

**TITLE 135  
PROCEDURAL RULE**

**WEST VIRGINIA COUNCIL FOR COMMUNITY AND TECHNICAL COLLEGE  
EDUCATION**

**SERIES 41  
COMMUNITY AND TECHNICAL COLLEGE DEVELOPMENTAL EDUCATION  
COMPETENCIES**

**§135-41-1. General.**

- 1.1. Scope – This policy identifies the competencies in reading, writing and mathematics that serve as the framework for the developmental education curriculum in the member institutions of the West Virginia Community and Technical College System.
- 1.2. Authority – West Virginia Code §18B-2B-6
- 1.3. Filing Date – April 5, 2013
- 1.4. Effective Date – May 5, 2013

**§135-41-2. Policy.**

- 2.1. The institutions of the West Virginia Community and Technical College System (WVCTCS) agree on the following competencies in reading, writing and mathematics as being required for success in college-level courses in writing and mathematics.
- 2.2. Degree or certificate-seeking students entering a community and technical college shall demonstrate mastery of the basic competencies in reading, writing, and mathematics required for success in their chosen program of study (major) through the administration of a system-approved diagnostic exam.
- 2.3. Students failing to demonstrate such mastery shall receive developmental instruction and/or the additional academic support services necessary to master the competencies required for success in their chosen program of study.
- 2.4. To reduce the time required to complete the certificate or associate degree requirements, students shall be required to complete only those developmental courses, course modules, co-curricular paired courses, or other remedial programs that address their specific deficiencies as identified through the administration of the approved diagnostic exam.

**§135-41-3. Reading Competencies.**

- 3.1. Demonstrate active reading strategies.
  - 3.1.1. Skills: pre-read, read, review, outline and take notes.

- 3.2. Increase vocabulary development and word analysis strategies.
  - 3.2.1. Skills: ability to use dictionary and thesaurus; understand and recognize word-parts and context clues; and create and use graphic organizer.
- 3.3. Demonstrate literal reading skills (understanding what is stated).
  - 3.3.1. Comprehension skills: identify main idea and supporting details; distinguish fact versus fiction; identifying patterns of order.
- 3.4. Demonstrate interpretive reading skills (understanding what is implied rather than what is stated).
  - 3.4.1. Comprehension skills: make inferences and draw conclusions and able to read visual aids
- 3.5. Demonstrate critical reading skills (applying concepts and ideas).
  - 3.5.1. Comprehension skills: analyze and synthesize ideas; identify purpose and tone, and summarize in your own words.

**§135-41-4. Writing Competencies.**

- 4.1. Produce effective written communication appropriate for audience and purpose using a writing process demonstrating the skills of pre-writing, drafting, revising, and editing.
  - 4.1.1. Skills: Demonstrate pre-writing, drafting, revising, editing
- 4.2. Construct grammatically correct sentences demonstrating effective use of Standard Written English.
- 4.3. Demonstrate a clear flow of ideas from sentence to sentence and paragraph to paragraph.
  - 4.3.1. Skills: Demonstrate the use of transitions, logical progression of idea
- 4.4. Write developed paragraph(s) with topic sentence(s) appropriate supporting details.
- 4.5. Construct expository essays with an introduction, thesis, body, and conclusion.

**§135-41-5. Mathematics Competencies.**

- 5.1. The following competencies/skills are required of students entering college-level math courses which are necessary for success in general or liberal arts math courses.
  - 5.1.1. Whole numbers and integers
    - Add, subtract, multiply and divide whole numbers (including understanding place value, estimation, rounding)
    - Write and evaluate exponential expressions
    - Simplify arithmetic expressions using order of operations
    - Graph integers on a number line

- Add, subtract, multiply and divide integers
  - Demonstrate understanding of absolute value
- 5.1.2. Fractions and Connections
- Find prime factors of a number
  - Add, subtract, multiply and divide signed fractions (including mixed) and decimals
  - Connect fractions, decimals and percent
  - Represent a ratio as a fraction
  - Write and solve proportions
  - Solve problems involving percentages
  - Use unit ratios to convert between units of measure (time, linear measures, etc.)
- 5.1.3. Linear Equations and Inequalities
- Understanding the meaning of “variable” and evaluate algebraic expressions containing variables
  - Use properties to simplify algebraic expressions
  - Understand the difference between simplifying an expression and solving an equation
  - Solve equations using the addition and multiplication principles, including multi-step equations
  - Solve equations by removing parentheses and combining like terms
  - Solve equations by clearing fractions
  - Evaluate formulas and solve a formula for a specified variable
  - Solve applied problems by identifying a variable, writing an equation, solving and checking
  - Solve varied types of application problems including geometric applications
  - Solve linear inequalities in one variable and graph the solution on a number line
- 5.1.4. Exponents and Polynomials
- Evaluate expressions containing exponents
  - Use the rules of exponents to simplify expressions
  - Convert between scientific notation and decimal notation
  - Multiply and divide using scientific notation
  - Evaluate a polynomial for a given value of the variable(s)
  - Identify terms, like terms, coefficients and degree of a polynomial
  - Simplify polynomials by combining like terms
- 5.1.5. Graphing
- Determine whether an ordered pair is a solution of a linear equation
  - Graph linear equations of the forms  $y=mx+b$ ,  $Ax+By=C$ ,  $x=a$  and  $y=b$
  - Find the intercepts of a linear equation
  - Find the slope of a line given two points
  - Find the slope of a line from an equation
  - Identify the slope as the rate of change in an applied problem
- 5.1.6. Roots and Radicals
- Use the Pythagorean Theorem

5.2. In addition to the competencies identified in Section 5.1, additional math competencies are required of students entering programs of study (majors) in the areas of science, technology, engineering, or math.

5.2.1. Exponents and Polynomials

- Add, subtract and multiply polynomials
- Find special products of binomials
- Divide a polynomial by a monomial

5.2.2. Factoring

- Factor the greatest common factor from the terms of a polynomial
- Factor by grouping
- Factor trinomials in the form  $x^2 + bx + c$
- Factor trinomials in the form  $ax^2 + bx + c$ ,  $a \neq 1$
- Factor trinomial squares and differences of squares
- Solve quadratic equations by factoring
- Solve quadratic equations by the quadratic formula (using calculator to estimate radical, if necessary)
- Solve applied problems involving quadratic equations

5.2.3. Graphing

- Write the equation of a line given the slope and y-intercept, slope and a point on the line, or two points on the line
- Determine whether two lines are parallel or perpendicular by comparing their slopes
- Identify the domain and range of a function
- Use functional notation and evaluate functions

5.2.4. System of Equations

- Determine whether an ordered pair is a solution to a system of equations
- Solve systems of two linear equations by graphing, substitution and elimination
- Solve applied problems using systems of equations

5.3. In addition to the competencies listed in sections 5.1 and 5.2, the following competencies are required of students entering programs of study (majors) which require math courses in College Algebra or higher.

5.3.1. Rational Equations

- Simplify rational expressions
- Identify values for which rational expressions are undefined
- Multiply and divide rational expressions
- Find the least common denominator for rational expressions
- Add and subtract rational expressions
- Simplify complex fractions
- Solve rational equations

5.3.2. Roots and Radicals

- Differentiate between rational, irrational and imaginary roots
- Use the radical product rule and quotient rules
- Add and subtract radical expressions
- Simplify radical expressions
- Solve radical equations

### 5.3.3. Quadratics

- Use the quadratic formula to solve quadratic equations
- Graph quadratic equations and identify intercepts

### 5.3.4. Additional intermediate algebra competencies required include:

- Use set builder notation, roster form and Venn diagrams to describe the union and intersection of sets
- Simplify complex fractions and complex algebraic functions
- Solve equations and inequalities containing rational expressions
- Graph the solutions for inequalities containing rational expressions
- Factoring Cubes
- Use the square root property of equality to solve quadratic equations
- Solve quadratic equations by completing the Square
- Evaluate cube roots
- Simplify cube roots
- Rationalize denominators of fractional expression and radicals
- Understand the meaning of nth root
- Evaluate expressions with fractional exponents
- Perform arithmetic operations with radical expressions
- Evaluate and graph radical function
- Simplify expressions using the properties of rational exponents
- Determine the domain and range of radical and rational functions
- Perform operations on complex numbers
- Identify the real and imaginary parts of complex numbers
- Simplify square roots of negative numbers
- Solve equations that contain one or more radical expressions
- Divide polynomials by polynomials
- Use synthetic division find roots (zeros) of polynomials