



Algebra 2

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STANDARDS	PAGE REFERENCES
<p>Strand 1: Number and Operations</p> <p>Number sense is the understanding of numbers and how they relate to each other and how they are used in specific context or real-world application. It includes an awareness of the different ways in which numbers are used, such as counting, measuring, labeling, and locating. It includes an awareness of the different types of numbers such as, whole numbers, integers, fractions, and decimals and the relationships between them and when each is most useful. Number sense includes an understanding of the size of numbers, so that students should be able to recognize that the volume of their room is closer to 1,000 than 10,000 cubic feet. Students develop a sense of what numbers are, i.e., to use numbers and number relationships to acquire basic facts, to solve a wide variety of real-world problems, and to estimate to determine the reasonableness of results.</p>	
<p>Concept 1: Number Sense</p> <p>Understand and apply numbers, ways of representing numbers, and the relationships among numbers and different number systems.</p> <p>In Grades 9 and 10, students apply the skills they have learned about the real number system to subsets of the real number system for problem solving. By extending number systems to solve problems, students lay a foundation for problem solving with complex numbers in the College Work Readiness Standard.</p>	
<p>PO 1. Justify with examples the relation between the number system being used (natural numbers, whole numbers, integers, rational numbers and irrational numbers) and the question of whether or not an equation has a solution in that number system.</p>	<p>Student Edition: 11, 16 #53, 27, 32 #59, 285, 371 Example 6, 433 <i>Check Your Understanding</i> 393 #4-#9 <i>Preparing for Standardized Tests</i> 403 #2 <i>Study Tip</i> 12</p> <p>Teacher Edition: AE 403; DI 12; WO 12, 285</p>

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PO 2. Sort sets of numbers as finite or infinite, and justify the sort.	Student Edition: 11, 28-29, 30 #6-#13, #23-#34, 31 #39-#42, 41-45, 46 #45-#50, 48 #69-#71, 106 #40 <i>Study Guide and Review</i> 50 1-2 Teacher Edition: AE 28, 29, 43, 44; TT 12
PO 3. Express that the distance between two numbers is the absolute value of their difference.	Student Edition: 27-29, 43 Example 3, 45 #22, 664 #9 <i>Study Tip</i> 307 Teacher Edition: FM 29; SQ 27; T 27; TT 28; WO 29
<p>Concept 2: Numerical Operations</p> <p>Understand and apply numerical operations and their relationship to one another.</p> <p>In Grades 9 and 10, students build on their understanding of rational numbers. Students apply that understanding to solve problems through operations with powers and roots of real numbers. Students use their understanding of operations with roots of real numbers and extend that understanding to operations with complex numbers in grades 11 and 12.</p>	
PO 1. Solve word problems involving absolute value, powers, roots, and scientific notation. Connections: MHS-S4C3-06, MHS-S4C3-07, MHS-S4C3-08	Student Edition: 28 Example 2, 30 #5, #35, 31 #43, 288 #3, #48, 289 #53, 434 #36, #55-#56, 534 <i>Why?</i> 27, 284, 333, 383, 431 Teacher Edition: AE 433, 535; T 383
PO 2. Summarize the properties of and connections between real number operations; justify manipulations of expressions using the properties of real number operations.	Student Edition: 11-17, 203, 299 #45 <i>Concept Summary</i> 297, 333 <i>Key Concept</i> 5, 19, 33, 43, 384, 409, 425, 455 Teacher Edition: FM 35; TT 6
PO 3. Calculate powers and roots of rational and irrational numbers.	Student Edition: 284, 289, 294, 296, 297 #10-#13, 334 Example 1, 383-384, 525-531 <i>Algebra Lab</i> 301 <i>Concepts and Skills Bank</i> 995-996 <i>Graphing Technology Lab</i> 291, 437 <i>Why?</i> 284 Teacher Edition: AE 432, 433, 995, 996; DI 433; WO 434

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PO 4. Compute using scientific notation.	<p>Student Edition: 533 Real-World Example 1, 537 #1, #4 <i>Concepts and Skills Bank</i> 997 <i>Preparing for Standardized Tests</i> 884 <i>Why?</i> 333</p> <p>Teacher Edition: AE 997; T 333, 997; TNT 997; TT 258</p>
<p>Concept 3: Estimation</p> <p>Use estimation strategies reasonably and fluently while integrating content from each of the other strands.</p> <p>In Grades 9 and 10, students apply estimation skills mastered in the middle grades to effectively solve problems with less common rational numbers. Students analyze problems in context to determine when it is more appropriate to use estimates and approximations in order to extend that analysis to recognize the limitations of estimations in grades 11 and 12.</p>	
PO 1. Determine rational approximations of irrational numbers.	<p>Student Edition: 261 Example 4, 285 Example 2, 288, 430 #64, 433 Real-World Example 3, 525 <i>Key Concept</i> 11</p> <p>Teacher Edition: AE 261, 527; T 525</p>
PO 2. Use estimation to determine the reasonableness of a solution.	<p>Student Edition: 93 Real-World Example 1, 94 Real-World Example 2, 95-97, 140 #41, 297 #9, 298 #20, 299 #41c, 381 #31c, #39 <i>Check Your Progress</i> 93 <i>Graphing Technology Lab</i> 285 #2-#3 <i>Problem-Solving Handbook</i> 944</p> <p>Teacher Edition: AE 94, 95</p>
PO 3. Determine when an estimate is more appropriate than an exact answer.	<p>Student Edition: 264 #39-#40, 265 #49-#50, 271 Real-World Example 5, 427 #8, 433 Real-World Example 3 <i>Preparing for Standardized Tests</i> 469 #1 <i>Problem-Solving Handbook</i> 944 <i>Standardized Test Practice</i> 390 #62</p>
PO 4. Estimate the location of the rational or irrational numbers on a number line.	<p>Student Edition: 34 Example 1, 35 Example 2, 36-37, 41-47 <i>Algebra Lab</i> 40 <i>Study Guide and Review</i> 52</p> <p>Teacher Edition: AE 35, 42, 43, 44</p>

STANDARDS

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Strand 2: Data Analysis, Probability, and Discrete Mathematics

This strand requires students to use data collection, data analysis, statistics, probability, systematic listing and counting, and the study of graphs. This prepares students for the study of discrete functions as well as to make valid inferences, decisions, and arguments. Discrete mathematics is a branch of mathematics that is widely used in business and industry. Combinatorics is the mathematics of systematic counting. Vertex-edge graphs are used to model and solve problems involving paths, networks, and relationships among a finite number of objects.

Concept 1: Data Analysis (Statistics)

Understand and apply data collection, organization, and representation to analyze and sort data.

In Grades 9 and 10, students build on their understanding of data collection and measures of center from the middle grades to effectively represent, analyze, interpret, and make inferences from multiple data sets using multiple summary statistics. In grades 11 and 12 students draw from this deeper analysis to compare and investigate statistical design and more advanced statistical measures.

PO 1. Draw inferences about data sets from lists, tables, matrices, and plots.

Connections: SCHS-S1C4-02

Student Edition:

Algebra Lab 100, 785
Check Your Progress 93 #1D
Graphing Technology Lab 319 #6
Spreadsheet Lab 192 #3

Teacher Edition:

AA 94, 187

PO 2. Organize collected data into an appropriate graphical representation with or without technology.

Student Edition:

93 Real-World Example 1, 94 Real-World Example 2, 95-97, 189 #21, #28, 186 Real-World Example 2, 190 #33
Algebra Lab 99, 785
Check Your Progress 93 #1A, 187 #2A
Graphing Technology Lab 319 #2
Spreadsheet Lab 192 #1

Teacher Edition:

AA 93

PO 3. Display data, including paired data, as lists, tables, matrices, and plots with or without technology; make predictions and observations about patterns or departures from patterns.

Student Edition:

93 Real-World Example 1, 94 Real-World Example 2, 95-97, 186 Real-World Example 2
Algebra Lab 99-100, 785
Graphing Technology Lab 319 #5, #7, 751
Spreadsheet Lab 192

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<p>PO 4. Make inferences by comparing data sets using one or more summary statistics.</p> <p>Connections: SCHS-S1C3-06</p>	<p>Student Edition: 186-187, 189 #21, #28, 197 #28b, 766 Example 4 #b <i>Algebra Lab</i> 99-100 <i>Graphing Technology Lab</i> 319 #5, 751 <i>Spreadsheet Lab</i> 192 #2 <i>Study Tip</i> 195</p> <p>Teacher Edition: AA 187</p>
<p>PO 5. Determine which measure of center is most appropriate in a given situation and explain why.</p>	<p>Student Edition: 752, 755 #1-#4, 757 #25-#27, #31-#32 <i>Algebra Lab</i> 99, 785 <i>Why?</i> 752</p> <p>Teacher Edition: AE 753; EC 100; SQ 752</p>
<p>PO 6. Evaluate the reasonableness of conclusions drawn from data analysis.</p> <p>Connections: SCHS-S1C3-02</p>	<p>Student Edition: 93 Real-World Example 1 #d 94 Real-World Example 2, 95-97 <i>Algebra Lab</i> 100 <i>Check Your Progress</i> 93 #1D</p> <p>Teacher Edition: AE 94</p>
<p>PO 7. Identify misrepresentations and distortions in displays of data and explain why they are misrepresentations or distortions.</p>	<p>Student Edition: 745-749, 770 #26 <i>Graphing Technology Lab</i> 751</p> <p>Teacher Edition: AE 746, 747, 748; T 745</p>
<p>PO 8. Design simple experiments or investigations and collect data to answer questions.</p>	<p>Student Edition: 190 #39-#40, 745-749 <i>Algebra Lab</i> 100 #3-#4, 785 <i>Graphing Technology Lab</i> 319</p> <p>Teacher Edition: DI 750; TT 95</p>

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<p>Concept 2: Probability Understand and apply the basic concepts of probability. In Grades 9 and 10, students apply the law of large numbers to their knowledge of theoretical and experimental probability. Students investigate probability of independent and dependent events, and apply concepts area to determine the geometric probability of a simulation. Students deepen their understanding of probability and experimentation in order to prepare for advanced problem solving with estimations and exact calculations for probability with independent and dependent events; and univariate and bivariate data in grades 11 and 12.</p>	
<p>PO 1. Make predictions and solve problems based on theoretical probability models.</p> <p>Connections: MHS-S2C3-01</p>	<p>Student Edition: 759-763, 764-771, 773-778 <i>Algebra Lab 779</i></p> <p>Teacher Edition: A 763; AE 760, 765; DI 763, 771; T 764</p>
<p>PO 2. Determine the theoretical probability of events, estimate probabilities using experiments, and compare the two.</p>	<p>Student Edition: 764-771, 786-792 <i>Why? 759</i></p> <p>Teacher Edition: AE 787, 788, 789; DI 771; SQ 759; WO 771</p>
<p>PO 3. Use simulations to model situations involving independent and dependent events.</p>	<p>Student Edition: 759-763, 766 Example 4, 767-771, 786-792 <i>Algebra Lab 785</i></p> <p>Teacher Edition: AE 787, 788, 789; DI 763; WO 771</p>
<p>PO 4. Explain and use the law of large numbers (that experimental results tend to approach theoretical probabilities after a large number of trials).</p>	<p>Student Edition: 764, 768-769</p> <p>Teacher Edition: T 764</p>
<p>PO 5. Use concepts and formulas of area to calculate geometric probabilities.</p> <p>Connections: MHS-S4C1-01, MHS-S4C4-02, MHS-S4C4-03, MHS-S4C4-04, MHS-S4C4-05</p>	<p>Student Edition: 773-778 <i>Algebra Lab 779</i></p> <p>Teacher Edition: T 779</p>

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<p>Concept 3: Systematic Listing and Counting</p> <p>Understand and demonstrate the systematic listing and counting of possible outcomes.</p> <p>In Grades 9 and 10, students use the counting techniques learned in the middle grades to calculate and solve problems related to combinations and permutations. Students represent problems and solutions using algebraic symbols in order to lay a foundation for work with Pascal's Triangle and the binomial theorem in College Work Readiness.</p>	
<p>PO 1. Apply the addition and multiplication principles of counting, representing these principles algebraically using factorial notation.</p> <p>Connections: MHS-S2C2-01, MHS-S5C1-01, MHS-S5C1-02</p>	<p>Student Edition: P8-P11, P13, P14 Example 4, 764 Example 1</p> <p>Teacher Edition: AE P9, P10; TT P10</p>
<p>PO 2. Apply appropriate means of computing the number of possible arrangements of items using permutations where order matters, and combinations where order does not matter.</p> <p>Connections: MHS-S5C1-01, MHS-S5C1-02</p>	<p>Student Edition: P12-P14</p> <p><i>Reading Math</i> P13</p> <p><i>Skills Review</i> 758 #42-#45</p> <p>Teacher Edition: AE P12, P13; TT P13; WO P13</p>
<p>PO 3. Determine the number of possible outcomes of an event.</p> <p>Connections: MHS-S2C1-02, MHS-S2C4-01, MHS-S5C1-02</p>	<p>Student Edition: P13 Example 3, P14 #17-#20</p> <p><i>Key Concept</i> P12</p> <p>Teacher Edition: AE P13; TT P13</p>
<p>Concept 4: Vertex-Edge Graphs</p> <p>Understand and apply vertex-edge graphs.</p> <p>In Grades 9 and 10, students apply their understanding from grades 7 and 8 of Euler/Hamilton paths, directed graphs, and algorithmic reasoning to model and solve network problems. The understanding of networks students gain in grades 9 and 10 extends to problem solving using circuits, shortest paths, minimum weight spanning trees, and adjacency matrices in grades 11 and 12.</p>	
<p>PO 1. Solve network problems using graphs and matrices.</p> <p>Connections: MHS-S2C1-01, MHS-S2C1-03, MHS-S2C3-03, MHS-S3C3-15, MHS-S4C3-01, MHS-S4C3-03</p>	<p>Student Edition: 209-217, 220-227</p> <p><i>Algebra Lab</i> 218-219</p> <p>Teacher Edition: AE 210, 211, 212, 213, 222, 223; DI 217; FM 212; WO 212</p>

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Strand 3: Patterns, Algebra, and Functions

Patterns occur everywhere in nature. Algebraic methods are used to explore, model and describe patterns, relationships, and functions involving numbers, shapes, iteration, recursion, and graphs within a variety of real-world problem solving situations. Iteration and recursion are used to model sequential, step-by-step change. Algebra emphasizes relationships among quantities, including functions, ways of representing mathematical relationships, and the analysis of change.

Concept 1: Patterns

Identify patterns and apply pattern recognition to reason mathematically while integrating content from each of the other strands.

In Grades 9 and 10, students recognize sequences as arithmetic or geometric and use their algebraic skills to model, represent, and extend sequences. The representation and modeling of sequences will lead students to use their skills to solve problems in context in grades 11 and 12.

PO 1. Recognize, describe, and analyze sequences using tables, graphs, words, or symbols; use sequences in modeling.

Student Edition:

381-386, 688-694, 696-701, 714-718

Study Guide and Review 733-735

Teacher Edition:

AE 682, 683, 684, 689, 690, 691, 697, 715; DI 687; T 681, 688

PO 2. Determine a specific term of a sequence.

Student Edition:

682 Real-World Example 3, 685 #9, #31-#32, 686 #51-#53, 688-694, 696-701, 731 #48

Spreadsheet Lab 720

Teacher Edition:

AE 682, 683, 689, 690; T 681, 688

PO 3. Create sequences using explicit and recursive formulas involving both subscripts and function notation.

Student Edition:

688-694, 696-701, 714-718

Spreadsheet Lab 720

Teacher Edition:

AE 689, 697, 698, 715, 716; FM 689; T 688

Connections: MHS-S3C4-03, MHS-S5C1-01, MHS-S5C1-02

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Concept 2: Functions and Relationships

Describe and model functions and their relationships.

In Grades 9 and 10, students deepen their understanding of functions, both linear and quadratic, and they learn the practical and mathematical limitations of modeling functions. In grades 9 and 10 linear and quadratic functions begin students' formal instruction to the library of functions, while in grades 11 and 12 students investigate many other functions.

<p>PO 1. Sketch and interpret a graph that models a given context, make connections between the graph and the context, and solve maximum and minimum problems using the graph.</p> <p>Connections: MHS-S4C3-05, MHS-S4C3-06, MHS-S4C3-07, MHS-S4C3-08, SSHS-S1C1-04, SSHS-S2C1-04</p>	<p>Student Edition: 73 #50, 81 #35, 93 Real-World Example 1, 135-140, 252, 260 Example 2, 296, 358-360, 425-426, 495 Real-World Example 6 <i>Algebra Lab</i> 68, 75 <i>Graphing Technology Lab</i> 90, 108, 142, 365 <i>Why?</i> 69</p> <p>Teacher Edition: AE 71, 95, 252, 260, 359; T 92</p>
<p>PO 2. Determine if a relationship represented by an equation, graph, table, description, or set of ordered pairs is a function.</p> <p>Connections: MHS-S3C3-03</p>	<p>Student Edition: P4-P5, 61-67, 69, 71 #1-#4, 74 #61-#63, 101, 348, 350, 424, 577 <i>Algebra Lab</i> 68</p> <p>Teacher Edition: AE P5, 62, 63, 64; DI 67; TT 62</p>
<p>PO 3. Use function notation; evaluate a function at a specified value in its domain.</p> <p>Connections: MHS-S3C3-03, MHS-S3C3-04, MHS-S3C3-07</p>	<p>Student Edition: 64, 65 #21-#22, #24-#32, 66 #34, #35, 69 Example 1, 72 #18-#24, 101 Example 1, 102, 120 #34, 349, 427 #1-#7, #9-#28, 533, 569 <i>Algebra Lab</i> 75 <i>Check Your Progress</i> 425 <i>Graphing Technology Lab</i> 108</p> <p>Teacher Edition: AE 70, 102</p>
<p>PO 4. Use equations, graphs, tables, descriptions, or sets of ordered pairs to express a relationship between two variables.</p>	<p>Student Edition: 76-81, 92-97, 409-415 <i>Algebra Lab</i> 99-100, 356 <i>Graphing Technology Lab</i> 90, 423, 540</p> <p>Teacher Edition: AE 77, 78, 86, 536; DI 411</p>
<p>PO 5. Recognize and solve problems that can be modeled using a system of two equations in two variables.</p> <p>Connections: MHS-S4C3-08</p>	<p>Student Edition: 135-140, 143-149, 151-156 <i>Graphing Technology Lab</i> 142, 158</p> <p>Teacher Edition: AE 136, 137, 138, 144, 145, 152, 153; DI 146</p>

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<p>PO 6. Recognize and solve problems that can be modeled using a quadratic function.</p> <p>Connections: MHS-S4C3-08</p>	<p>Student Edition: 249-257, 259-265, 268-274, 284-289 <i>Graphing Technology Lab</i> 267, 291</p> <p>Teacher Edition: AE 250, 251, 252, 253, 269, 271, 286; DI 257; FM 252</p>
<p>PO 7. Determine domain and range of a function from an equation, graph, table, description, or set of ordered pairs.</p> <p>Connections: MHS-S3C3-12, MHS-S3C3-13, MHS-S3C3-14</p>	<p>Student Edition: P4-P5, 61-62, 64 #1-#8, 65 #11-#20, #23, 74 #61-#63, 424 Example 1, 427 #13-#18, 569-570, 572 #1-#6, 573 #7-#22, #25-#28 <i>Study Guide and Review</i> 123 2-1</p> <p>Teacher Edition: AE P4, P5, 62, 425, 570; SQ 61</p>
<p>Concept 3: Algebraic Representations</p> <p>Represent and analyze mathematical situations and structures using algebraic representations. In Grades 9 and 10, students extend their understanding of algebraic expressions with rational numbers to polynomial, rational, and square root expressions. Students deepen their understanding of the structure of algebra to analyze equations, solve systems of equations, perform operations on matrices, and generalize solution strategies to solve polynomial equations and problems. This lays the groundwork for students in grades 11 and 12 to perform operations on these expressions and extend their work with matrices and systems of equations.</p>	
<p>PO 1. Create and explain the need for equivalent forms of an equation or expression.</p>	<p>Student Edition: 24 #62, 39 #59, 333-338, 525-526, 529 #1-#4, #20-#27, 900 Example 3 <i>Algebra Lab</i> 340 <i>Key Concept</i> 899 <i>Mid-Chapter Quiz</i> 26 #13 <i>Preparing for Standardized Tests</i> 930 <i>Standardized Test Practice</i> 57 #13 <i>Transform Each Side of an Equation</i> 899</p> <p>Teacher Edition: AE 334, 336, 526; DI 339; FM 901; T 268, 930</p>
<p>PO 2. Solve formulas for specified variables.</p>	<p>Student Edition: 7, 8 #38, 9 #40, 17 #68, 21 Example 6, 23 #51, 32 #68, 421 #49, 597 Real-World Example 4 <i>Mid-Chapter Quiz</i> 26 #20 <i>Study Guide and Review</i> 51 #30-#33 <i>Why?</i> 76</p> <p>Teacher Edition: AE 7, 21</p>

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<p>PO 3. Write an equation given a table of values, two points on the line, the slope and a point on the line, or the graph of the line.</p>	<p>Student Edition: 83-88, 93 Real-World Example 1, 94-95 Real-World Example 2, 96-97, 107 #50-#52, 116 #55 <i>Graphing Technology Lab</i> 90 <i>Mid-Chapter Quiz</i> 91 #20-#23 <i>Study Guide and Review</i> 124 2-4, 125 2-5</p> <p>Teacher Edition: AE 83, 85, 86, 95; DI 84; FM 85</p>
<p>PO 4. Determine from two linear equations whether the lines are parallel, perpendicular, coincident, or intersecting but not perpendicular.</p> <p>Connections: MHS-S4C3-04, MHS-S4C3-07</p>	<p>Student Edition: 86 Example 4, #6-#7, 87 #23-#26, 88 #40, 107 #50-#52, 111 Example 4, 114 #39 <i>Graphing Technology Lab</i> 108 <i>Key Concept</i> 85 <i>Study Guide and Review</i> 124 #39-#40</p> <p>Teacher Edition: AE 86</p>
<p>PO 5. Solve linear equations and equations involving absolute value, with one variable.</p> <p>Connections: MHS-S1C2-01</p>	<p>Student Edition: 18-25, 27-31 <i>Mid-Chapter Quiz</i> 26 #18-#20 <i>Practice Test</i> 53 #3-#20 <i>Study Guide and Review</i> 51 <i>Why?</i> 18, 27</p> <p>Teacher Edition: AE 19, 20, 21, 28, 29; DI 21; T 27</p>
<p>PO 6. Solve linear inequalities in one variable.</p>	<p>Student Edition: 33-39, 41-47 <i>Algebra Lab</i> 40 <i>Practice Test</i> 53 #22-#25 <i>Study Guide and Review</i> 52 <i>Why?</i> 33, 41</p> <p>Teacher Edition: AE 34, 35, 36, 42, 43, 44; DI 39; T 33, 41</p>

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<p>PO 7. Solve systems of two linear equations in two variables.</p> <p>Connections: MHS-S4C3-05</p>	<p>Student Edition: 135-140, 143-149, 151-157, 231-233 <i>Graphing Technology Lab</i> 142, 158, 236 <i>Study Guide and Review</i> 175, 240 4-6 <i>Why?</i> 135</p> <p>Teacher Edition: A 150; AE 136, 137, 138, 144, 145, 152, 153; DI 141; WO 141</p>
<p>PO 8. Simplify and evaluate polynomials, rational expressions, expressions containing absolute value, and radicals.</p>	<p>Student Edition: P8, 27-31, 271-275, 277, 284-289, 335-338, 384-397, 439-441, 553-554</p> <p>Teacher Edition: AE 28, 29, 271, 277, 278, 385, 442, 554; DI 275; T 27</p>
<p>PO 9. Multiply and divide monomial expressions with integer exponents.</p>	<p>Student Edition: 333-339, 341, 345 #12-#17, 347 #53-#59 <i>Study Guide and Review</i> 398 6-1 <i>Why?</i> 333, 341</p> <p>Teacher Edition: AE 334, 335, 336; T 333, 340, 341</p>
<p>PO 10. Add, subtract, and multiply polynomial and rational expressions.</p>	<p>Student Edition: 336 Example 6, 337-338, 553-560, 562-567 <i>Study Guide and Review</i> 398 6-1, 606 <i>Why?</i> 553</p> <p>Teacher Edition: AE 336, 554, 555, 556, 563, 564; T 553</p>
<p>PO 11. Solve square root equations involving only one radical.</p>	<p>Student Edition: 453-457, 482 #43-#48 <i>Graphing Technology Lab</i> 460-461 <i>Practice Test</i> 467 #32-#40 <i>Study Guide and Review</i> 466 <i>Why?</i> 453</p> <p>Teacher Edition: AE 454, 455; DI 459; T 453</p>

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<p>PO 12. Factor quadratic polynomials in the form of $ax^2 + bx + c$ where a, b, and c are integers.</p> <p>Connections: MHS-S3C3-13, MHS-S4C3-08, MHS-S5C1-01, MHS-S5C1-02</p>	<p>Student Edition: P7-P8, 268-274, 282 #75-#77, 290 #70-#72, 368, 556 Example 5 <i>Mid-Chapter Quiz</i> 283 #10-#13 <i>Study Guide and Review</i> 322 5-3</p> <p>Teacher Edition: AE P7, P8, 269, 270, 369</p>
<p>PO 13. Solve quadratic equations.</p> <p>Connections: MHS-S3C2-07, MHS-S3C3-12, MHS-S4C3-08</p>	<p>Student Edition: 268-275, 280 #36-#41, 284-289, 292-299 <i>Algebra Lab</i> 301-302 <i>Graphing Technology Lab</i> 291 <i>Why?</i> 268</p> <p>Teacher Edition: AE 269, 270, 271, 275, 277, 278, 285, 287, 294; DI 275; T 268</p>
<p>PO 14. Factor higher order polynomials.</p> <p>Connections: MHS-S3C3-12</p>	<p>Student Edition: 357-363, 368-374, 383-389, 391-395 <i>Algebra Lab</i> 359 <i>Concept Summary</i> 383 <i>Graphing Technology Lab</i> 365-366, 376</p> <p>Teacher Edition: AE 358, 359, 360, 369, 370; DI 390</p>
<p>PO 15. Solve problems using operations with matrices.</p>	<p>Student Edition: 193-198, 200-205, 222-227, 229-234 <i>Algebra Lab</i> 218-219 <i>Graphing Technology Lab</i> 236 <i>Why?</i> 193</p> <p>Teacher Edition: AE 194, 195, 201, 202, 203, 223, 224; DI 201; T 193</p>

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Concept 4: Analysis of Change

Analyze how changing the values of one quantity corresponds to change in the values of another quantity.

In Grades 9 and 10, students apply their understanding of rate change and simple rates in grades 7 and 8 to linear functions. Students use rates and rate of change to solve problems, including interest problems. Students in grades 11 and 12 solve problems using rate of change and analyze and interpret rate of change in financial contexts.

<p>PO 1. Determine the slope and intercepts of the graph of a linear function, interpreting slope as a constant rate of change.</p> <p>Connections: MHS-S3C3-04, MHS-S4C3-06, MHS-S5C1-01, MHS-S5C1-02</p>	<p>Student Edition: 77-81, 84-89, 92-97, 124 <i>Graphing Technology Lab</i> 90 <i>Mid-Chapter Quiz</i> 91 #19 <i>Study Guide and Review</i> 124</p> <p>Teacher Edition: AE 78, 84, 85, 86, 93, 94, 95</p>
<p>PO 2. Solve problems involving rate of change.</p> <p>Connections: MHS-S4C2-01, MHS-S4C2-02, MHS-S4C2-04</p>	<p>Student Edition: 76-81, 89 #47-#49, 98 #24-#27 <i>Mid-Chapter Quiz</i> 91 #14 <i>Study Guide and Review</i> 124 2-3</p> <p>Teacher Edition: AE 77, 78</p>
<p>PO 3. Solve interest problems.</p> <p>Connections: MHS-S3C1-03, SSHS-S5C5-04</p>	<p>Student Edition: 487-490, 528 Real-World Example 6, 529 #40, 530 #47, 601 #32 <i>Key Concept</i> 486, 528 <i>Spreadsheet Lab</i> 532, 720 <i>Study Guide and Review</i> 544 #55, #62</p> <p>Teacher Edition: AE 487; DI 491</p>

STANDARDS

PAGE REFERENCES

Strand 5: Structure and Logic

This strand emphasizes the core processes of problem solving. Students draw from the content of the other four strands to devise algorithms and analyze algorithmic thinking. Strand One and Strand Three provide the conceptual and computational basis for these algorithms. Logical reasoning and proof draws its substance from the study of geometry, patterns, and analysis to connect remaining strands. Students use algorithms, algorithmic thinking, and logical reasoning (both inductive and deductive) as they make conjectures and test the validity of arguments and proofs. Concept two develops the core processes as students evaluate situations, select problem solving strategies, draw logical conclusions, develop and describe solutions, and recognize their applications.

Concept 1: Algorithms and Algorithmic Thinking

Use reasoning to solve mathematical problems.

In Grades 9 and 10, students apply their understanding of algorithms and algebraic structure from grades 7 and 8 to analyze, determine the equivalence of, and use algorithms to solve problems. Students deepen these analysis skills in grades 11 and 12.

PO 1. Select an algorithm that explains a particular mathematical process; determine the purpose of a simple mathematical algorithm.

Connections: MHS-S2C1-02, MHS-S2C3-01, MHS-S2C3-02, MHS-S2C3-03, MHS-S3C3-12, MHS-S3C3-13, MHS-S3C4-01, MHS-S4C1-10, MHS-S4C1-11, MHS-S4C3-01, MHS-S4C3-02, MHS-S4C3-03, MHS-S4C4-02, MHS-S5C1-02

Student Edition:

70, 103, 270, 721-722

Algebra Lab 726

Concept Summary 723

Graphing Technology Lab 90, 108

Key Concept 193, 194, 201, 204, 277, 343, 377, 391, 722

Teacher Edition:

T 193

PO 2. Analyze algorithms for validity and equivalence recognizing the purpose of the algorithm.

Connections: MHS-S2C1-04, MHS-S2C3-01, MHS-S2C3-02, MHS-S2C3-03, MHS-S3C1-03, MHS-S3C3-12, MHS-S3C3-13, MHS-S3C4-01, MHS-S4C1-10, MHS-S4C1-11, MHS-S4C3-01, MHS-S4C3-02, MHS-S4C3-03, MHS-S4C4-02

Student Edition:

73 #51, 270, 284, 377, 409-410, 721-722

Algebra Lab 726

Concept Summary 297

Key Concept 85, 103, 411

Teacher Edition:

A 107, 199, 266, 347, 422; EC 291; PT 722; T 268; TT 723

STANDARDS

PAGE REFERENCES

Concept 2: Logic, Reasoning, Problem Solving, and Proof

Evaluate situations, select problem-solving strategies, draw logical conclusions, develop and describe solutions, and recognize their applications.

In Grades 9 and 10, students formalize the development of inductive, deductive, and proportional reason, introduced in grades 7 and 8, as they make and defend generalizations and justify their reasoning using accepted standards of mathematical evidence and proof. Students' grasp of logical structure is extended to mathematical modeling in grades 11 and 12.

<p>PO 1. Analyze a problem situation, determine the question(s) to be answered, organize given information, determine how to represent the problem, and identify implicit and explicit assumptions that have been made.</p>	<p>Student Edition: <i>Algebra Lab</i> 311, 356, 726 <i>Graphing Technology Lab</i> 90, 108, 258, 291, 303-304, 319 <i>Spreadsheet Lab</i> 192</p>
<p>PO 2. Solve problems by formulating one or more strategies, applying the strategies, verifying the solution(s), and communicating the reasoning used to obtain the solution(s).</p>	<p>Student Edition: 259-265, 268-275, 284-289, 451 #69 <i>Concept Summary</i> 297 <i>Graphing Technology Lab</i> 267 Teacher Edition: A 107, 199, 266, 275, 347; CS 287; QF 293; T 267</p>
<p>PO 3. Evaluate a solution for reasonableness and interpret the meaning of the solution in the context of the original problem.</p>	<p>Student Edition: 93 Real-World Example 1, 94 Real-World Example 2, 95-97, 140 #41, 297 #9, 298 #20, 299 #41c, 381 #31c, #39, 597 Real-World Example 4 <i>Check Your Progress</i> 93 <i>Graphing Technology Lab</i> 285 #2-#3 <i>Problem-Solving Handbook</i> 944 Teacher Edition: AE 94, 95; T 284</p>
<p>PO 4. Generalize a solution strategy for a single problem to a class of related problems; explain the role of generalizations in inductive and deductive reasoning.</p>	<p>Student Edition: 289 #60, 354 #64, 389 #58, 421 #55, 429 #50, 444 #65, 451 #66, 458 #74-#75, 560 #62, 574 #40 <i>Algebra Lab</i> 356 <i>Preparing for Standardized Tests</i> 738-739 Teacher Edition: T 431</p>
<p>PO 5. Summarize and communicate mathematical ideas using formal and informal reasoning.</p>	<p>Student Edition: 363 #51, 374 #83, 381 #43, 415 #63, 421 #52, 560 #65, 636 #64, 727-730 <i>Why?</i> 727 Teacher Edition: AE 728; T 727</p>

STANDARDS	PAGE REFERENCES
PO 6. Synthesize mathematical information from multiple sources to draw a conclusion, make inferences based on mathematical information, evaluate the conclusions of others, analyze a mathematical argument, and recognize flaws or gaps in reasoning.	Student Edition: 274 #79, 289 #58, 299 #43, 346 #48, 395 #46, 429 #51, 444 #60, 451 #70, 458 #71, 560 #60
PO 7. Find structural similarities within different algebraic expressions and geometric figures.	Student Edition: 272 #46-#48, 273 #65, #69, 621 #44, 656, 773, 848 <i>Graphing Technology Lab</i> 319 <i>Standardized Test Practice</i> 300 #51, 711 #71
PO 8. Use inductive reasoning to make conjectures, use deductive reasoning to analyze and prove a valid conjecture, and develop a counterexample to refute an invalid conjecture.	Student Edition: 265 #56, 274 #85, 281 #68, 299 #45, 421 #55, 538 #14, 601 #36, 728 Example 3 <i>Graphing Technology Lab</i> 423, 540 <i>Preparing for Standardized Tests</i> 738-739 Teacher Edition: A 107, 199, 266; AE 729; C 729
PO 9. State the inverse, converse, and contrapositive of a given statement and state the relationship between the truth value of these statements and the original statement.	Student Edition: P18, 421, 423, 462, 463, 872
PO 10. List related <i>if... then</i> statements in logical order.	Student Edition: 694 #75
PO 11. Draw a simple valid conclusion from a given <i>if...then</i> statement and a minor premise.	Student Edition: 421 #52, 592 #49, 694 #75, 710 #64, 730 #34-#35, 757 #29, 762 #26
PO 12. Construct a simple formal deductive proof.	Student Edition: 514 #62, 710 #61, 727-731, 891 <i>Study Guide and Review</i> 736 11-7 Teacher Edition: AE 728; DI 731
PO 13. Identify and explain the roles played by definitions, postulates, propositions and theorems in the logical structure of mathematics, including Euclidean geometry.	Student Edition: <i>Algebra Lab</i> 726 <i>Key Concept</i> 555, 571, 579, 587, 588, 617, 639, 640, 648, 696, 697, 723 <i>Math History Link</i> 595, 697 Teacher Edition: DI 570; FM 571