



ARIZONA
Mathematics Standard High School
***Algebra: Concepts and Applications* © 2004**

OBJECTIVES	PAGE REFERENCES
Strand 1: Number Sense and Operations	
Every student should understand and use all concepts and skills from the previous grade levels. The standards are designed so that new learning builds on preceding skills and are needed to learn new skills. Communication, Problem-solving, Reasoning & Proof, Connections, and Representation are the process standards that are embedded throughout the teaching and learning of mathematical strands.	
Concept 1: Number Sense	
Understand and apply numbers, ways of representing numbers, the relationships among numbers and different number systems.	
PO 1. Classify real numbers as members of one or more subsets: natural, whole, integers, rational, or irrational numbers.	SE: 52, 94, 600-605, 611 #1-#3, 619 #44-#46, 630 #11-#14 TWE: A 605 RA 602 T 94 TT 53, 601
PO 2. Identify properties of the real number system: commutative, associative, distributive, identity, inverse, and closure.	SE: 14-18, 19-23, 45 #20-#25 TWE: A 18, 23 EC 18, 23 RA 16 T 14 TT 16
PO 3. Distinguish between finite and infinite sets of numbers.	SE: 110-111
Concept 2: Numerical Operations	
Understand and apply numerical operations and their relationship to one another.	
PO 1. Select the grade-level appropriate operation to solve word problems.	SE: 8-13, 54-57, 64-69, 70-74, 100-103, 154-159, 336-340, 341-345, 347-351, 357-361
PO 2. Solve word problems using grade-level appropriate operations and numbers.	SE: 8-13, 54-57, 64-69, 70-74, 100-103, 154-159, 336-340, 341-345, 347-351, 357-361
PO 3. Simplify numerical expressions including signed numbers and absolute values.	SE: 55 ex 6-ex 7, 56 #39-#44, 63 #5, 64-69, 70-74, 75-79 TWE: A 69, 74, 79 EC 69, 74 RA 77
PO 4. Apply subscripts to represent ordinal position.	SE: 110-111, 494-495
PO 5. Use grade-level appropriate mathematical terminology.	SE: 8-13, 14-18, 38-43, 117-121, 146-151, 302-307 <i>Investigation</i> 152-153, 210-211 TWE: A 387, 571

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PO 6. Compute using scientific notation.	SE: 352-356, 361 #46-#49, 375 #37-#45, 377 #12-#15, 425 #67 TWE: A 356 EA 355 EC 356 MTL 352 RA 354
PO 7. Simplify numerical expressions using the order of operations.	SE: 8-13, 18 #28-#32, 23 #46-#47, 45 #15-#19, 47 #6-#8 TWE: A 13 BQ 47 EA 11 EC 13 RA 11
Concept 3: Estimation	
Use estimation strategies reasonably and fluently.	
PO 1. Solve grade-level appropriate problems using estimation.	SE: 302, 315 #39, 340 #43, 363, 365 #37, 371 #37-#40 <i>Hands-On Algebra</i> 362
PO 2. Determine if a solution to a problem is reasonable.	SE: 24-29
PO 3. Determine rational approximations of irrational numbers.	SE: 362-365, 371 #37-#40, 376 #49-#53, 377 #16-#19 TWE: A 365 EC 365 RA 364
Strand 2: Data Analysis, Probability, and Discrete Mathematics Every student should understand and use all concepts and skills from the previous grade levels. The standards are designed so that new learning builds on preceding skills and are needed to learn new skills. Communication, Problem-solving, Reasoning & Proof, Connections, and Representation are the process standards that are embedded throughout the teaching and learning of mathematical strands.	
Concept 1: Data Analysis (Statistics)	
Understand and apply data collection, organization and representation to analyze and sort data.	
PO 1. Formulate questions to collect data in contextual situations.	SE: 32-37 TWE: FTC 109
PO 2. Organize collected data into an appropriate graphical representation.	SE: 38-43, 46 #40-#47, 210-211, 302-307, 308-309, 315 #41 TWE: A 43 FTC 109 MTL 303
PO 3. Display data as lists, tables, matrices, and plots.	SE: 32-37, 38-43, 46 #40-#47, 210-211, 302-307, 308-309, 315 #41 TWE: A 43 FTC 109 MTL 303 RA 34
PO 4. Construct equivalent displays of the same data.	SE: 32-37, 38-43, 210-211, 302-307 TWE: A 43

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PO 5. Identify graphic misrepresentations and distortions of sets of data.	This objective can be met in Glencoe's <i>Mathematics: Applications and Concepts Course 3</i> © 2004 pages 450-453.
PO 6. Identify which of the measures of central tendency is most appropriate in a given situation.	SE: 104-109, 116 #41-#42, 121 #42, 127 #49 TWE: A 109 EC 109 FA 108 FTC 106 GCE 105 RA 107
PO 7. Make reasonable predictions based upon linear patterns in data sets or scatter plots.	SE: 302-307, 308-309, 329 #26-#27 TWE: MTL 303 RA 304
PO 8. Make reasonable predictions for a set of data, based on patterns.	SE: 302-307, 308-309, 329 #26-#27 TWE: MTL 303 RA 304
PO 9. Draw inferences from charts, tables, graphs, plots, or data sets.	SE: 215 #5, 218, 302-307, 308-309, 329 #26-#27, 333 #4 TWE: MTL 303 RA 304
PO 10. Apply the concepts of mean, median, mode, range, and quartiles to summarize data sets.	SE: 104-109, 116 #41-#42, 121 #42, 127 #49 TWE: A 109 EC 109 FA 108 FTC 106 GCE 105 RA 107
PO 11. Evaluate the reasonableness of conclusions drawn from data analysis.	SE: 210-211
PO 12. Recognize and explain the impact of interpreting data (making inferences or drawing conclusions) from a biased sample.	SE: 37 #23, 43 #24-#25
PO 13. Draw a line of best fit for a scatter plot.	SE: 302-307, 308-309, 329 #26-#27 TWE: MTL 303 RA 304
PO 14. Determine whether displayed data has positive, negative, or no correlation.	SE: 302-307, 308-309, 329 #26-#27 TWE: MTL 303 RA 304
PO 15. Identify a normal distribution.	This objective can be met in Glencoe's <i>Advanced Mathematical Concepts: Precalculus with Applications</i> © 2004 pages 918-925.
PO 16. Identify differences between sampling and census.	SE: 37 #23, 43 #24-#25
PO 17. Identify differences between biased and unbiased samples.	SE: 37 #23, 43 #24-#25
Concept 2: Probability	
Understand and apply the basic concepts of probability.	
PO 1. Find the probability that a specific event will occur, with or without replacement.	SE: 219-223, 224-229, 232 #37-#43, 233 #20 TWE: A 223 EC 223, 229

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PO 2. Determine simple probabilities related to geometric figures.	SE: 649 #43
PO 3. Predict the outcome of a grade-level appropriate probability experiment.	SE: 406 ex 5, 649 #43 TWE: HA 220, 225 MTL 219, 224
PO 4. Record the data from performing a grade-level appropriate probability experiment.	SE: 406 ex 5, 649 #43 TWE: HA 220, 225 MTL 219, 224
PO 5. Compare the outcome of an experiment to predictions made prior to performing the experiment.	SE: 406 ex 5, 649 #43 TWE: HA 220, 225 MTL 219, 224
PO 6. Distinguish between independent and dependent events.	SE: 224-225 TWE: TT 225
PO 7. Compare the results of two repetitions of the same grade-level appropriate probability experiment.	SE: 406 ex 5, 649 #43 TWE: HA 220, 225 MTL 219, 224
Concept 3: Discrete Mathematics – Systematic Listing and Counting Understand and demonstrate the systematic listing and counting of possible outcomes.	
PO 1. Determine the number of possible outcomes for a contextual event using a chart, a tree diagram, or the counting principle.	SE: 146-151, 158 #51, 159 #4-#6, 174 #42, 181 #19-#20, 183 #8-#10 TWE: A 151 EC 151 MTL 146, 152 RA 148
PO 2. Determine when to use combinations versus permutations in counting objects.	SE: 152-153, 280-281 TWE: A 153 FTC 153 MTL 152
PO 3. Use combinations or permutations to solve contextual problems.	SE: 152-153, 280-281 TWE: A 153 FTC 153 MTL 152
Concept 4: Vertex-Edge Graphs Understand and apply vertex-edge graphs. (Grades K-8)	
Strand 3: Patterns, Algebra, and Functions Every student should understand and use all concepts and skills from the previous grade levels. The standards are designed so that new learning builds on preceding skills and are needed to learn new skills. Communication, Problem-solving, Reasoning & Proof, Connections, and Representation are the process standards that are embedded throughout the teaching and learning of mathematical strands.	
Concept 1: Patterns Identify patterns and apply pattern recognition to reason mathematically.	
PO 1. Communicate a grade-level appropriate iterative or recursive pattern, using symbols or numbers.	SE: 110-111, 315 #40, 494-495 TWE: A 111 MTL 494 TT 495
PO 2. Find the n^{th} term of an iterative or recursive pattern.	SE: 110-111, 494-495 TWE: A 111 MTL 494

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PO 3. Evaluate problems using basic recursion formulas.	SE: 110-111, 315 #40, 494-495 TWE: A 111 MTL 494
Concept 2: Functions and Relationships Describe and model functions and their relationships.	
PO 1. Determine if a relationship is a function, given a graph, table, or set of ordered pairs.	SE: 256-261, 269 #1-#2, 275 #32, 277 #33-#35, 279 #11-#12 TWE: A 261 TT 257
PO 2. Describe a contextual situation that is depicted by a given graph.	SE: 256-261, 262-263, 425 #68, 553 #32
PO 3. Identify a graph that models a given real-world situation.	SE: 256-261, 262-263, 425 #68, 553 #32
PO 4. Sketch a graph that models a given contextual situation.	SE: 256-261, 262-263, 425 #68, 553 #32
PO 5. Determine domain and range for a function.	SE: 238-243, 255 #44, 289 #29, 301 #51-#52, 304 ex 2, 305 #1, 308-309, 371 #47 TWE: A 243 EC 243
PO 6. Determine the solution to a contextual maximum/minimum problem, given the graphical representation.	SE: 305 #5, 459 #42, 463 #43
PO 7. Express the relationship between two variables using tables/matrices, equations, or graphs.	SE: 256-261, 262-263, 290-295, 296-301, 310-315, 316-321, 331 #6-#8 TWE: MTL 311
PO 8. Interpret the relationship between data suggested by tables/matrices, equations, or graphs.	SE: 256-261, 262-263, 290-295, 296-301, 310-315, 316-321, 331 #6-#8 TWE: MTL 311
PO 9. Determine from two linear equations whether the lines are parallel, perpendicular, coincident, or intersecting but not perpendicular.	SE: 322-327, 330 #36-#39, 331 #19 TWE: A 327 EC 327 MTL 322 RA 325
Concept 3: Algebraic Representations Represent and analyze mathematical situations and structures using algebraic representations.	
PO 1. Evaluate algebraic expressions, including absolute value and square roots.	SE: 614-619, 620-623, 631 #31-#32, 633 #21-#22 TWE: EC 619, 623 RA 617 TT 617
PO 2. Simplify algebraic expressions.	SE: 14-18, 19-23, 29 #20-#23, 37 #26, 43 #27, 45 #20-#31, 47 #16-#18, 57 #54-#59 TWE: EC 18, 23
PO 3. Multiply and divide monomial expressions with integral exponents.	SE: 341-345, 347-351, 356 #51-#59, 361 #50-#53, 375 #21-#36, 377 #8-#11 TWE: A 345, 351 EC 351

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PO 4. Translate a written expression or sentence into a mathematical expression or sentence.	SE: 4-7, 11 #2, 13 #58-#61, 23 #48, 24-29, 37 #28, 44 #11-#14, 47 #3-#5 TWE: A 7 RA 6
PO 5. Translate a sentence written in context into an algebraic equation involving multiple operations.	SE: 4-7, 11 #2, 13 #58-#61, 23 #48, 24-29, 37 #28, 44 #11-#14, 47 #3-#5 TWE: A 7 RA 6
PO 6. Write a linear equation for a table of values.	SE: 290-295, 301 #48, 329 #19, 331 #9-#11 TWE: A 295
PO 7. Write a linear algebraic sentence that represents a data set that models a contextual situation.	SE: 256-261, 262-263, 425 #68, 553 #32
PO 8. Solve linear (first degree) equations in one variable (may include absolute value).	SE: 117-121, 122-127, 128-131, 133 #32-#37, 134 #40-#47, 135 #19-#24 TWE: A 121 EC 121, 127 TT 129
PO 9. Solve linear inequalities in one variable.	SE: 509-513, 514-518, 519-523, 524-529, 530-534, 539 #36-#39, 543 #17-#32 TWE: A 518 EC 518, 523
PO 10. Write an equation of the line given: two points on the line, the slope and a point on the line, or the graph of the line.	SE: 290-295, 296-301, 329 #15-#25, 331 #6-#11 TWE: A 295, 301 EC 295, 301 RA 293, 299
PO 11. Solve an algebraic proportion.	SE: 188-193, 197 #18, 203 #1-#2, 231 #11-#14, 233 #3-#6 TWE: A 193 EC 193 RA 191 TT 189, 190
PO 12. Solve systems of linear equations in two variables (integral coefficients and rational solutions).	SE: 550-553, 554-559, 560-565, 566-571, 572-577 TWE: A 656 EC 553, 559, 565, 571
PO 13. Add, subtract, and perform scalar multiplication with matrices.	SE: 80-81
PO 14. Calculate powers and roots of real numbers, both rational and irrational, using technology when appropriate.	SE: 336-340, 357-361, 362-365, 371 #41-#44 TWE: A 361, 365 EC 360, 361, 365 GCE 338
PO 15. Simplify square roots and cube roots with monomial radicands (including those with variables) that are perfect squares or perfect cubes.	SE: 336-340, 357-361, 362-365, 371 #41-#44 TWE: A 361, 365 EC 360, 361, 365 GCE 338
PO 16. Solve square root radical equations involving only one radical.	SE: 624-629, 632 #41-#50, 633 #23-#24

OBJECTIVES	PAGE REFERENCES
PO 17. Solve quadratic equations.	SE: 468-473, 474-477, 478-482, 483-487, 498 #39-#46 TWE: A 473, 477 EC 473 RA 471, 475
PO 18. Identify the sine, cosine, and tangent ratios of the acute angles of a right triangle.	This objective can be met in Glencoe's <i>Mathematics: Applications and Concepts Course 3</i> © 2004 pages 192-193.
Concept 4: Analysis of Change Analyze change in a variable over time and in various contexts.	
PO 1. Determine slope, x-, and y-intercepts of a linear equation.	SE: 284-289, 310 ex 1, 311 ex 2, 314 #12-#23, 315 #36, 321 #2-#4, 329 #28-#29 TWE: A 289 RA 286
PO 2. Solve formulas for specified variables.	SE: 174 #36

Codes Used for TWE Pages

A	Assessment
BQ	Chapter Test Bonus Question
EA	Error Analysis
EC	Extra Credit
FA	Family Activity
FTC	From the Classroom of ...
GCE	Graphing Calculator Exploration
HA	Hands-On Algebra
MTL	Motivating the Lesson
RA	Reteaching Activity
T	Teach
TT	Teaching Tip