do they have in common and what is different?

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

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