A student deemed to be Elementary Algebra Proficient will not be required to retake elementary algebra whether they remain in the associate degree program at their CUNY college or transfer to another CUNY associate degree program. This student will be eligible to take an appropriate credit math course in any associate degree program.

**NOTE:** Students who are STEM majors or need college algebra or precalculus may be required to take a non-credit intermediate algebra course in some associate degree programs.

### Definition of Elementary Algebra Proficiency

Students needing mathematics remediation who are in an associate degree program, whether at a community college or a comprehensive CUNY college, will be considered Elementary Algebra Proficient if they pass* an elementary algebra course or equivalent or workshop or immersion program with the equivalent of a grade of C or better (C is defined as 74 – 76).

**NOTE:** Some students may also need to take and pass an arithmetic course before taking elementary algebra; each college will determine its own criteria for exit from arithmetic.

*To pass elementary algebra (or equivalent course or workshop or immersion program) with a grade of C or better a student must:

- Pass a CUNY-wide uniform final exam (database or actual exam to be supplied by CUNY Central) with a grade of 60 or better

  **AND**

- Have an overall average of at least 74 (equivalent to a grade of C) in the course, where the CUNY-wide uniform final exam must count exactly 35% of the course average.

**Note:** If a student is in an equivalent course or workshop or immersion program where the only assessment is the uniform final, the student MUST score at least a 74 on the uniform final to pass (must answer 19 of 25 questions correctly on the uniform final exam).
Structure of the Uniform Final Exam in Elementary Algebra

- 25 multiple choice questions (4 choices each) generated algorithmically from a central CUNY database.
- The exam may be given on a computer or in paper and pencil form.
- Students will have 100 minutes to complete the exam.
- No calculators will be allowed on the exam. (The Math Panel therefore recommends that no calculators be allowed in remedial mathematics classes needed to prepare for Elementary Algebra Proficiency.)
- The content of the exam is based on the topics listed on pages 3 – 5 of this document.

Post-Course Intervention (Optional)
Students who score 56 on the uniform final and have a class average of at least 84 (the class average does not include the uniform final exam) may be given one intervention and then retake the final exam once without reenrolling in the course.

Structure:
- The intervention must be at least 20 hours.
- The intervention must be completed and the uniform final retaken immediately after the student took the course and before the next semester begins.
- Students scoring 60 or better on the uniform final exam will be given a passing grade in the course.

Uniform Final Exam Topics/Learning Objectives Follow on Pages 3 – 5
CUNY Elementary Algebra Proficiency Standards Details
As amended 3/30/2012

One goal of the Math Panel was to improve the alignment of math standards with the DOE (Department of Education). Therefore, in constructing this document we took into consideration the Integrated Algebra standards. The letters and numbers in parentheses correspond to the corresponding statements from the Integrated Algebra details by Strand. An asterisk (*) indicates the statement was modified to reflect a significant difference.

**Pre-Algebra Prerequisites.** These are assumed foundations.

a) Perform the four basic binary operations with rational numbers represented as fractions or decimals including signed numbers.
b) Understand and determine the order relations <, >, = of real numbers.
c) Properly apply the order of operations (only whole number exponents).
d) Understand how to compute the absolute value of real numbers.
e) Find the areas and/or perimeters of polygons (triangles, rectangles, squares, trapezoids) and circles.

**TOPICS/LEARNING OBJECTIVES THAT WILL BE TESTED ON THE UNIFORM FINAL EXAM**

These topics are *not* sequentially ordered according to dependencies or suggested sequencing.

1) Operations

   a. Radicals. Includes only square roots of nonnegative *numbers*.
      i. Simplify radical terms (no variable in the radicand). (AN2)
      ii. Perform addition, subtraction, multiplication and division using like and unlike radical terms and express the result in simplest form. (AN3*)
         1. Multiplication should involve at most one factor of the form $a + b\sqrt{d}$ with $a \neq 0$.
         2. All divisors and denominators should be of the form $a + b\sqrt{d}$ with $a = 0$.
   b. Scientific Notation
      i. Convert between standard decimal and scientific notation.
      ii. Understand and use scientific notation to compute products and quotients of numbers. (AN4)
   c. Exponents. Multiply and divide monomial expressions with a common base using the properties of exponents. All exponents are integral. (AA12)

2) Variables and Expressions

   a. Translate a quantitative verbal phrase into an algebraic expression. (AA1)
   b. Add and subtract monomials and polynomials. (AA13*)
c. Multiplication of a monomial and binomial by any degree polynomial. (AA13*)
d. Divide a polynomial by a monomial, where the quotient has no remainder. (AA14*)
e. Factoring
   i. Identify and factor the greatest common factor from an algebraic expression.
   ii. Identify and factor the difference of two perfect squares. (AA19)
   iii. Factor all trinomials of a single variable, including a leading coefficient other than 1.
   iv. Factor algebraic expressions by grouping with up to 4 terms, possibly with multiple variables.
   v. Factor algebraic expressions completely where the factorization requires more than one step (e.g. first remove the GCF and then factor the remaining factor). (AA20*)

3) Equations and Inequalities
a. Translate verbal sentences into mathematical equations. (AA4)
b. Solve all types of linear equations in one variable. (AA22)
c. Systems of Linear Equations (2x2) †
   i. Solve systems of two linear equations in two variables algebraically. (AA10)
   ii. Graph and solve systems of linear equations with rational coefficients in two variables. (AG7*)
† Note: On a multiple choice exam it is impossible to impose a solution method on students. As a result, we will combine these two objectives into a single test item and assume students may use either method when answering the question.

d. Solve literal equations for a given variable. (AA23) (Area and perimeter formulas should be included as one source of examples.)
e. Quadratic Equations:
   i. Understand and apply the multiplication property of zero to solve quadratic equations with integral coefficients. (AA27*)
   ii. Solve quadratic equations with no linear term.
   iii. Determine the measure of a third side of a right triangle using the Pythagorean Theorem, given the lengths of any two sides. (AA45)
f. Linear inequalities in a single variable
   i. Solve linear inequalities in one variable. (AA24)
   ii. Represent solutions to linear inequalities as a single inequality.
iii. Represent the solution to a linear inequality in one variable on a number line.

4) Functions and functional notation. This is an introduction to basic notational representation and should not include any explicit discussion of functions vs. relations, domain, range and vertical line test, etc.
   a. Use function notation to compute a single output for simple linear and quadratic relationships.

5) Coordinate Geometry
   a. Slope and equations of a line
      i. Determine the slope of a line, given the coordinates of two points on the line. (AA33)
      ii. Write the equation of a line, given its slope and the coordinates of a point on the line. (AA34)
      iii. Write the equation of a line, given the coordinates of two points on the line. (AA35)
      iv. Write the equation of a line parallel to the x- or y-axis. (AA36)
      v. Determine the slope and y-intercept of a line, given its equation in any form. (AA37*)
      vi. Write and transform equations of lines in the following forms
          1. Point-Slope form
          2. Slope Intercept form
          3. $Ax + By = C$ form
   b. Draw and recognize graphs of lines.

6) Proportions and percent
   a. Solve simple verbal problem with two quantities that are proportional.
   b. Solve simple verbal problem involving a single percent and/or a single percent increase/decrease.