Skills Covered in Math Placement Tests

Most students new to MUS typically take one of the following three tests to determine the most suitable placement in a math class for the coming year.

I. Evaluation of Arithmetic Skills
(for all interested entering seventh graders who have NOT yet completed Algebra I):

Based on test performance, the student will be placed in regular Pre-Algebra, Honors Accelerated Pre-Algebra, or Honors Accelerated Algebra I. Rising seventh-graders who already plan to take regular Pre-Algebra and are not interested in one of the two accelerated classes need not take a placement test.

Skills covered: This test is designed to determine a student’s ability to think mathematically and to use mathematical thinking to solve problems. All questions can be answered using arithmetic skills. Mastery of operations involving whole numbers, fractions, integers, percent, and exponents is expected. Ninety minutes will be allotted for completion of the test, and no calculator may be used.

II. Evaluation of Pre-Algebra Skills
(for all new students entering eighth grade or above who have NOT yet completed Algebra I):

Based on test performance, the student will be placed in Algebra I-A, Honors Algebra I, or Honors Accelerated Algebra I.

Skills covered:

• Addition, subtraction, multiplication, division of integers, rational numbers including mixed numbers.

  Example: Evaluate \(-3\frac{2}{5} + 7\frac{1}{9}\).

• Evaluating and simplifying variable expressions including the distributive property

  Example: Simplify completely \(8(5a - 4n + 3p) - 4(6p - 8n + 11a)\).

• Order of operations

  Example: Simplify \((8+5)*35/5+6\).

• Converting between percent, fractions and decimals
Example: Give decimal and percent for this number \( \frac{5}{8} \)

- Finding greatest common factor and least common multiple

Example: Find the GCF and LCM for these terms. \( 7xy, 8x^3y^2, 10a^4 \)

- Exponents including powers of products and quotients

Example: Compute \( (a^2b)^5 \).

- Proportional reasoning

Example: Solve for \( x \) in the following equation. \( \frac{2x + 3}{4x} = \frac{3}{4} \).

- Solving multi-step equations

Example: Solve for \( x \) in the following equation. \( \frac{1}{2}(4x - 2) = x + 5 \)

**III. Evaluation of Algebra I Skills**

(for all new students entering seventh or above who HAVE completed Algebra I):

Based on test performance, the student will be placed in Algebra I-B, Honors Algebra I, Honors Geometry, Honors Accelerated Geometry, or (if the student has already completed Geometry) Honors Algebra II.

Skills covered:

- Simplify algebraic expression

Example: Simplify \( 7(13x + 2x - 4x) + 2(6x - 3 + 7x) \).

- Solve linear equations

Example: Solve for \( n \) in the equation \( \frac{5}{3n + 5} = \frac{5}{5n - 2} \).
• Solve systems of two equations with two unknowns (substitution method and addition or subtraction method)

Example: Solve the following system of equations for x and y.

\[ \begin{align*}
3x + 5y &= 7 \\
x + 2y &= 1
\end{align*} \]

• Factor expressions completely

Example: Completely factor the expression \( 25x^2 - 30xy + 9y^2 \).

• Find equations of lines by both point/slope method and given two points

Example: Find the equation of the line that passes through (-2,-2) and has a slope of \( \frac{-3}{4} \).

• Find the slope of a line given two points

Example: Find the slope of the line that contains the points (5, -3) and (7, 2).

• Simplify radical expressions

Example: Simplify the expression \( \frac{5}{3 - \sqrt{2}} \) by rationalizing the denominator.

• Solve a quadratic equation by factoring or using the quadratic formula

Example: Solve the equation \( 4y^2 - 4y = 7 \) for y.

• Simplify rational expressions

Example: Simplify the expression \( \frac{x^2 - x - 20}{2x^2 - 13x + 15} \).

• Word problems solved with linear equations

NOTE: Math placement at a higher level than Algebra II will usually be based on the student’s transcript record and other relevant factors, rather than or in addition to a placement test, as the situation warrants.