

# honors algebra 1

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## Content, Standards & Objectives

This document contains an ordered list of all of the topics from the scope and sequence of Thinkwell's Honors Algebra 1, along with the learning objectives covered in each topic and the corresponding standards.

Although Thinkwell's Honors Algebra 1 was not designed as a common core curriculum, this document is provided for those customers whose state homeschool requirements include common core standard mapping information.

*Example:*

*Topic's number and title* → **2.1.5 Solving Equations with Variables on Both Sides**

**Learning Objectives:**

*Topic's learning objectives* → 

- Write and solve equations with variables on both sides.
- Identify identities and contradictions.

*Topic's related standard from the High School Algebra Common Core State Standards for Mathematics* → **Standards:**  
→ A-REI: 3, Q.A.2

We suggest keeping this document handy. Please let us know if you have any questions about the content here. Email us at [support@thinkwell.com](mailto:support@thinkwell.com).

## 1 Foundations for Algebra

### 1.1 The Language of Algebra

#### 1.1.1 Variables and Expressions

**Learning Objectives:**

- Translate between words and algebraic expressions.
- Evaluate algebraic expressions.
- Write algebraic expressions.

**Standards:**

A-SSE: 1, A-SSE: 1.a, F-BF: 1a

#### 1.1.2 Adding and Subtracting Real Numbers

**Learning Objectives:**

- Add and subtract numbers on a number line.
- Add and subtract real numbers.

#### 1.1.3 Multiplying and Dividing Real Numbers

**Learning Objectives:**

- Multiply and divide signed real numbers.
- Multiply and divide with fractions.
- Multiply and divide with zero.

#### 1.1.4 Powers and Exponents

**Learning Objectives:**

- Write powers for geometric models.
- Evaluate powers.
- Write powers.

#### 1.1.5 Square Roots and Real Numbers

**Learning Objectives:**

- Find square roots of perfect squares and of fractions.
- Classify real numbers.
- Approximate square roots.



## 1.2 Tools of Algebra

### 1.2.1 Set Theory

**Learning Objectives:**

- Find the union and intersection of sets.
- Make Venn diagrams and find complements of sets.
- Determine relationships between sets.
- Find the cross product of sets.

**Standards:**

S-CP: 1

### 1.2.2 Order of Operations

**Learning Objectives:**

- Simplify numerical expressions.
- Evaluate algebraic expressions.

**Standards:**

A-SSE: 1, A-SSE: 1.a

### 1.2.3 Simplifying Expressions

**Learning Objectives:**

- Use the Distributive Property with mental math.
- Combine like terms to simplify algebraic expressions.
- Use properties to justify simplification steps.

**Standards:**

A-SSE: 1.a, A-SSE: 3, A-APR: 1

### 1.2.4 Introduction to Functions

**Learning Objectives:**

- Graph points in the coordinate plane.
- Locate points in the coordinate plane.
- Generate and graph ordered pairs.

**Standards:**

A-SSE: 1, Q.A.2

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## 2 Equations, Proportions, and Percent

### 2.1 Solving Equations

#### 2.1.1 Addition and Subtraction Equations

**Learning Objectives:**

- Solve equations by addition.
- Solve equations by subtraction.
- Write equations.

**Standards:**

A-SSE: 1, A-SSE: 1.a, A-CED: 1, A-REI: 3, F-BF: 1a, Q.A.2

#### 2.1.2 Multiplication and Division Equations

**Learning Objectives:**

- Solve equations by multiplication.
- Solve equations by division.
- Write and solve one-step equations.

**Standards:**

A-SSE: 1, A-CED: 1, A-REI: 3, F-BF: 1a, Q.A.2

#### 2.1.3 Solving Two-Step Equations

**Learning Objectives:**

- Solve two-step equations.
- Write two-step equations.
- Solve equations that contain fractions.

**Standards:**

A-REI: 3

#### 2.1.4 Solving Multi-Step Equations

**Learning Objectives:**

- Solve equations that contain like terms.
- Solve equations that contain fractions.
- Write and solve multi-step equations.

**Standards:**

A-SSE: 1, A-REI: 3, Q.A.2

## 2.1.5 Solving Equations with Variables on Both Sides

### Learning Objectives:

- Solve equations with variables on both sides.
- Identify identities and contradictions.
- Write and solve equations with variables on both sides.

### Standards:

A-REI: 3, Q.A.2

## 2.1.6 Solving Literal Equations

### Learning Objectives:

- Solve literal equations for a variable.

### Standards:

A-CED: 4

## 2.1.7 Solving Absolute-Value Equations

### Learning Objectives:

- Write and solve absolute-value equations.
- Solve special cases of absolute-value equations.

### Standards:

A-SSE: 1, A-CED: 1, F-BF: 1a, Q.A.3

## 2.2 Proportion and Percent

### 2.2.1 Rates, Ratios, and Proportions

#### Learning Objectives:

- Write and solve proportions.
- Find unit rates.
- Convert rates.
- Convert units using proportions.

#### Standards:

A-SSE: 1, A-CED: 1, F-BF: 1a, Q.A.1, Q.A.2

### 2.2.2 Applications of Proportion

#### Learning Objectives:

- Write and solve proportions to find unknown measures in similar figures.
- Determine the effects on area, perimeter, and volume when the dimensions of a figure are changed.

#### Standards:

A-SSE: 1, A-SSE: 1.a, A-CED: 1, F-BF: 1a, Q.A.2



## 2.2.3 Percents

### Learning Objectives:

- Use proportions to solve percent problems.
- Use equations to solve percent problems.
- Write equations to solve percent problems for the part, percent, or whole.

### Standards:

F-BF: 1a

## 2.2.4 Applications of Percent

### Learning Objectives:

- Write equations to solve percent applications.
- Use the simple interest formula.
- Use estimation when solving percent applications.

### Standards:

F-BF: 1a

## 2.2.5 Percent Increase and Decrease

### Learning Objectives:

- Find the percent of increase or decrease.
- Find results of a percent increase or decrease.
- Use equations to find discounts and markups.

### Standards:

F-BF: 1a

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## 3 Inequalities

### 3.1 Introduction to Inequalities

#### 3.1.1 Graphing and Writing Inequalities

**Learning Objectives:**

- Identify solutions of inequalities.
- Write, solve, and graph inequalities.
- Write inequalities from graphs.

**Standards:**

A-SSE: 1, A-SSE: 1.a, A-CED: 1, A-CED: 3, Q.A.2

#### 3.1.2 Solving Inequalities by Adding or Subtracting

**Learning Objectives:**

- Use addition and subtraction to solve inequalities.
- Write and graph inequalities.

**Standards:**

A-SSE: 1, A-CED: 1, A-CED: 3, A-REI: 3, Q.A.2, Q.A.3

#### 3.1.3 Solving Inequalities by Multiplying or Dividing

**Learning Objectives:**

- Solve inequalities by multiplying or dividing by a positive number.
- Solve inequalities by multiplying or dividing by a negative number.
- Write and graph inequalities.

**Standards:**

A-SSE: 1, A-CED: 1, A-CED: 3, A-REI: 3, Q.A.2

### 3.2 Multi-Step and Compound Inequalities

#### 3.2.1 Solving Two-Step and Multi-Step Inequalities

**Learning Objectives:**

- Solve and graph two-step inequalities.
- Write, solve, and graph multi-step inequalities.

**Standards:**

A-REI: 3, Q.A.2

#### 3.2.2 Solving Inequalities with Variables on Both Sides

**Learning Objectives:**

- Write and solve inequalities with variable terms on both sides.
- Solve inequalities that are identities or contradictions.

**Standards:**

A-CED: 1, A-CED: 3, A-REI: 3, Q.A.2

### 3.2.3 Solving Compound Inequalities

#### Learning Objectives:

- Write and graph compound inequalities.
- Solve compound inequalities involving AND or OR.

#### Standards:

A-SSE: 1, A-CED: 3, A-REI: 3, Q.A.2

### 3.2.4 Solving Absolute-Value Inequalities

#### Learning Objectives:

- Solve and graph absolute-value inequalities involving  $<$ .
- Solve and graph absolute-value inequalities involving  $>$ .
- Write and solve absolute-value inequalities.
- Solve special cases of absolute-value inequalities.

#### Standards:

A-SSE: 1, A-CED: 1, A-CED: 3, Q.A.2





## 4 Functions

### 4.1 Introduction to Functions

#### 4.1.1 Graphing Relationships

**Learning Objectives:**

- *Relate graphs to situations.*
- *Sketch graphs for situations.*
- *Write situations for graphs.*

**Standards:**

F-IF: 4

#### 4.1.2 Relations and Functions

**Learning Objectives:**

- *Show multiple representations of relations.*
- *Find the domain and range of relations.*
- *Determine whether relations are functions.*

**Standards:**

F-IF: 1, F-IF: 5

#### 4.1.3 Writing Function Rules

**Learning Objectives:**

- *Write equations from function tables.*
- *Evaluate functions using function notation.*
- *Identify independent and dependent variables.*
- *Write functions.*
- *Identify reasonable domain values and find corresponding range values.*

**Standards:**

A-SSE: 1, A-SSE: 1.a, A-CED: 3, F-IF: 1, F-IF: 2, F-BF: 1, F-BF: 1a, F-LE: 1b, F-LE: 2, Q.A.2

### 4.2 Applying Functions

#### 4.2.1 Graphing Functions

**Learning Objectives:**

- *Find solutions to equations with two variables.*
- *Check solutions of equations.*
- *Read solutions for graphs.*
- *Graph linear functions.*

**Standards:**

A-REI: 10, F-IF: 1, F-IF: 7

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## 4.2.2 Scatter Plots and Trend Lines

### Learning Objectives:

- Graph scatter plots from data.
- Describe correlations of scatter plots.
- Identify correlations of data sets.
- Match scatter plots to situations.
- Draw trend lines to make predictions.

### Standards:

S-ID: 6, S-ID: 6a, S-ID: 6c

## 4.2.3 Arithmetic Sequences

### Learning Objectives:

- Identify arithmetic sequences.
- Find the  $n$ th term of arithmetic sequences.

### Standards:

F-BF: 2, F-LE: 2



## 5 Linear Functions

### 5.1 Characteristics of Linear Functions

#### 5.1.1 Identifying Linear Functions

**Learning Objectives:**

- Identify graphs, lists of ordered pairs, and equations as linear functions.
- Graph linear functions.
- State domains and ranges.

**Standards:**

A-SSE: 1, A-SSE: 1.a, F-IF: 1, F-IF: 2, F-IF: 4, F-IF: 7, F-LE: 1a, F-LE: 1b, F-LE: 2

#### 5.1.2 Using Intercepts

**Learning Objectives:**

- Find intercepts.
- Graph linear equations using intercepts.
- Determine the meaning of intercepts.

**Standards:**

A-SSE: 1, A-SSE: 1.a, F-IF: 2, F-IF: 4, F-IF: 7, F-IF: 7a, F-LE: 5

#### 5.1.3 Rate of Change and Slope

**Learning Objectives:**

- Find rates of change from tables.
- Find rates of change from graphs.
- Find slopes from graphs, including horizontal and vertical lines.
- Describe slopes.

**Standards:**

F-IF: 6, F-LE: 1b

#### 5.1.4 The Slope Formula

**Learning Objectives:**

- Find slopes by using the slope formula.
- Find slopes from graphs, tables, and equations.
- Interpret the meaning of slopes.

**Standards:**

F-IF: 4, F-IF: 6

### 5.1.5 The Midpoint and Distance Formulas

#### Learning Objectives:

- Find coordinates of midpoints.
- Find coordinates of endpoints.
- Find distances in the coordinate plane using the Pythagorean Theorem.
- Find distances using the distance formula.

#### Standards:

G-CO: 1, G-GPE: 6

### 5.1.6 Direct Variation

#### Learning Objectives:

- Identify direct variations from ordered pairs.
- Identify direct variations from equations.
- Write and solve direct variation equations.
- Graph direct variations.

#### Standards:

A-SSE: 1, F-IF: 8, F-BF: 1, F-BF: 1a, F-LE: 1b, F-LE: 2

## 5.2 Using Linear Functions

### 5.2.1 Slope-Intercept Form

#### Learning Objectives:

- Graph lines using the slope and  $y$ -intercept.
- Write and graph linear equations in slope-intercept form.
- Identify slopes and  $y$ -intercepts and describe their meanings.

#### Standards:

A-SSE: 1, A-SSE: 1.a, F-IF: 4, F-IF: 6, F-IF: 7, F-IF: 8, F-BF: 1, F-BF: 1a, F-LE: 1b, F-LE: 2, F-LE: 5, S-ID: 7, Q.A.2

### 5.2.2 Point-Slope Form

#### Learning Objectives:

- Graph lines using slope and a point.
- Use point-slope form to graph.
- Write linear equations in slope-intercept form.
- Use two points to find intercepts.
- Evaluate equations in slope-intercept form.

#### Standards:

A-SSE: 1, A-SSE: 1.a, F-IF: 4, F-IF: 7, F-IF: 7a, F-IF: 8, F-BF: 1, F-BF: 1a, F-LE: 1b, F-LE: 2, Q.A.2



## 5.2.3 Slopes of Parallel and Perpendicular Lines

### Learning Objectives:

- Identify parallel and perpendicular lines.
- Find slopes of line segments.
- Write equations of parallel and perpendicular lines.

### Standards:

G-CO: 1, G-GPE: 5

## 5.2.4 Transforming Linear Functions

### Learning Objectives:

- Translate, rotate, and reflect linear functions.
- Describe transformations of linear functions.
- Perform multiple transformations of linear functions.
- Write equations of transformed functions.

### Standards:

A-SSE: 1, A-SSE: 1.a, F-IF: 2, F-IF: 4, F-IF: 7, F-BF: 3, F-LE: 1b, G-CO: 2

## 6 Systems of Equations and Inequalities

### 6.1 Systems of Linear Equations

#### 6.1.1 Solving Systems by Graphing

**Learning Objectives:**

- Identify solutions of systems.
- Solve systems of linear equations by graphing.
- Write systems of linear equations.

**Standards:**

A-CED: 3, A-REI: 6, A-REI: 10, A-REI: 11, F-IF: 7, F-BF: 1, F-BF: 1a, F-LE: 1b, F-LE: 2, Q.A.2

#### 6.1.2 Solving Systems by Substitution

**Learning Objectives:**

- Solve systems of linear equations by substitution.
- Write systems of linear equations.

**Standards:**

A-CED: 3, A-REI: 6, A-REI: 11, F-BF: 1, F-BF: 1a, F-LE: 2, Q.A.2

#### 6.1.3 Solving Systems by Elimination

**Learning Objectives:**

- Solve systems of linear equations using elimination with addition.
- Solve systems of linear equations using elimination with subtraction.
- Solve systems of linear equations using elimination with multiplication.
- Write systems of linear equations.

**Standards:**

A-CED: 3, A-REI: 5, A-REI: 6, A-REI: 11, F-BF: 1, F-BF: 1a, F-LE: 2, Q.A.2

#### 6.1.4 Solving Special Systems

**Learning Objectives:**

- Solve systems with no solution.
- Solve systems with infinitely many solutions.
- Classify systems of linear equations.
- Write systems of linear equations.

**Standards:**

A-CED: 3, A-REI: 5, A-REI: 6, A-REI: 10, A-REI: 11, F-IF: 7, F-BF: 1, F-BF: 1a, F-LE: 1b, F-LE: 2, Q.A.2



### 6.1.5 Applying Systems

#### Learning Objectives:

- Solve rate problems using elimination.
- Write systems of linear equations.
- Solve mixture problems using substitution.
- Solve number digit problems using elimination.

#### Standards:

A-CED: 3, A-REI: 5, A-REI: 6, A-REI: 11, F-BF: 1, F-BF: 1a, F-LE: 1b, F-LE: 2, Q.A.2

## 6.2 Linear Inequalities

### 6.2.1 Graphing Linear Inequalities

#### Learning Objectives:

- Identify solutions of linear inequalities.
- Graph linear inequalities in two variables.
- Write linear inequalities.
- Write inequalities from graphs.

#### Standards:

A-SSE: 1, A-SSE: 1.a, A-CED: 3, F-IF: 4, F-IF: 7, F-BF: 1, Q.A.2

### 6.2.2 Solving Systems of Linear Inequalities

#### Learning Objectives:

- Solve systems of linear inequalities by graphing.
- Graph systems with parallel boundary lines.
- Write systems of linear inequalities.

#### Standards:

A-CED: 3, A-REI: 12, F-IF: 7, F-BF: 1, Q.A.2

## 7 Exponents and Polynomials

### 7.1 Exponents

#### 7.1.1 Product and Power Properties of Exponents

**Learning Objectives:**

- Evaluate powers with whole number exponents.
- Use the Product of Powers Property to simplify expressions.
- Use the Power of a Power Property to simplify expressions.
- Use the Power of a Product Property to simplify expressions.

#### 7.1.2 Integer Exponents

**Learning Objectives:**

- Evaluate powers with negative exponents.
- Use the Zero Power Property to simplify expressions.
- Simplify algebraic expressions containing negative exponents.

#### 7.1.3 Quotient Properties of Exponents

**Learning Objectives:**

- Use the Quotient of Powers Property.
- Use the Quotient of Powers Property to simplify expressions.
- Use the Power of a Quotient Property to simplify expressions.
- Use the Negative Power of a Quotient Property.

#### 7.1.4 An Application of Exponents: Scientific Notation

**Learning Objectives:**

- Convert numbers between scientific notation and standard form.
- Compare and order numbers in scientific notation.
- Multiply and divide numbers in scientific notation.

#### 7.1.5 Fractional Exponents

**Learning Objectives:**

- Evaluate powers with fractional exponents.
- Simplify expressions with fractional exponents.
- Use properties of exponents to simplify expressions.

**Standards:**

RN.A.1, RN.A.2





### 7.2 Polynomials

#### 7.2.1 Polynomials

##### Learning Objectives:

- Find the degree of polynomials.
- Write polynomials in standard form.
- Identify the leading coefficient of polynomials.
- Classify polynomials.
- Evaluate polynomials.

##### Standards:

A-SSE: 1.a

#### 7.2.2 Adding and Subtracting Polynomials

##### Learning Objectives:

- Add polynomials horizontally.
- Write polynomial expressions for perimeter.
- Find the opposite of polynomials.
- Subtract polynomials horizontally.
- Write polynomial expressions for profit.
- Evaluate polynomial expressions.

##### Standards:

A-SSE: 1.a, A-APR: 1

#### 7.2.3 Multiplying Polynomials by Monomials

##### Learning Objectives:

- Multiply monomials.
- Multiply polynomials by monomials.
- Write polynomial expressions for the volume of rectangular solids.

##### Standards:

A-SSE: 1, A-SSE: 1.a, A-APR: 1

#### 7.2.4 Multiplying Binomials

##### Learning Objectives:

- Multiply two binomials.
- Write polynomial expressions to represent lengths and areas.
- Find special products of binomials.

##### Standards:

A-SSE: 2, A-APR: 1



## 8 Factoring Polynomials

### 8.1 Factoring Methods

#### 8.1.1 Factors and Greatest Common Factors

**Learning Objectives:**

- Write prime factorizations.
- Find the GCF of numbers.
- Find the GCF of monomials.

**Standards:**

A-SSE: 1.a

#### 8.1.2 Factoring by GCF

**Learning Objectives:**

- Factor polynomials by using the GCF and by grouping.
- Factor out a common binomial factor from polynomials.

**Standards:**

A-SSE: 2, A-APR: 1, A-SSE: 1.a

#### 8.1.3 Factoring $x^2 + bx + c$

**Learning Objectives:**

- Factor trinomials by guess and check.
- Factor  $x^2 + bx + c$  when  $c$  is positive.
- Factor  $x^2 + bx + c$  when  $c$  is negative.

**Standards:**

A-SSE: 2, A-APR: 1, A-SSE: 1.a

#### 8.1.4 Factoring $ax^2 + bx + c$

**Learning Objectives:**

- Factor  $ax^2 + bx + c$  by guess and check.
- Factor  $ax^2 + bx + c$  when  $c$  is positive.
- Factor  $ax^2 + bx + c$  when  $c$  is negative.
- Factor  $ax^2 + bx + c$  when  $a$  is negative.

**Standards:**

A-SSE: 2, A-APR: 1, A-SSE: 1.a

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## 8.2 Applying Factoring Methods

### 8.2.1 Factoring Special Products

#### Learning Objectives:

- Recognize and factor perfect-square trinomials.
- Recognize and factor the difference of two squares.
- Write and evaluate expressions for perimeter.

#### Standards:

A-SSE: 1, A-SSE: 1.a, A-SSE: 2, A-SSE: 3, A-APR: 1

### 8.2.2 Choosing a Factoring Method

#### Learning Objectives:

- Determine whether polynomials are completely factored.
- Factor by GCF and recognize patterns.
- Factor by multiple methods.

#### Standards:

A-SSE: 2, A-APR: 1, A-SSE: 1.a



## 9 Quadratic Functions and Equations

### 9.1 Quadratic Functions

#### 9.1.1 Identifying Quadratic Functions

**Learning Objectives:**

- Identify quadratic functions.
- Graph quadratic functions by using a table of values.
- Identify the direction of parabolas.
- Identify the vertex and minimum or maximum of parabolas.
- Find the domain and range of quadratic functions.

**Standards:**

A-SSE: 1.a, F-IF: 1, F-IF: 5, F-IF: 8

#### 9.1.2 Characteristics of Quadratic Functions

**Learning Objectives:**

- Find the zeros of quadratic functions from graphs.
- Find the axis of symmetry of quadratic functions by using zeros or the formula.
- Find the vertex of parabolas.

**Standards:**

A-SSE: 1, A-SSE: 1.a, F-IF: 4

#### 9.1.3 Graphing Quadratic Functions

**Learning Objectives:**

- Graph quadratic functions.

**Standards:**

A-SSE: 1, A-SSE: 1.a, F-IF: 2, F-IF: 4, F-IF: 7, F-IF: 8, F-IF: 8a

#### 9.1.4 Transforming Quadratic Functions

**Learning Objectives:**

- Compare widths of parabolas.
- Compare graphs of quadratic functions.
- Write height functions.
- Use a graphing calculator to find the zeros of quadratic functions.

**Standards:**

A-SSE: 1, A-SSE: 1.a, F-IF: 2, F-IF: 4, F-IF: 7, F-BF: 1, F-BF: 1a, F-BF: 3, G-CO: 2

### 9.2 Solving Quadratic Equations

#### 9.2.1 Solving Quadratic Equations by Graphing

**Learning Objectives:**

- Solve quadratic equations by graphing.

**Standards:**

A-SSE: 1, A-SSE: 1.a, A-REI: 4, A-REI: 10, F-IF: 7

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### 9.2.2 Solving Quadratic Equations by Factoring

#### Learning Objectives:

- Use the Zero Product Property to solve quadratic equations.
- Solve quadratic equations by factoring.

#### Standards:

A-SSE: 1, A-SSE: 1.a, A-SSE: 2, A-SSE: 3.a, A-APR: 1, A-REI: 4, A-REI: 4b, F-IF: 8, F-IF: 8a

### 9.2.3 Solving Quadratic Equations by Using Square Roots

#### Learning Objectives:

- Use square roots to solve  $x^2 = c$ .
- Use square roots to solve quadratic equations.
- Approximate solutions to quadratic equations using a calculator.

#### Standards:

A-REI: 4, A-REI: 4b

### 9.2.4 Completing the Square

#### Learning Objectives:

- Complete the square to form perfect-square trinomials.
- Solve  $x^2 + bx = c$  by completing the square.
- Solve  $ax^2 + bx = c$  by completing the square.
- Write quadratic equations to represent area of rectangles.

#### Standards:

A-SSE: 2, A-REI: 4, A-REI: 4a, A-REI: 4b

### 9.2.5 The Quadratic Formula

#### Learning Objectives:

- Solve quadratic equations using the Quadratic Formula.
- Estimate solutions of quadratic equations using the Quadratic Formula.
- Solve quadratic equations using different methods.

#### Standards:

A-REI: 4, A-REI: 4b

### 9.2.6 The Discriminant

#### Learning Objectives:

- Determine the number of solutions of quadratic equations using the discriminant.
- Use the discriminant to find the number of  $x$ -intercepts of a quadratic.

#### Standards:

A-SSE: 1, A-SSE: 1.a



## 10 Data Analysis and Probability

### 10.1 Probability

#### 10.1.1 Experimental Probability

**Learning Objectives:**

- Identify sample spaces and outcomes.
- Estimate the likelihood of events.
- Find experimental probabilities.

**Standards:**

S-CP: 1

#### 10.1.2 Theoretical Probability

**Learning Objectives:**

- Find theoretical probabilities.
- Find probabilities by using the complement.
- Convert between odds and probabilities.

**Standards:**

S-CP: 1

#### 10.1.3 Independent and Dependent Events

**Learning Objectives:**

- Classify events as independent or dependent.
- Find probabilities of independent events.
- Find probabilities of dependent events.

**Standards:**

S-CP: 1, S-CP: 2, S-CP: 3, S-CP: 5, S-CP: 6, S-CP: 8

#### 10.1.4 Combinations and Permutations

**Learning Objectives:**

- Use the Fundamental Counting Principle.
- Find combinations and permutations.

### 10.2 Data Analysis

#### 10.2.1 Bar, Circle, and Line Graphs

**Learning Objectives:**

- Read and interpret bar and double bar graphs.
- Read and interpret line and double line graphs.
- Read and interpret circle graphs.
- Choose and create appropriate displays for data sets.

**Standards:**

Q.A.1

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### 10.2.2 Stem-and-Leaf Plots and Histograms

#### Learning Objectives:

- Read and interpret stem-and-leaf plots.
- Make stem-and-leaf plots, circle graphs, frequency tables, and cumulative frequency tables.
- Make and analyze histograms.
- Choose appropriate displays of data sets.

#### Standards:

S-ID: 1

### 10.2.3 Mean, Median, Mode, and Range

#### Learning Objectives:

- Find the mean, median, mode, and range of data sets.
- Choose measures of central tendencies.
- Explore effects of outliers.

#### Standards:

S-ID: 2, S-ID: 3

### 10.2.4 Box-and-Whisker Plots

#### Learning Objectives:

- Create box-and-whisker plots.
- Compare data sets using box-and-whisker plots.

#### Standards:

S-ID: 1, S-ID: 2, S-ID: 3

### 10.2.5 Expected Value

#### Learning Objectives:

- Find probability distributions.
- Find expected values.

#### Standards:

S-MD: 2, S-MD: 3, S-MD: 4, S-MD: 5, S-MD: 5a

### 10.2.6 Normal Distribution

#### Learning Objectives:

- Find means, variances, and standard deviations.
- Sketch curves to represent normal distributions.
- Find normal probabilities.

#### Standards:

S-ID: 2, S-ID: 4

### 10.2.7 Misleading Graphs and Statistics

#### Learning Objectives:

- Analyze misleading bar, line, and circle graphs.
- Analyze misleading statistics.

#### Standards:

Q.A.1

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## 11 Exponential and Radical Functions

### 11.1 Exponential Functions

#### 11.1.1 Geometric Sequences

**Learning Objectives:**

- *Extend geometric sequences.*
- *Find the  $n$ th term of geometric sequences.*

**Standards:**

F-BF: 2, F-LE: 2

#### 11.1.2 Exponential Functions

**Learning Objectives:**

- *Identify and evaluate exponential functions.*
- *Graph  $y = ab^x$  with  $a > 0$  and  $b > 1$ .*
- *Graph  $y = ab^x$  with  $a < 0$  and  $b > 1$ .*
- *Graph  $y = ab^x$  with  $a < 0$  and  $b < 1$ .*
- *Solve exponential functions using a graphing calculator.*

**Standards:**

A-SSE: 1, F-IF: 1, F-IF: 2, F-IF: 7, F-LE: 1a, F-LE: 2

#### 11.1.3 Exponential Growth and Decay

**Learning Objectives:**

- *Write and evaluate exponential growth functions.*
- *Write and evaluate compound interest functions.*
- *Write and evaluate exponential decay functions.*
- *Evaluate the half-life of substances.*

**Standards:**

A-SSE: 1, A-SSE: 1.a, F-IF: 2, F-IF: 8b, F-BF: 1, F-BF: 1a, F-LE: 2

#### 11.1.4 Linear, Quadratic, and Exponential Models

**Learning Objectives:**

- *Graph data sets to choose the most appropriate model.*
- *Use patterns to choose the most appropriate model.*
- *Write functions that model data sets and evaluate.*

**Standards:**

A-SSE: 1, A-SSE: 1.a, F-IF: 4, F-BF: 1, F-BF: 1a, F-LE: 1, F-LE: 1a, F-LE: 1b, F-LE: 1c, F-LE: 2, S-ID: 6a, S-ID: 6c



## 11.2 Radical Functions, Expressions, and Equations

### 11.2.1 Square-Root Functions

#### Learning Objectives:

- Evaluate square-root functions.
- Find the domain of square-root functions.
- Graph square-root functions.

#### Standards:

A-SSE: 1.a, F-IF: 1, F-IF: 7, F-IF: 7b

### 11.2.2 Radical Expressions

#### Learning Objectives:

- Simplify square-root expressions.
- Use the Product and Quotient Properties of Square Roots.
- Use the Pythagorean Theorem to estimate distances.

#### Standards:

A-SSE: 2, RN.A.2

### 11.2.3 Adding and Subtracting Radical Expressions

#### Learning Objectives:

- Add and subtract square-root expressions.
- Simplify square-root expressions.
- Find perimeter of shapes with radical expressions.

#### Standards:

A-SSE: 2, RN.A.2

### 11.2.4 Multiplying and Dividing Radical Expressions

#### Learning Objectives:

- Multiply square roots.
- Use the Distributive Property with radical expressions.
- Multiply sums and differences of radicals.
- Rationalize denominators.

#### Standards:

A-SSE: 2, RN.A.2

### 11.2.5 Solving Radical Equations

#### Learning Objectives:

- Solve simple radical equations.
- Solve simple radical equations by addition, subtraction, multiplication, or division.
- Solve radical equations with square roots on both sides.
- Determine whether solutions are extraneous.

#### Standards:

A-SSE: 1, A-SSE: 1.a, A-REI: 2, RN.A.2

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## 12 Rational Functions and Equations

### 12.1 Rational Functions and Expressions

#### 12.1.1 Inverse Variation

**Learning Objectives:**

- Identify inverse variations.
- Write and graph inverse variations.
- Determine a reasonable domain and range for inverse variations.
- Use the Product Rule for inverse variations.

**Standards:**

A-SSE: 1, A-SSE: 1.a, F-IF: 4, F-IF: 7, F-IF: 8, F-BF: 1

#### 12.1.2 Rational Functions

**Learning Objectives:**

- Identify excluded values for rational functions.
- Identify asymptotes for rational functions.
- Graph rational functions using asymptotes.
- Describe reasonable domain and range values for rational functions.

**Standards:**

A-SSE: 1, A-SSE: 1.a, F-IF: 7, F-IF: 7d

#### 12.1.3 Simplifying Rational Expressions

**Learning Objectives:**

- Identify excluded values of rational expressions.
- Simplify rational expressions.
- Write, simplify, and evaluate geometric ratios.

**Standards:**

A-SSE: 1, A-SSE: 1.a, A-SSE: 2, A-APR: 7, F-BF: 1a

### 12.2 Operations with Rational Expressions

#### 12.2.1 Multiplying and Dividing Rational Expressions

**Learning Objectives:**

- Multiply rational expressions.
- Multiply rational expressions by a polynomial.
- Multiply rational expressions containing polynomials.
- Divide by rational expressions and polynomials.
- Write and simplify expressions that represent probabilities.
- Simplify complex fractions.

**Standards:**

A-SSE: 1, A-SSE: 1.a, A-SSE: 2, A-APR: 7

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### 12.2.2 Adding and Subtracting Rational Expressions

#### Learning Objectives:

- Add and subtract rational expressions with like denominators.
- Identify least common multiples.
- Add and subtract rational expressions with unlike denominators.
- Write, simplify, and evaluate expressions involving distance, rate, and time.

#### Standards:

A-SSE: 1, A-SSE: 1.a, A-SSE: 2, A-APR: 7, F-BF: 1a

### 12.2.3 Dividing Polynomials

#### Learning Objectives:

- Divide polynomials by monomials and by binomials.
- Perform long division of polynomials.

#### Standards:

A-SSE: 2, A-APR: 6, A-APR: 7

### 12.2.4 Solving Rational Equations

#### Learning Objectives:

- Solve rational equations by using cross products.
- Solve rational equations by using the LCD.
- Write and solve work problems.
- Identify extraneous solutions when solving rational equations.

#### Standards:

A-SSE: 1.a, A-SSE: 2, A-APR: 7, A-REI: 2, F-BF: 1a