NCLS Math Program Evaluation Test for Algebra 2A

Name: **Grade:**

Are You Ready for Algebra 2A?

If you have mastered working with proportions, multiplying simple algebraic expressions, simple functions and basic linear equations as illustrated in the problems below, you are ready for this class.

1. **Algebraic Expressions.** Simplify each of the following expressions:

   (a) $3x + 8x$
   (b) $(4y - 7) - 3(10y - 39)$
   (c) $(2x + 1)(3x + 4)$
   (d) $(x + y)^3$

2. **Linear Equations.** Solve each of the following linear equations:

   (a) $x + 12 = 20$
   (b) $3x = 36$
   (c) $4y + 9 = -17$
   (d) $-14x + 47 = 8x - 84$

3. **Factoring.** Factor each of the following expressions:

   (a) $x^2 - 7x + 10$
   (b) $x^2y + 5xy - 36y$
   (c) $x^3 - 6x^2 + 11x - 6$
   (d) $x^3 - x^2 + x - 1$

4. **Means, Medians, and Modes**

   (a) What are the mean, median, and mode of the numbers 4, 5, 7, 7, and 7?
   (b) If the sum of 10 numbers is 90, what is the mean of the 10 numbers?
   (c) Jen scores an 88 on her midterm. Out of the 14 other students in her class, 7 of them scored lower than she did. What was the median of the class midterm scores?

5. **Proportions.** Evaluate each of the following problems involving proportionality:

(a) If x and y are directly proportional and x = 5 when y = 30, what is y when x is 30?
(b) If x and y are inversely proportional, what happens to x when y is increased by 25%?
(c) If x and $y^2$are inversely proportional and x = 4 when y = 4, what is the value of x when y = ½?

6. **Quadratic Equations.** Solve each of the following quadratic equations:

(a) $x^2 - 5x + 6 = 0$
(b) $x^2 + 2x - 24 = 0$
(c) $6x^2 - 13x + 6 = 0$
(d) $x^2 + 6x + 13 = 0$
(e) $x^2 + x + 1 = 0$

7. Functions

(a) If $f(x) = x^2 + 6x + 18$, for what value(s) of x does $f(x) = 9$?
(b) If $f(x) = 2f(x-1)$ for all integers x, and $f(n) = 3$ for some integer n, find the value of $[f(n-5)][f(n+5)]$.
(c) If $f(x) = 3x(2^x)$, how many times does the graph of $f(x)$ cross the x-axis?
(d) If $f(x) + f(2-x) = 4$ for all x, find $f(y-2) + f(4-y)$.

8. Formulae Rewriting

(a) Given $\frac{1}{z} = \frac{1}{x} + \frac{1}{y}$, make x the subject.
(b) If $p(q-t) = q\text{^}2(p-t)$, use p and q to represent t.

9. **Graphing**. Graph the following linear function:

(a) $y = 3x + \frac{7}{3}$
(b) $4x + 5y = 7$
(c) $y = |x + 2|$