

# Intermediate Algebra



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Openstax	Lyn Marecek, MaryAnne Anthony-Smith	Intermediate Algebra	<a href="#">Intermediate Algebra</a>
Mathispower4u	James Sousa	MathIsPower4U	<a href="#">Mathispower4u Videos</a>

Alta Intermediate Algebra was developed to meet the scope and sequence of a typical one-semester algebra course. To develop the course, Knewton used three main sources of content: OpenStax, videos created by a Math Professor we have partnered with, and a team of Subject Matter Experts. The SMEs come from diverse backgrounds and are all academics in the field of mathematics.

Alta Intermediate Algebra has two instructional sequences for every learning objective, giving students multiple opportunities to learn new concepts. Between our OpenStax text, video content, and Knewton SMEs, we were able to solicit ideas from math instructors and students at all levels of higher education. Alta Intermediate Algebra covers the typical breadth of algebra topics, and also provides the necessary depth to ensure the course is manageable and engaging for instructors and students alike.

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## Intermediate Algebra | Table of Contents

### Chapter 1: Foundations

#### 1.1 Use the Language of Algebra

- Prime Factorization, Algebraic Symbols, and Order of Operations
  - Find factors, prime factorizations, and least common multiples
  - Use algebraic symbols and variables
  - Simplify expressions with grouping symbols and exponents using order of operations
- Simplifying and Rewriting Algebraic Expressions
  - Evaluate an expression involving exponents and order of operations
  - Identify and combine like terms
  - Translate an English phrase and word problems into an algebraic expression

#### 1.2 Integers

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  - Multiply and divide integers
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- Square Roots and the Real Number System
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    - Locate fractions and decimals on the number line (\*59)
-

- Using the Properties of Real Numbers
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## **Chapter 2: Solving Linear Equations and Inequalities**

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- Solving Compound Inequalities
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## 2.7 Solve Absolute Value Equations and Inequalities

- Solving Absolute Value Equations and Inequalities
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-

### 3.4 Graph Linear Inequalities in Two Variables

- Graphing Linear Inequalities
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  - Write a linear inequality given its graph
  - Graph a linear inequality in two variables (\*57)
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### 3.5 Relations and Functions

- Introduction to Functions
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  - Determine if a relation is a function given an equation
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  - Use function notation to find the value of a function given a variable expression

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- Solving Systems of Linear Equations in Two Variables Algebraically
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-

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- Solving Systems of Linear Equations in Three Variables
  - Determine whether an ordered triple is a solution of a system of three linear equations with three variables
  - Solve a system of linear equations with three variables
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#### 4.5 Solve Systems of Equations Using Matrices

- Solving Systems of Linear Equations with Matrix Row Operations
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- Determinants of Matrices
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  - Evaluate the determinant of a 3x3 matrix
- Solving Systems of Linear Equations with Cramer's Rule and Determinants
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#### 4.7 Graphing Systems of Linear Inequalities

- Solving Systems of Linear Inequalities
  - Determine if an ordered pair is a solution of a system of linear inequalities
  - Solve systems of linear inequalities by graphing (\*37)
  - Solve an application using systems of linear inequalities

### **Chapter 5: Polynomials and Polynomial Functions**

#### 5.1 Add and Subtract Polynomials

- Adding and Subtracting Polynomials and Polynomial Functions
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  - Add or subtract polynomial expressions
  - Evaluate a polynomial function for a given value
  - Add or subtract polynomial functions

#### 5.2 Properties of Exponents and Scientific Notation

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    - Use the quotient property and the zero property of exponents to simplify expressions
    - Rewrite expressions with positive exponents using the definition of negative exponents
    - Use the power property for exponents and extensions to products and quotients to simplify expressions
    - Simplify exponential expressions by combining all properties
-

- Scientific Notation
  - Convert between decimal notation and scientific notation
  - Multiply and divide expressions given in scientific notation

### 5.3 Multiply Polynomials

- Multiplying Polynomials
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  - Multiply two binomials
  - Multiply a polynomial by a polynomial
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  - Use the conjugate pairs pattern to multiply conjugates
  - Multiply polynomial functions

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- Dividing Polynomials and Polynomial Functions
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  - Use polynomial long division to divide polynomials
  - Divide polynomial functions
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  - Use the remainder and factor theorems

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### 6.1 Greatest Common Factor and Factor by Grouping

- The Greatest Common Factor and Factoring by Grouping
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  - Factor the greatest common factor from polynomial expressions
  - Factor polynomials by grouping

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- Factoring Trinomials
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  - Factor a trinomial with a leading coefficient of greater than 1 using trial and error
  - Factor a trinomial with a leading coefficient of greater than 1 using the 'ac' method
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### 6.3 Factor Special Products

- Factoring Special Products
  - Factor polynomials using a perfect squares binomial pattern
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  - Factor a sum or a difference of cubes

### 6.4 General Strategy for Factoring Polynomials

- Choosing a Factoring Strategy
    - Use a general strategy for factoring polynomials
-

## 6.5 Polynomial Equations

- Solving Polynomial Equations by Factoring
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  - Solve polynomial equations by factoring
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  - Use factoring to solve application problems involving polynomial equations

## Chapter 7: Rational Expressions and Functions

### 7.1 Multiply and Divide Rational Expressions

- Domain of Rational Expressions and Simplifying Rational Expressions
  - Determine which values make a rational expression undefined
  - Simplify rational expressions
- Multiplying and Dividing Rational Expressions
  - Multiply two rational expressions
  - Divide rational expressions, including those written as complex fractions
  - Multiply and divide rational functions

### 7.2 Add and Subtract Rational Expressions

- Adding and Subtracting Rational Expressions
  - Add or subtract rational expressions with a common denominator or with denominators that are opposites
  - Determine the least common denominator of rational expressions
  - Add or subtract rational expressions with unlike denominators
  - Add and subtract rational functions

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- Simplifying Complex Rational Expressions
  - Simplify complex rational expressions by writing the expression as division
  - Simplify complex rational expressions by using the least common denominator

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- Solving Rational Equations and Using Rational Functions
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  - Rewrite a rational equation in terms of a specific variable

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- Proportions and Similar Figures with Rational Equations
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  - Solve application problems involving similar figures
- Uniform Motion, Work, and Problem Solving
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  - Use rational equations to solve problems involving rates of work
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## 7.6 Solve Rational Inequalities

- Solving Rational Inequalities
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### 8.1 Simplify Expressions with Roots

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- Simplifying Radical Expressions
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- Rational Exponents
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- Dividing Radical Expressions and Rationalizing Denominators
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- Solving Radical Equations
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### 8.7 Use Radicals in Functions

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### 9.5 Solve Applications of Quadratic Equations

- Problem Solving with Quadratic Equations
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### 9.6 Graph Quadratic Functions Using Properties

- Parabolas and Their Properties
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    - Determine the intercepts of a parabola given a function
-

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  - Calculate resultant values using exponential growth and decay models

#### 10.3 Evaluate and Graph Logarithmic Functions

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#### 11.1 Distance and Midpoint Formulas and Circles

- The Distance and Midpoint Formulas
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  - Identify conic sections by their equations

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### Chapter 12: Sequences, Series, and the Binomial Theorem

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- Introduction to Sequences
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  - Find a formula for the general term of a sequence
- Factorial Notation and Sigma Notation
  - Use factorial notation
  - Find the partial sum
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#### 12.2 Arithmetic Sequences and Series

- Arithmetic Sequences and Series
  - Determine if a sequence is arithmetic and write the first few terms of an arithmetic sequence
  - Find the general term of an arithmetic sequence
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#### 12.3 Geometric Sequences and Series

- Geometric Sequences
    - Determine if a sequence is geometric and write the first few terms of a geometric sequence
    - Find the general term of a geometric sequence
  - Finite and Infinite Geometric Series and Applications
    - Find the sum of the first  $n$  terms of a geometric sequence
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