



Beginning Algebra (Algebra 1)– Part 1

Michigan State Algebra Content Expectations

Course Description

Students enrolled in Beginning Algebra will study characteristics of our number system and how those characteristics are applicable to problem situations, which may arise in the real world or in disciplines other than mathematics. This class emphasizes the use of technology, problem solving, critical thinking, and reasoning. Topics include integers, equations, inequalities, polynomials, factoring, linear functions and graphs, number patterns, systems of equations, quadratics equations and graphs, among others.

Text Book

Martin-Gay, Elayne K. Beginning Algebra, Fourth Edition. Pearson Prentice Hall.

Unit 1 Description

This unit will review the basic symbols and words--the language--of arithmetic and introduce using variables in place of numbers.

Essential Content and Skills

The learner will:

- Translate sentences into mathematical statements.
- Identify natural numbers, whole numbers, integers, rational numbers, irrational numbers, and real numbers.
- Find the absolute value of a real number.
- Multiply and divide fractions.
- Add and subtract fractions.
- Write fractions in simplest form.
- Define and use exponents and the order of operations.
- Evaluate algebraic expression.
- Give replacement values for variables.
- Determine whether a number is a solution of a given equation.
- Translate phrases into expressions and sentences into equations.
- Add real numbers with the same sign.
- Add real numbers with unlike signs.
- Solve problems that involve addition of real numbers.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

- Find the opposite signs.
 - Add and subtract real numbers.
 - Evaluate algebraic expressions using real numbers.
 - Solve problems that involve subtraction of real numbers.
 - Multiply and divide real numbers.
 - Evaluate algebraic expressions using real numbers.
 - Use the commutative and associative properties.
 - Use the distributive property.
 - Use the identity and inverse properties.
 - Read bar graphs.
 - Read line graphs.
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Unit 1 Michigan State Content Expectations

[Click here to view the Michigan DOE Curriculum Content Standards.](#)

Unit 1 Lesson 1: Symbols and Sets of Numbers

State Standard	Description
L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers.

Unit 1 Lesson 2: Fractions

State Standard	Description
L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers.

Unit 1 Lesson 3: Introduction to Variable Expressions and Equations

State Standard	Description
L2.1.2	Calculate fluently with numerical expressions involving exponents. Use the rules of exponents, and evaluate numerical expressions involving rational and negative exponents, and transition easily between roots and exponents.
A1.1.1	Give a verbal description of an expression that is presented in symbolic form, write an algebraic expression from a verbal description, and evaluate expressions given values of the variables.
A1.1.2	Know the properties of exponents and roots and apply them in algebraic expressions.
A1.1.3	Factor algebraic expressions using, for example, greatest common factor, grouping, and the special product identities (e.g., differences of squares and cubes).

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 1 Lesson 4: Introduction to Variable Expressions and Equations

State Standard	Description
L2.1.2	Calculate fluently with numerical expressions involving exponents. Use the rules of exponents, and evaluate numerical expressions involving rational and negative exponents, and transition easily between roots and exponents.
A1.1.1	Give a verbal description of an expression that is presented in symbolic form, write an algebraic expression from a verbal description, and evaluate expressions given values of the variables.
A1.1.2	Know the properties of exponents and roots and apply them in algebraic expressions.
A1.1.3	Factor algebraic expressions using, for example, greatest common factor, grouping, and the special product identities (e.g., differences of squares and cubes).

Unit 1 Lesson 5: Adding Real Numbers

State Standard	Description
L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers.
L1.1.2	Explain why the multiplicative inverse of a number has the same sign as the number, while the additive inverse has the opposite sign.
L1.1.3	Explain how the properties of associativity, commutativity, and distributivity, as well as identity and inverse elements, are used in arithmetic and algebraic calculations.

Unit 1 Lesson 6: Subtracting Real Numbers

State Standard	Description
L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers.
L1.1.3	Explain how the properties of associativity, commutativity, and distributivity, as well as identity and inverse elements, are used in arithmetic and algebraic calculations.

Unit 1 Lesson 7: Multiplying and Dividing Real Numbers

State Standard	Description
L1.1.2	Explain why the multiplicative inverse of a number has the same sign as the number, while the additive inverse has the opposite sign.
L1.1.3	Explain how the properties of associativity, commutativity, and distributivity, as well as identity and inverse elements, are used in arithmetic and algebraic calculations.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 1 Lesson 8: Properties of Real Numbers

State Standard	Description
L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers. Explain how the properties of associativity, commutativity, and distributivity, as well as identity and inverse elements, are used in arithmetic and algebraic calculations. Organize and summarize a data set in a table, plot, chart, or spreadsheet; find patterns in a display of data; understand and critique data displays in the media.
L1.1.3	
L1.2.4	

Unit 1 Lesson 9: Reading Graphs

State Standard	Description
L1.2.4	Organize and summarize a data set in a table, plot, chart, or spreadsheet; find patterns in a display of data; understand and critique data displays in the media. Construct and apply mathematical models, including lines and curves of best fit, to estimate values of related quantities. Construct a scatterplot for a bivariate data set with appropriate labels and scales. Given a scatterplot, identify patterns, clusters, and outliers. Recognize no correlation, weak correlation, and strong correlation.
S2.1.1	
S2.1.2	

Unit 1 Lesson 10: Reading Graphs

State Standard	Description
L1.2.4	Organize and summarize a data set in a table, plot, chart, or spreadsheet; find patterns in a display of data; understand and critique data displays in the media. Given a scatterplot, identify patterns, clusters, and outliers. Recognize no correlation, weak correlation, and strong correlation..
S2.1.2	

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 2 Description

This unit will focus on equations, inequalities, and problem solving.

Essential Content and Skills

The learner will:

- Identify terms, like terms, and unlike terms.
- Combine like terms.
- Use the distributive property to remove parentheses.
- Write word phrases as algebraic expressions.
- Define linear equations in one variable and equivalent equations.
- Use the addition property of equality to solve linear equations.
- Use the multiplication property of equality to solve linear equations.
- Use both the addition and multiplication properties of equality to solve linear equations.
- Apply the general strategy for solving a linear equation.
- Solve equations containing fractions.
- Solve equations containing decimals.
- Recognize identities and equations with no solution.
- Write sentences as equations and solve.
- Apply the steps for problem solving.
- Use formulas to solve problems.
- Solve a formula or equation for one of its variables.
- Solve problems involving percents.
- Solve problems involving distance.
- Solve problems involving mixtures.
- Solve problems involving interest.
- Define linear inequality in one variable.
- Graph solution sets on a number line and use interval notation.
- Solve linear inequalities.
- Solve compound inequalities.
- Solve inequality applications.

Unit 2 Michigan State Algebra Content Expectations

Unit 2 Lesson 1: Simplifying Algebraic Expressions

State Standard	Description
L1.1.3 A1.2.3	Explain how the properties of associativity, commutativity, and distributivity, as well as identity and inverse elements, are used in arithmetic and algebraic calculations. Solve linear and quadratic equations and inequalities, including systems of up to three linear equations with three unknowns. Justify steps in the solutions, and apply the quadratic formula appropriately.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 2 Lesson 2: Addition Property of Equality

State Standard	Description
L1.1.3	Explain how the properties of associativity, commutativity, and distributivity, as well as identity and inverse elements, are used in arithmetic and algebraic calculations. Write equations and inequalities with one or two variables to represent mathematical or applied situations and solve. Solve (and justify steps in the solutions) linear and quadratic equations and inequalities, including systems of up to three linear equations with three unknowns; apply the quadratic formula appropriately.
A1.2.1	
A1.2.3	

Unit 2 Lesson 3: Multiplication Property of Equality

State Standard	Description
L1.1.3	Explain how the properties of associativity, commutativity, and distributivity, as well as identity and inverse elements, are used in arithmetic and algebraic calculations.

Unit 2 Lesson 4: Solving Linear Equations

State Standard	Description
L1.1.3	Explain how the properties of associativity, commutativity, and distributivity, as well as identity and inverse elements, are used in arithmetic and algebraic calculations. Give a verbal description of an expression that is presented in symbolic form, write an algebraic expression from a verbal description, and evaluate expressions given values of the variables. Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.
A1.1.1	
A1.2.8	

Unit 2 Lesson 5: Solving Linear Equations

State Standard	Description
L1.1.3	Explain how the properties of associativity, commutativity, and distributivity, as well as identity and inverse elements, are used in arithmetic and algebraic calculations. Give a verbal description of an expression that is presented in symbolic form, write an algebraic expression from a verbal description, and evaluate expressions given values of the variables. Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.
A1.1.1	
A1.2.8	

Unit 2 Lesson 6: Introduction to Problem Solving

State Standard	Description
A1.1.1	Give a verbal description of an expression that is presented in symbolic form, write an algebraic expression from a verbal description, and evaluate expressions given values of the variables. Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.
A1.2.8	

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 2 Lesson 7: Formulas and Problem Solving

State Standard	Description
L1.1.3	Explain how the properties of associativity, commutativity, and distributivity, as well as identity and inverse elements, are used in arithmetic and algebraic calculations. Give a verbal description of an expression that is presented in symbolic form, write an algebraic expression from a verbal description, and evaluate expressions given values of the variables. Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.
A1.1.1	
A1.2.8	

Unit 2 Lesson 8: Problem Solving

State Standard	Description
L1.1.3	Explain how the properties of associativity, commutativity, and distributivity, as well as identity and inverse elements, are used in arithmetic and algebraic calculations. Give a verbal description of an expression that is presented in symbolic form, write an algebraic expression from a verbal description, and evaluate expressions given values of the variables. Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.
A1.1.1	
A1.2.8	

Unit 2 Lesson 9: Solving Linear Inequalities

State Standard	Description
A1.2.1	Write equations and inequalities with one or two variables to represent mathematical or applied situations, and solve. Solve (and justify steps in the solutions) linear and quadratic equations and inequalities, including systems of up to three linear equations with three unknowns; apply the quadratic formula appropriately. Solve absolute value equations and inequalities (e.g., solve $ x - 3 \leq 6$) and justify steps in the solutions. Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.
A1.2.3	
A1.2.4	
A1.2.8	

Unit 2 Lesson 10: Solving Linear Inequalities

State Standard	Description
A1.2.1	Write and solve equations and inequalities with one or two variables to represent mathematical or applied situations. Solve (and justify steps in the solutions) linear and quadratic equations and inequalities, including systems of up to three linear equations with three unknowns; apply the quadratic formula appropriately. Solve absolute value equations and inequalities (e.g., solve $ x - 3 \leq 6$) and justify steps in the solutions. Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.
A 1.2.3	
A1.2.4	
A1.2.8	

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 3 Description

This unit will focus on exponents, polynomials, and factoring polynomials.

Essential Content and Skills

The learner will:

- Evaluate exponential expressions.
- Use the product rule for exponents.
- Use the power rule for exponents.
- Use the power rules for products and quotients.
- Use the quotient rule for exponents, and define a number raised to the 0 power.
- Define monomial, binomial, trinomial, polynomial, and degree.
- Find the value of a polynomial given replacement values for the variables.
- Add and subtract polynomials.
- Use the distributive property to multiply polynomials.
- Multiply polynomials vertically.
- Multiply two binomials using the foil method.
- Square a binomial.
- Evaluate numbers raised to negative integer powers.
- Use all the rules and definitions for exponents to simplify exponential expressions.
- Write numbers in scientific notation.
- Convert numbers from scientific notation to standard form.
- Divide a polynomial by a monomial.
- Use long division to divide a polynomial by another polynomial.
- Find the greatest common factor of a list of integers.
- Find the greatest common factor of a list of terms.
- Factor out the greatest common factor from a polynomial.
- Factor a polynomial by grouping.
- Factor trinomials.
- Factor perfect square trinomials.
- Factor trinomials by grouping.
- Factor the difference of two squares.
- Factor the sum or difference of two cubes.
- Define quadratic equation.
- Solve quadratic equations by factoring.
- Solve equations with degree greater than 2 by factoring.
- Solve problems that can be modeled by quadratic equations.

Unit 3 Michigan State Algebra Content Expectations

Unit 3 Lesson 1: Exponents

State Standard	Description
L2.1.2	Calculate fluently with numerical expressions involving exponents. Use the rules of exponents, and evaluate numerical expressions involving rational and negative exponents, and transition easily between roots and exponents.
A1.1.2	Know the properties of exponents and roots and apply them in algebraic expressions.
A1.2.1	Write equations and inequalities with one or two variables to represent mathematical or applied situations and solve.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 3 Lesson 2: Adding and Subtracting Polynomials

State Standard	Description
A1.2.1	Write equations and inequalities with one or two variables to represent mathematical or applied situations and solve.
A1.2.8	Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.

Unit 3 Lesson 3: Multiplying Polynomials and Special Products

State Standard	Description
A1.2.1	Write equations and inequalities with one or two variables to represent mathematical or applied situations and solve.
A1.2.8	Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.

Unit 3 Lesson 4: Negative Exponents and Scientific Notation

State Standard	Description
L2.1.2	Calculate fluently with numerical expressions involving exponents. Use the rules of exponents, and evaluate numerical expressions involving rational and negative exponents, and transition easily between roots and exponents.
A1.2.1	Write equations and inequalities with one or two variables to represent mathematical or applied situations and solve.
A1.2.8	Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.

Unit 3 Lesson 5: Division of Polynomials

State Standard	Description
A1.2.1	Write equations and inequalities with one or two variables to represent mathematical or applied situations and solve.
A1.2.8	Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.

Unit 3 Lesson 6: The Greatest Common Factor and Factoring by Grouping

State Standard	Description
A1.1.3	Factor algebraic expressions using, for example, greatest common factor, grouping, and the special product identities (e.g., differences of squares and cubes).

Unit 3 Lesson 7: Factoring Trinomials

State Standard	Description
A1.1.3	Factor algebraic expressions using, for example, greatest common factor, grouping, and the special product identities (e.g., differences of squares and cubes).

Unit 3 Lesson 8: Factoring Trinomials

State Standard	Description
A1.1.3	Factor algebraic expressions using, for example, greatest common factor, grouping, and the special product identities (e.g., differences of squares and cubes).

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 3 Lesson 9: Factoring Binomials

State Standard	Description
A1.1.3	Factor algebraic expressions using, for example, greatest common factor, grouping, and the special product identities (e.g., differences of squares and cubes).

Unit 3 Lesson 10: Solving Quadratic Equations and Problem Solving

State Standard	Description
A1.1.3	Factor algebraic expressions using, for example, greatest common factor, grouping, and the special product identities (e.g., differences of squares and cubes).
A1.2.3	Solve (and justify steps in the solutions) linear and quadratic equations and inequalities, including systems of up to three linear equations with three unknowns; apply the quadratic formula appropriately.
A1.2.8	Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 4 Description

This unit will focus on rational expressions.

Essential Content and Skills

The learner will:

- Find the value of a rational expression given a replacement number.
- Identify values for which a rational expression is undefined.
- Write rational expressions in lowest terms.
- Multiply rational expressions.
- Divide rational expressions.
- Add and subtract rational expressions with the same denominator.
- Find the least common denominator of a list of rational expressions.
- Write a rational expression as an equivalent expression whose denominator is given.
- Add and subtract rational expressions with unlike denominators.
- Solve equations containing rational expressions.
- Solve equations containing rational expressions for a specified variable.
- Use proportions to solve problems.
- Solve problems about numbers.
- Solve problems about work.
- Solve problems about distance.
- Solve problems involving direct variation.
- Solve problems involving inverse variation.
- Solve variation and problem solving.
- Simplify complex fractions using various methods.

Unit 4 Michigan State Algebra Content Expectations

Unit 4 Lesson 1: Simplifying Rational Expressions

State Standard	Description
L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers

Unit 4 Lesson 2: Multiplying and Dividing Rational Expressions

State Standard	Description
L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers.

Unit 4 Lesson 3: Adding and Subtracting Rational Expressions with Common Denominators and Least Common Denominator

State Standard	Description
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Course Name - Part

Michigan State Curriculum Content Standards (continued)

L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers.
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Unit 4 Lesson 4: Adding and Subtracting Rational Expressions with Unlike Denominators

State Standard	Description
L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers.

Unit 4 Lesson 5: Adding and Subtracting Rational Expressions with Unlike Denominators

State Standard	Description
L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers.

Unit 4 Lesson 6: Solving Equations Involving Rational Expressions

State Standard	Description
L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers. Write equations and inequalities with one or two variables to represent mathematical or applied situations and solve. Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.
A1.2.1	
A1.2.8	

Unit 4 Lesson 7: Proportion and Problem Solving with Rational Equations

State Standard	Description
L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers. Write equations and inequalities with one or two variables to represent mathematical or applied situations and solve. Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.
A1.2.1	
A1.2.8	

Unit 4 Lesson 8: Variation and Problem Solving

State Standard	Description
L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers. Write equations and inequalities with one or two variables to represent mathematical or applied situations and solve. Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.
A1.2.1	
A1.2.8	

Course Name - Part

Michigan State Curriculum Content Standards (continued)

Unit 4 Lesson 9: Simplifying Complex Fractions

State Standard	Description
L1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers. Write equations and inequalities with one or two variables to represent mathematical or applied situations and solve. Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.
A1.2.1	
A1.2.8	

Unit 4 Lesson 10: Simplifying Complex Fractions

State Standard	Description
L.1.1.1	Know the different properties that hold in different number systems and recognize that the applicable properties change in the transition from the positive integers to all integers, to the rational numbers, and to the real numbers. Write equations and inequalities with one or two variables to represent mathematical or applied situations and solve. Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.
A1.2.1	
A1.2.8	