NCLS Math Program Evaluation Test for Algebra 1B

Name: _____   **Grade:** _____

Instruction: this diagnostic test consists of two parts, **Fundamentals** and **Problem Solving**. The student should attempt all of the questions below without a calculator and without any help. There is no time limit.

Fundamentals

1. **Solving Linear Equations**. Solve each of the following:

(a) $3x - 7 = 9 - x$ 3x

(b) $\frac{7-2r}{3} = 4r$

2. **Proportion**.

(a) If x and y are directly proportional and x = 8 when y = 20, then what is y when x = 40?

(b) If x and y are inversely proportional and x = 8 when y = 20, then what is y when x = 40?

3. **Systems of Equations**.

(a) Find all values of r and s such that $r - s = 5$ and $3r - 5s = 9$ 3r.

(b) Find all values of p and q such that $3p + 7q = 1$ and $5p = 14q + 53$.

4. **Graphing Lines**.

(a) What is the slope of the line through (3, 4) and (-1, 3)?

(b) What is the slope of the graph of $3x - 4y = 7$?

(c) Find the slope-intercept form of the equation of the line through (5, -2) and (-1, 6).

5. **Introductory Quadratics**. Find all solutions to the following equations:

(a) $4x^2 = 81$

(b) $x^2 + 8x + 12 = 0$

(c) $x^2 - 3x - 88 = 0$

Problem Solving

6. A box containing 3 oranges, 2 apples, and one banana weighs 15 units. Another box containing 5 oranges, 7 apples, and 2 bananas weighs 44 units. A third box containing 1 orange, 3 apples, and 5 bananas weighs 26 units. How much does each fruit weigh?

7. Find z if $\dfrac{3}{1-\frac{2}{z}} = 3z.$

8. At a certain time, Janice notices that her digital watch reads *a* minutes after two o'clock. Fifteen minutes later, it reads *b* minutes after three o'clock. She is amused to note that *a* is six times the value of *b*. What time was it when she looked at her watch for the second time?

9. Calvin and Susie are running for class president. Of the first 80% of the ballots that are counted, Susie receives 53% of the votes and Calvin receives 47%. At least what percentage of the remaining votes must Calvin receive to catch up to Susie in the election?

10. The golden ratio is the largest number *g* such that $\dfrac{g}{1+g} = \dfrac{1}{g}.$ Find $g(g-1).$

11. A line passing through the points $(2a+2, 3a^2)$ and $(3a+4, 5a^2)$ has slope $a+3.$ Find all possible values of $a.$

12. Describe all values of x that satisfy $7 - 3x < x - 1 \le 2x + 9.$