

CUNY Elementary Algebra Final Exam Learning Objectives Summer 2016 Revision

This document lists the revised Elementary Algebra learning objectives tested on the CUNY Elementary Algebra Final Exam (CEAFE). These learning objectives will be effective beginning with the Summer 2016 CEAFE administration. For a summary of changes, see the last section of this document.

To articulate the alignment between the CEAFE Learning Objectives and New York State mathematics standards, most objectives are followed by letters and numbers in parentheses. The letters and numbers in parentheses correspond to statements from the New York State 2005 Integrated Algebra Learning Standards for Mathematics. An asterisk (*) indicates that the statement is significantly modified.

Learning objectives tested on the CUNY Elementary Algebra Final Exam (CEAFE)

1) Operations

- a. Radicals. Includes only square roots of nonnegative *integers*.
 - 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 involves at most one factor of the form $a + b\sqrt{d}$ with $a \neq 0$ ($a, b,$ and $d > 1$ are integers).
 2. All divisors and denominators are of the form $b\sqrt{d}$ (b and $d > 1$ are integers).
- b. 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*)
- f. Evaluate an expression given the value of all variables.

3) Equations and Inequalities

- a. Translate verbal sentences into mathematical equations. (AA4)
- b. Solve all types of linear equations in one variable. (AA22)
- c. Solve systems of two linear equations in two variables algebraically. (AA10)
- d. Solve literal equations for a given variable. (AA23)

- e. Quadratic Equations
 - i. Understand and apply the multiplication property of zero to solve quadratic equations with integral coefficients. (AA27*)
 - ii. 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) Coordinate Geometry. Slope and equations of a line
- a. Determine the slope of a line, given the coordinates of two points on the line. (AA33)
 - b. Write the equation of a line, given its slope and the coordinates of a point on the line. (AA34)
 - c. Write the equation of a line, given the coordinates of two points on the line. (AA35)
 - d. Write the equation of a line parallel to the x - or y -axis. (AA36)
 - e. Determine the slope and y -intercept of a line, given its equation in any form. (AA37)
 - f. Write and transform equations of lines in the following forms
 - i. Slope Intercept form
 - ii. $Ax + By = C$ form
 - g. Determine the slope of a line, given its graph.
 - h. Draw and recognize the graph of a line given its equation in any form.

Summary of CEAFE changes (Effective Summer 2016)

The CEAFE *now* requires students to

- Evaluate an expression given the value of two variables rather than to evaluate function notation.
- Solve a linear equation in one variable with fractions.
- Determine the slope of a line, given its graph.

The CEAFE *no longer* has items on

- scientific notation
- percents
- proportions