



Glencoe

ARIZONA

Academic Content Standards Grade 8

Impact Mathematics: Algebra and More Course 3 © 2005

CONTENT STANDARDS	PAGE REFERENCES
Strand 1: Number Sense and Operations	
Concept 1: Number Sense	
Understand and apply numbers, ways of representing numbers, the relationships among numbers and different number systems.	
PO 1. Locate rational numbers on a number line.	SE: 232-233, 339, 340-342 <i>On Your Own Exercises</i> 38-39 #1, 3 224 #19 TG: T232
PO 2. Identify irrational numbers.	SE: 200-202 <i>On Your Own Exercises</i> 204 #42-47, 206 #59 TG: T200-T202
PO 3. Classify real numbers as rational or irrational.	SE: 200-202 <i>Just the Facts</i> 192 <i>Lab Investigation</i> 219-222 <i>Review and Self-Assessment</i> 210 #12 TG: AM T190 T200 T219
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: <i>Lab Investigation</i> 270-274 <i>On Your Own Exercises</i> 223-225, 275-279, 328 #31-35
PO 2. Solve word problems using grade level appropriate operations and numbers.	SE: 110-112 <i>Explore</i> 169 <i>On Your Own Exercises</i> 120-126, 275-279
PO 3. Determine the square of an integer.	SE: 85, 129-130, 390-392, 457-459 <i>On Your Own Exercises</i> 134-135 #6
PO 4. Determine the square root of an integer.	SE: 190-193, 193-197, 459-461 <i>Remember</i> 457 <i>On Your Own Exercises</i> 328 #21-30 TG: OSA T457
PO 5. Identify squaring and finding square roots as inverse operations.	SE: 190-193, 433 <i>Review and Self-Assessment</i> 210-211
PO 6. Apply grade level appropriate properties to assist in computation.	SE: 358-361, 362-365
PO 7. Apply the symbols " $\sqrt{\quad}$ " to represent square root, " \pm " to represent roots, " $\{\}$ " as grouping symbols.	SE: 190-193, 194-197, 197-199 <i>On Your Own Exercises</i> 203-206 TG: AM T190

CONTENT STANDARDS	PAGE REFERENCES
PO 8. Use grade level appropriate mathematical terminology.	SE: 191, 197, 226, 492 TG: I T266 OSA T391 AM T457 AL T488
PO 9. Calculate the missing value in a percentage problem.	SE: <i>On Your Own Exercises</i> 512 #36-38, 617 #4, 621 #9, 630 #33, 644 #7, 649 #15
PO 10. Convert standard notation to scientific notation and vice versa.	SE: 146-149, 149-152, 156-158 <i>Lab Investigation</i> 159-161 <i>On Your Own Exercises</i> 164-165 #43-45, 167 #56-57
PO 11. Simplify numerical expressions using the order of operations with grade appropriate operations on number sets.	SE: 146-149, 149-152, 153-155, 190-193, 193-197, 362-365
Concept 3: Estimation Use estimation strategies reasonably and fluently.	
PO 1. Solve grade level appropriate problems using estimation.	SE: 101 #13, 241-244, 262 <i>Share and Summarize</i> 172 <i>On Your Own Exercises</i> 123 #19, 164 #44
PO 2. Use estimation to verify the reasonableness of a calculation. (e.g., Is 32 the square root of 64?)	SE: 242-243, 640-641 <i>Lab Investigation</i> 159-161 TG: T161 AM T245 T640-T641
PO 3. Express answers to the appropriate place or degree of precision. (e.g., time and money)	SE: <i>Lab Investigation</i> 219-222 <i>On Your Own Exercises</i> 22 #12
PO 4. Verify the reasonableness of estimates made from calculator results within a contextual situation.	SE: 242-243, 248, 262 <i>On Your Own Exercises</i> 166 #49, 167 #52-55
Strand 2: Data Analysis, Probability, and Discrete Mathematics	
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: 638-641
PO 2. Construct box-and-whisker plots.	SE: <i>On Your Own Exercises</i> 537 #60
PO 3. Determine the appropriate type of graphical display for a given data set.	SE: 51-55, 602-604, 605-608, 612-615 <i>On Your Own Exercises</i> 58 #15, 120 #1, 238 #40, 352 #18, 537 #60
PO 4. Interpret box-and-whisker plots, circle graphs and scatter plots.	SE: 51-55, 127-130 <i>On Your Own Exercises</i> 58 #14-15, 63 #32, 352 #18, 537 #60
PO 5. Answer questions based on box-and-whisker plots, circle graphs and scatter plots.	SE: 51-55, 127-130 <i>On Your Own Exercises</i> 58 #14-15, 63 #32, 352 #18, 537 #60
PO 6. Solve problems in contextual situations using the mean, median, mode, and range of a given data set.	SE: 557, 603-604, 614 #8 <i>Remember</i> 45 <i>Share and Summarize</i> 615 <i>On Your Own Exercises</i> 45 #46

CONTENT STANDARDS	PAGE REFERENCES
PO 7. Formulate reasonable predictions based on a given set of data.	SE: 51-55, 558-559, 563, 567, 569, 607 <i>Lab Investigation</i> 545-546 TG: T545 T584
PO 8. Compare trends in data related to the same investigation.	SE: 51-55, 127-130 <i>On Your Own Exercises</i> 58 #14-15, 61 #27-28, 137 #21, 255 #22
PO 9. Solve contextual problems using scatter plots, box-and-whisker plots, and double line graphs of continuous data.	SE: 51-55, 127-130 <i>On Your Own Exercises</i> 58 #14-15, 61 #27-28, 137 #21, 255 #22, 537 #60
PO 10. Evaluate the effects of missing or incorrect data on the results of an investigation. (e.g., Susie's teacher recorded a 39 instead of a 93 for her last quiz, what will happen to Susie's average?)	This objective can be met during teacher/class discussion.
PO 11. Identify a line of best fit for a scatter plot.	SE: 51-55, 127-130 <i>On Your Own Exercises</i> 58 #14-15, 61 #27-28, 137 #21, 255 #22
PO 12. Distinguish between causation and correlation.	SE: 51-55, 127-130 <i>On Your Own Exercises</i> 58 #14-15, 61 #27-28, 137 #21, 255 #22
Concept 2: Probability Understand and apply the basic concepts of probability.	
PO 1. Determine the probability that a specific event will occur in a 2-stage probability experiment.	SE: 566-568, 569-570, 571-572, 582-586 <i>On Your Own Exercises</i> 573-581
PO 2. Solve contextual situations using probability. (e.g., If the probability of Michelle making a free throw is 0.25, what is the probability that she will make three free throws in a row?)	SE: 565-568, 569-570, 571-572, 582-586, 587-589 <i>Lab Investigation</i> 545-546 <i>On Your Own Exercises</i> 573-581, 590-594
PO 3. Predict the outcome of a grade level appropriate probability experiment.	SE: 547-550, 558, 560, 573 <i>Share and Summarize</i> 550 TG: D T547 I T565 OSA T566 SS T550
PO 4. Record the data from performing a grade level appropriate probability experiment.	SE: 565-568, 569-570, 571-572, 582-586, 587-589 <i>Lab Investigation</i> 545-546 <i>On Your Own Exercises</i> 573-581, 590-594
PO 5. Compare the outcome of an experiment to predictions made prior to performing the experiment.	SE: 565-568, 569-570, 571-572, 582-586, 587-589 <i>Lab Investigation</i> 545-546 <i>On Your Own Exercises</i> 573-581, 590-594
PO 6. Distinguish between independent and dependent events.	SE: 566-568, 569-570, 571-572, 582-586 <i>On Your Own Exercises</i> 573-581
PO 7. Compare the results of two repetitions of the same grade level appropriate probability experiment.	SE: 566-568, 569-570 <i>On Your Own Exercises</i> 138 #24

CONTENT STANDARDS	PAGE REFERENCES
Concept 3: Discrete Mathematics – Systematic Listing and Counting	
Understand and demonstrate the systematic listing and counting of possible outcomes.	
PO 1. Determine all possible outcomes involving the combination of two or more sets of objects. (e.g., If you roll a 6-sided number cube 4 times, how many possible outcomes are possible?)	SE: 544, 547-550, 550-554, 554-557 <i>Lab Investigation</i> 545-546 <i>On Your Own Exercises</i> 558-563
PO 2. Determine all possible arrangements given a set. (e.g., How many ways can you arrange a set of 7 books on a shelf?)	SE: 544, 547-550, 550-554, 554-557 <i>Lab Investigation</i> 545-546 <i>On Your Own Exercises</i> 558-563
Concept 4: Vertex-Edge Graphs	
Understand and apply vertex-edge graphs.	
PO 1. Solve contextual problems represented by vertex-edge graphs.	SE: 612-615 <i>On Your Own Exercises</i> 622 #10, 629 #19
Strand 3: Patterns, Algebra, and Functions	
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: 74-77, 110-112, 112-115, 118-119 <i>On Your Own Exercises</i> 78-81, 511 #33
PO 2. Extend a grade level appropriate iterative or recursive pattern.	SE: 74-77, 110-112, 112-115, 118-119, 130, 613-615 <i>Explore</i> 146 <i>On Your Own Exercises</i> 562 #11
PO 3. Solve grade level appropriate iterative or recursive pattern problems.	SE: 74-77, 110-112, 112-115, 118-119, 130, 613-615 <i>Explore</i> 146 <i>On Your Own Exercises</i> 562 #11
Concept 2: Functions and Relationships	
Describe and model functions and their relationships.	
PO 1. Describe the rule used in a simple grade level appropriate function. (e.g., T-chart, input/output model)	SE: 488-489, 490-492, 492-496 <i>On Your Own Exercises</i> 504-509
PO 2. Distinguish between linear and nonlinear functions, given graphic examples.	SE: 490-492, 492-496
PO 3. Determine whether a graph or table are related to a given equation of the form $y=ax^2$ where 'a' is a natural number.	SE: 71-73, 74-77, 83-87, 87-89, 90-92, 93-95 <i>On Your Own Exercises</i> 78-79, 98-106
PO 4. Identify independent and dependent variables for a contextual situation.	SE: 74-77, 488-489 <i>On Your Own Exercises</i> 78-81
Concept 3: Algebraic Representations	
Represent and analyze mathematical situations and structures using algebraic representations.	
PO 1. Evaluate algebraic expressions by substituting rational values for variables. [e.g., $2(ab+ac+bc)$, when $a = 2$, $b = 3/5$, and $c = 4$]	SE: 193-197, 359-361, 362-365, 374-375 <i>Lab Investigation</i> 366-367 <i>On Your Own Exercises</i> 368-371
PO 2. Use variables in contextual situations.	SE: 218, 228-229 <i>On Your Own Exercises</i> 223 #11-16, 235 #12-15, 251-253 #10-14
PO 3. Translate a written sentence or phrase into an algebraic equation or expression and vice versa. (e.g., Three less than twice a number is $2n-3$.)	SE: 260-262, 263-265, 411-413, 417-420 <i>Lab Investigation</i> 270-274 <i>On Your Own Exercises</i> 275-279

CONTENT STANDARDS	PAGE REFERENCES
PO 4. Translate a sentence written in context into an algebraic equation involving two operations.	SE: 260-262, 263-265, 411-413, 417-420 <i>Lab Investigation</i> 270-274 <i>On Your Own Exercises</i> 275-279
PO 5. Translate a contextual situation into an algebraic inequality. (e.g., Joe earns more than \$5.00 an hour; therefore, $x > 5$)	SE: 226-229, 229-231, 232-234 <i>On Your Own Exercises</i> 235-238
PO 6. Identify an equation or inequality that represents a contextual situation.	SE: 214-218, 226-229, 229-231, 232-234, 240-244, 245-248 <i>Lab Investigation</i> 270-274 <i>On Your Own Exercises</i> 235-238, 249-254
PO 7. Solve one-step equations with rational numbers as coefficients or as solutions.	SE: 214-218 <i>On Your Own Exercises</i> 223-225
PO 8. Solve one-step equations that model contextual situations.	SE: 214-218 <i>On Your Own Exercises</i> 223-225
PO 9. Solve two-step equations with rational coefficients and integer solutions. (e.g., $3x + 5 = 11$, $4x - 20 = 8$)	SE: 240-244, 245-248, 257-259, 417-420 <i>Lab Investigation</i> 270-274 <i>On Your Own Exercises</i> 249-254
PO 10. Graph an inequality on a number line.	SE: 226-229, 229-231, 232-234 <i>On Your Own Exercises</i> 235-238
PO 11. Solve a simple algebraic proportion.	SE: 7, 25, 329-331, 333, 335 <i>Share & Summarize</i> 333 <i>On Your Own Exercises</i> 630 TG: D T133, 333 AL T331, 333
PO 12. Solve applied problems using the Pythagorean theorem.	SE: <i>On Your Own Exercises</i> 63 #31, 205 #53, 206 #58
Concept 4: Analysis of Change Analyze change in a variable over time and in various contexts.	
PO 1. Identify the slope of a line as the rate of change. (the ratio of rise over run)	SE: 25-29, 29-31, 31-35 <i>On Your Own Exercises</i> 38-44, 82 #16-19, 106 #38-44 <i>Review and Self-Assessment</i> 67
Strand 4: Geometry and Measurement	
Concept 1: Geometric Properties Analyze the attributes and properties of two- and three-dimensional shapes and develop mathematical arguments about their relationships.	
PO 1. Draw a model that demonstrates basic geometric relationships such as parallelism, perpendicularity, similarity/ proportionality, and congruence.	SE: 289-291, 292-295, 295-296, 329, 330-333 <i>On Your Own Exercises</i> 206 #58, 280 #33-38, 334-337
PO 2. Draw three-dimensional figures by applying properties of each. (e.g., parallelism, perpendicularity and congruency)	SE: 299, 311 #9-10
PO 3. Recognize the three-dimensional figure represented by a net.	See Glencoe's <i>Geometry: Concepts and Applications</i> © 2004 SE: 506, 509
PO 4. Represent the surface area of rectangular prisms and cylinders as the area of their net.	See Glencoe's <i>Geometry: Concepts and Applications</i> © 2004 SE: 505, 507

CONTENT STANDARDS	PAGE REFERENCES
PO 5. Draw regular polygons with appropriate labels.	SE: 76, 289-291 <i>Explore</i> 339 <i>On Your Own Exercises</i> 297, 299, 311, 329, 337
PO 6. Identify the properties of angles created by a transversal intersecting two parallel lines. (e.g., corresponding angles are congruent)	TG: AM T316
PO 7. Recognize the relationship between inscribed angles and intercepted arcs.	TG: AL T291
PO 8. Identify tangents and secants of a circle.	See Glencoe's <i>Geometry: Concepts and Applications</i> © 2004 SE: 592-597, 600-605.
PO 9. Determine whether three given lengths can form a triangle.	See Glencoe's <i>Geometry: Concepts and Applications</i> © 2004 SE: 296-300, 304 #31-#36, 305 #21
PO 10. Identify corresponding angles of similar polygons as congruent and sides as proportional.	SE: 329, 330-333 <i>On Your Own Exercises</i> 206 #58, 280 #33-38, 334-337
Concept 2: Transformation of Shapes Apply spatial reasoning to create transformations and use symmetry to analyze mathematical situations.	
PO 1. Identify the planar geometric figure that is the result of a given rigid transformation.	SE: 339-342, 343-345 <i>On Your Own Exercises</i> 23 #24-25, 346-351
PO 2. Model a simple transformation on a coordinate grid. (e.g., translate right four units and down two units)	SE: 292-295, 295-296, 302-304, 305-306, 313-315, 316-318, 329-333, 340-342, 343-345 <i>On Your Own Exercises</i> 297-301
Concept 3: Coordinate Geometry Specify and describe spatial relationships using coordinate geometry and other representational systems.	
PO 1. Use a table of values to graph a linear equation.	SE: 6-9, 10-12, 12-15, 49-50, 51-55 <i>On Your Own Exercises</i> 16-22, 56 <i>Review and Self-Assessment</i> 64 #1-6
PO 2. Determine the midpoint, given two points on a number line.	SE: <i>Remember</i> 332
PO 3. Determine the distance between two points on a number line.	SE: 328 #30, 348 #7, 350 #12
Concept 4: Measurement - Units of Measure - Geometric Objects Understand and apply appropriate units of measure, measurement techniques, and formulas to determine measurements.	
PO 1. Solve problems for the area of a trapezoid.	See Glencoe's <i>Geometry: Concepts and Applications</i> © 2004 SE: 419-424, 447 #21, 449 #10
PO 2. Solve problems involving the volume of rectangular prisms and cylinders.	SE: 72-73 <i>Lab Investigation</i> 502-503 <i>On Your Own Exercises</i> 62 #30, 63 #32, 280 #31-32, 338 #21-22
PO 3. Calculate the surface area of rectangular prisms or cylinders.	SE: <i>On Your Own Exercises</i> 512 #35

CONTENT STANDARDS	PAGE REFERENCES
PO 4. Identify rectangular prisms and cylinders having the same volume.	See Glencoe's <i>Geometry: Concepts and Applications</i> © 2004 SE: 514 #24
PO 5. Find the measure of a missing interior angle in a triangle or quadrilateral.	SE: <i>On Your Own Exercises</i> 510 #27
PO 6. Solve problems using ratios and proportions, given the scale factor.	SE: 329-333 <i>On Your Own Exercises</i> 334-338
PO 7. Calculate the length of a side, given two similar triangles.	SE: 329 <i>On Your Own Exercises</i> 206 #58
Strand 5: Structure and Logic	
Concept 1: Algorithms and Algorithmic Thinking Use reasoning to solve mathematical problems in contextual situations.	
PO 1. Describe how to use a proportion to solve a problem in context.	SE: 25, 329-333 <i>On Your Own Exercises</i> 335 TG: T333
PO 2. Analyze algorithms.	SE: 8, 55, 94 <i>Share and Summarize</i> 77, 181 <i>Lab Investigation</i> 219-222
Concept 2: Logic, Reasoning, Arguments, and Mathematical Proof Evaluate situations, select problem-solving strategies, draw logical conclusions, develop and describe solutions and recognize their applications.	
PO 1. Solve a logic problem, given the necessary information.	SE: 130 <i>Lab Investigation</i> 219-222 <i>On Your Own Exercises</i> 135-137, 166-167, 223 #11-16 <i>Review and Self-Assessment</i> 143
PO 2. Identify simple valid arguments using if...then statements. (e.g., All squares are rectangles. If quadrilateral ABCD is a rectangle, is it a square?)	SE: 129, 131-133 <i>On Your Own Exercises</i> 135-137 <i>Review and Self-Assessment</i> 143 TG: AM T127, T131 D T130 TT T131
PO 3. Model a contextual situation using a flow chart.	SE: 215, 217, 433-435, 436-438 <i>On Your Own Exercises</i> 439
PO 4. Verify the Pythagorean theorem using an area dissection argument.	See Glencoe's <i>Geometry: Concepts and Applications</i> © 2004 SE: 256 TWE: TT 257

Codes Used for TG Pages

AL	Access for All Learners
AM	About the Mathematics
D	Develop
I	Introduce
OSA	On the Spot Assessment
SS	Share and Summarize
TT	Tips from Teachers