INTERMEDIATE ALGEBRA CURRICULUM FRAMEWORKS

ALGEBRA (encompasses 45-52% of MCA test items) (from Grade 8 standards)		
Standard 1: Understand the concept of function in real-world and mathematical situations, and distinguish between linear and nonlinear functions.		
Curriculum Benchmark	**MCA III Test Item Specifications**	**Notes**
Understand that a function is a relationship between an independent variable and a dependent variable in which the value of the independent variable determines the value of the dependent variable. Use functional notation, such as f(x), to represent such relationships. (8.2.1.1) For example: The relationship between the area of a square and the side length can be expressed as $f(x) = x^2$. In this case, $f(5) = 25$, which represents the fact that a square of side length 5 units has area 25 units squared.	• Vocabulary allowed in items: independent, dependent, constant, coefficient, and vocabulary given at previous grades	
Use linear functions to represent relationships in which changing the input variable by some amount leads to a change in the output variable that is a constant times that amount. (8.2.1.2) For example: Uncle Jim gave Emily $50 on the day she was born and $25 on each birthday after that. The function $f(x) = 50 + 25x$ represents the amount of money Jim has given after x years. The rate of change is $25 per year.	• Vocabulary allowed in items: independent, dependent, constant, coefficient, and vocabulary given at previous grades	

INTERMEDIATE ALGEBRA CURRICULUM FRAMEWORKS

ALGEBRA (encompasses 45-52% of MCA test items) (from Grade 8 standards) (continued)		
Standard 2: Recognize linear functions in real-world and mathematical situations; represent linear functions and other functions with tables, verbal descriptions, symbols and graphs; solve problems involving these functions and explain results in the original context.		
Curriculum Benchmark	**MCA III Test Item Specifications**	**Notes**
Represent linear functions with tables, verbal descriptions, symbols, equations and graphs; translate from one representation to another. (8.2.2.1)	• Vocabulary allowed in items: linear function, and vocabulary given at previous grades	
Identify graphical properties of linear functions including slopes and intercepts. Know that the slope equals the rate of change, and that the y-intercept is zero when the function represents a proportional relationship. (8.2.2.2)	• Coordinates used for determining slope must contain integer values • Vocabulary allowed in items: linear function, intercept, and vocabulary given at previous grades	
Identify how coefficient changes in the equation $f(x) = mx+b$ affect the graphs of linear functions. Know how to use graphing technology to examine these effects. (8.2.2.3)	• Vocabulary allowed in items: linear function, intercept, coefficient, constant, and vocabulary given at previous grades	

INTERMEDIATE ALGEBRA CURRICULUM FRAMEWORKS

ALGEBRA (encompasses 45-52% of MCA test items) (from Grade 8 standards) (continued)		
Standard 3: Generate equivalent numerical and algebraic expressions and use algebraic properties to evaluate expressions.		
Curriculum Benchmark	**MCA III Test Item Specifications**	**Notes**
Evaluate algebraic expressions, including expressions containing radicals and absolute values, at specified values of their variables. (Introduce graphing calculator use.) (8.2.3.1) For example: Evaluate $\pi r^2 h$ when $r = 3$ and $h = 0.5$, and then use an approximation of π to obtain an approximate answer.	• Items must not have context • Directives may include: simplify, evaluate • Vocabulary allowed in items: vocabulary given at previous grades	

INTERMEDIATE ALGEBRA CURRICULUM FRAMEWORKS

ALGEBRA (encompasses 45-52% of MCA test items) (from Grade 8 standards) (continued)		
Standard 4: Represent real-world and mathematical situations using equations and inequalities involving linear expressions. Solve equations and inequalities symbolically and graphically. Interpret solutions in the original context.		
Curriculum Benchmark	**MCA III Test Item Specifications**	**Notes**
Solve multi-step equations in one variable. Solve for one variable in a multi-variable equation in terms of the other variables. Justify the steps by identifying the properties of equalities used. (8.2.4.2) For example: The equation $10x + 17 = 3x$ can be changed to $7x + 17 = 0$, and then to $7x = -17$ by adding/subtracting the same quantities to both sides. These changes do not change the solution of the equation. Another example: Using the formula for the perimeter of a rectangle, solve for the base in terms of the height and perimeter.	• Vocabulary allowed in items: vocabulary given at previous grades	
Express linear equations in slope-intercept, point-slope and standard forms, and convert between these forms. Given sufficient information, find an equation of a line. (8.2.4.3) For example: Determine an equation of the line through the points (-1,6) and (2/3, -3/4).	• Items must not have context • Vocabulary allowed in items: slope-intercept form, point-slope form, standard form, and vocabulary given at previous grades	
Use linear inequalities to represent relationships in various contexts. (8.2.4.4) For example: A gas station charges $0.10 less per gallon of gasoline if a customer also gets a car wash. Without the car wash, gas costs $2.79 per gallon. The car wash is $8.95. What are the possible amounts (in gallons) of gasoline that you can buy if you also get a car wash and can spend at most $35?	• Inequalities contain no more than 1 variable • Vocabulary allowed in items: vocabulary given at previous grades	
Solve linear inequalities using properties of inequalities. Graph the solutions on a number line. (8.2.4.5) For example: The inequality $-3x < 6$ is equivalent to $x > -2$, which can be represented on the number line by shading in the interval to the right of -2.	• Vocabulary allowed in items: vocabulary given at previous grades	

INTERMEDIATE ALGEBRA CURRICULUM FRAMEWORKS

ALGEBRA (encompasses 45-52% of MCA test items) (from Grade 8 standards) (continued)		
Curriculum Benchmark	**MCA III Test Item Specifications**	**Notes**
Represent relationships in various contexts with equations and inequalities involving the absolute value of a linear expression. Solve such equations and inequalities and graph the solutions on a number line. (8.2.4.6) For example: A cylindrical machine part is manufactured with a radius of 2.1 cm, with a tolerance of 1/100 cm. The radius r satisfies the inequality $\|r - 2.1\| \leq .01$.	• Vocabulary allowed in items: vocabulary given at previous grades	
Represent relationships in various contexts using systems of linear equations. Solve systems of linear equations in two variables symbolically, graphically and numerically. (8.2.4.7) For example: Marty's cell phone company charges $15 per month plus $0.04 per minute for each call. Jeannine's company charges $0.25 per minute. Use a system of equations to determine the advantages of each plan based on the number of minutes used.	• Vocabulary allowed in items: system of equations, undefined, infinite, intersecting, identical, and vocabulary given at previous grades	
Understand that a system of linear equations may have no solution, one solution, or an infinite number of solutions. Relate the number of solutions to pairs of lines that are intersecting, parallel or identical. Check whether a pair of numbers satisfies a system of two linear equations in two unknowns by substituting the numbers into both equations. (8.2.4.8)	• Assessed within 8.2.4.7	

INTERMEDIATE ALGEBRA CURRICULUM FRAMEWORKS

ALGEBRA (encompasses 45-52% of MCA test items) (from Grades 9-12 standards) (continued)		
Standard 1: Understand the concept of function, and identify important features of functions and other relations using symbolic and graphical methods where appropriate.		
Curriculum Benchmark	**MCA III Test Item Specifications**	**Notes**
Understand the definition of a function. Use functional notation and evaluate a function at a given point in its domain. (9.2.1.1) For example: If $f(x)=\frac{1}{x^2-3}$, find f(-4).	• Vocabulary allowed in items: relation, domain, range and vocabulary given at previous grades	

INTERMEDIATE ALGEBRA CURRICULUM FRAMEWORKS

ALGEBRA (encompasses 45-52% of MCA test items) (from Grades 9-12 standards) (continued)		
Standard 3: Generate equivalent algebraic expressions involving polynomials and radicals; use algebraic properties to evaluate expressions.		
Curriculum Benchmark	**MCA III Test Item Specifications**	**Notes**
Evaluate polynomial and rational expressions and expressions containing radicals and absolute values at specified points in their domains. (9.2.3.1)	• Vocabulary allowed in items: polynomial and vocabulary given at previous grades	
Add, subtract and multiply polynomials; divide a polynomial by a polynomial of equal or lower degree. (9.2.3.2)	• Vocabulary allowed in items: polynomial, degree of a polynomial and vocabulary given at previous grades	
Factor common monomial factors from polynomials, factor quadratic polynomials, and factor the difference of two squares. (9.2.3.3) For example: $9x^6 - x^4 = (3x^3 - x^2)(3x^3 + x^2)$.	• Vocabulary allowed in items: polynomial, monomial and vocabulary given at previous grades	

INTERMEDIATE ALGEBRA CURRICULUM FRAMEWORKS

ALGEBRA (encompasses 45-52% of MCA test items) (from Grades 9-12 standards) (continued)		
Standard 4: Represent real-world and mathematical situations using equations and inequalities involving linear, quadratic, exponential and n^{th} root functions. Solve equations and inequalities symbolically and graphically. Interpret solutions in the original context.		
Curriculum Benchmark	**MCA III Test Item Specifications**	**Notes**
Represent relationships in various contexts using systems of linear inequalities; solve them graphically. Indicate which parts of the boundary are included in and excluded from the solution set using solid and dotted lines. (9.2.4.4)	• Vocabulary allowed in items: boundary and vocabulary given at previous grades	

INTERMEDIATE ALGEBRA CURRICULUM FRAMEWORKS

READING IN THE CONTENT AREA (Taken from "Standards for Literacy in Science and Technical Subjects")				
Benchmark	**Unit**	**Quarter**	**Activities**	**How Assessed**
Cite specific textual evidence to support analysis of technical texts, attending to the precise details of explanations or descriptions. (9.13.1.1)	Chapters 1-12	1-4	All problems are related to the central idea of the course algebra. Take any unit in the text.	Homework Quizzes Tests
Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. (9.13.2.2)	Chapters 1-12	1-4	All problems are related to the central idea of the course algebra.	Homework Quizzes Tests
Follow precisely a complex multi-step procedure when carrying out experiments, designing solutions, taking measurements, or performing technical tasks, attending to special cases (constraints) or exceptions defined in the text. (9.13.3.3)	Chapters 1-12	1-4	Homework, pretests, group and class activities	Homework Quizzes Tests
Determine the meaning of symbols, equations, graphical representations, tabular representations, key terms, and other domain-specific words and phrases as they are used in a specific technical context relevant to grades 9–10 texts and topics. (9.13.4.4)	Chapters 1-12	1-4	Homework, group and class activities, pretests	Homework Quizzes Tests
Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). (9.13.5.5)	Chapters 1-12	1-4	Algebra – the mathematics is related to all the course work	Homework Calculator use Class work Quizzes Tests
Analyze the author's purpose in describing phenomena, providing an explanation, describing a procedure, or discussing/reporting an experiment in a text, defining the question the author seeks to address. (9.13.6.6)	N/A (Algebra explanations are universal)			
Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. (9.13.7.7)	Chapters 1, 3-7, 10	1-4	Graphic calculators, class and group activities, homework	Quizzes Tests

INTERMEDIATE ALGEBRA CURRICULUM FRAMEWORKS

READING IN THE CONTENT AREA (Taken from "Standards for Literacy in Science and Technical Subjects")				
Benchmark	**Unit**	**Quarter**	**Activities**	**How Assessed**
Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a technical problem. (9.13.8.8)	All Units	1-4	All class and group activities, graphic calculators, homework pretests	Quizzes Tests
Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. (9.13.9.9)	N/A (Algebra has no contrasting findings)			
By the end of grade 10, read and comprehend technical texts in the grades 9–10 text complexity band independently and proficiently. (9.13.10.10)	Chapters 1-12	1-4	Ongoing. Word problems are always a challenge for students.	Homework Quizzes Tests