

# Elementary and Intermediate Algebra



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Alta Elementary and 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 Elementary and 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. Knewton Elementary 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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- Ellipses with Centers at the Origin
    - Graph an ellipse with its center at the origin (\*23)
    - Find the equation of an ellipse with its center at the origin
  - Ellipses with Centers Not at the Origin and Applications
    - Graph an ellipse with its center not at the origin (\*22)
    - Rewrite the equation of an ellipse given in general form by completing the square (\*11)
    - Solve applications with ellipses
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## 12.4 Hyperbolas

- Hyperbolas as Conic Sections
  - Graph a hyperbola with its center at the origin (\*23)
  - Graph a hyperbola with its center not at the origin (\*22)
  - Rewrite the equation of a hyperbola given in general form by completing the square (\*11)
- Identifying Conic Sections by Their Equations
  - Identify conic sections by their equations

## 12.5 Solve Systems of Nonlinear Equations

- Solving Systems of Nonlinear Equations
  - Solve a system of nonlinear equations by graphing
  - Solve a system of nonlinear equations using substitution
  - Solve a system of nonlinear equations using elimination
- Problem Solving with Systems of Nonlinear Equations
  - Use a system of nonlinear equations to solve applications

## Chapter 13: Sequences, Series, and the Binomial Theorem

### 13.1 Sequences

- Introduction to Sequences
  - Write the first few terms of a sequence
  - Find a formula for the general term of a sequence
- Factorial Notation and Sigma Notation
  - Use factorial notation
  - Find the partial sum
  - Use summation notation to write a sum

### 13.2 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
  - Find the sum of the first  $n$  terms of an arithmetic sequence

### 13.3 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
  - Find the sum of an infinite geometric series and use infinite geometric series to write a repeating decimal as a fraction
  - Use geometric sequences and series to solve monetary applications including annuities

### 13.4 Binomial Theorem

- The Binomial Theorem
  - Use Pascal's Triangle to expand a binomial
  - Evaluate a binomial coefficient
  - Use the binomial theorem to expand a binomial