



Contemporary Mathematics in Context

A Unified Approach

Course **1**

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STANDARDS	PAGE REFERENCES
<p>Standard 4.1 (Number and Numerical Operations) ALL STUDENTS WILL DEVELOP NUMBER SENSE AND WILL PERFORM STANDARD NUMERICAL OPERATIONS AND ESTIMATIONS ON ALL TYPES OF NUMBERS IN A VARIETY OF WAYS.</p>	
<p>Building upon knowledge and skills gained in preceding grades, by the end of Grade 12, students will:</p>	
<p>A. Number Sense</p>	
<p>1. Extend understanding of the number system to all real numbers.</p>	<p>Student Edition: 10 #5-#6, 25-26, 84, 111-112, 139, 191 #5, 424-426, 442-443 On Your Own <i>Think About This Situation 15</i></p> <p>Teacher's Guide: SS T18</p>
<p>2. Compare and order rational and irrational numbers.</p>	<p>Student Edition: 12, 16 #3, 24 #1, 26 #3d, 52, 81 #2, 203-204 #4, 466, 474-475 #2 <i>Checkpoint 18</i></p> <p>Teacher's Guide: E T142 #1, T466; M T204 #4, T210 #4d; SS T18</p>
<p>3. Develop conjectures and informal proofs of properties of number systems and sets of numbers.</p>	<p>Student Edition: 263 Organizing #3, 328 #3, 339 #2, 363-364 #3, 368 #1</p> <p>Teacher's Guide: M T263</p>

STANDARDS	PAGE REFERENCES
B. Numerical Operations	
1. Extend understanding and use of operations to real numbers and algebraic procedures.	Student Edition: 115, 117 #4, 119 Organizing #4, 120 #3, 136 #2-#3, 139 #1, 188 #b, 203 #3b, 221 #4, 236 #5, 239 #1, 240 #4, 241 #1 <i>Checkpoint</i> 131, 237 Teacher's Guide: M T116-T118
2. Develop, apply, and explain methods for solving problems involving rational and negative exponents.	Student Edition: 136 #2-#3, 193 #3, 425 #5c, 433 #1, 434 #4, 436 #5, 480 #5 Teacher's Guide: N T480; O T150 #4; R T151 #4
3. Perform operations on matrices. <ul style="list-style-type: none"> • Addition and subtraction • Scalar multiplication 	Student Edition: <i>Checkpoint</i> 270 Teacher's Guide: SS T270 Also see <i>Workbook Master</i> 100
4. Understand and apply the laws of exponents to simplify expressions involving numbers raised to powers.	Student Edition: 148-149 #3, 153 #3, 193 #3, 425 #5c, 433 #1, 434 #4, 436 #5, 480 #5 <i>Experiment</i> 2 145 <i>On Your Own</i> 146-147 Teacher's Guide: N T480
C. Estimation	
1. Recognize the limitations of estimation, assess the amount of error resulting from estimation, and determine whether the error is within acceptable tolerance limits.	Student Edition: 76 #2, 77 #3, 100 #4b, 195 #2, 197 #4-#5, 203 #3, 207 #1 <i>Checkpoint</i> 78 Teacher's Guide: E T197, T207

STANDARDS	PAGE REFERENCES
<p>Standard 4.2 (Geometry and Measurement) ALL STUDENTS WILL DEVELOP SPATIAL SENSE AND THE ABILITY TO USE GEOMETRIC PROPERTIES, RELATIONSHIPS, AND MEASUREMENT TO MODEL, DESCRIBE AND ANALYZE PHENOMENA.</p>	
<p>A. Geometric Properties</p>	
<p>1. Use geometric models to represent real-world situations and objects and to solve problems using those models (e.g., use Pythagorean theorem to decide whether an object can fit through a doorway).</p>	<p>Student Edition: 224 Modeling #4, 246, 327, 329-334, 336-338, 340-344, 364 #4, 366-368, 397 #5 <i>Checkpoint 328</i></p> <p>Teacher’s Guide: E T359; M T366-T368; R T338</p>
<p>2. Draw perspective views of 3D objects on isometric dot paper, given 2D representations (e.g., nets or projective views).</p>	<p>Student Edition: 329-334, 340-344, 346, 347-350, 393-394 <i>Checkpoint 344, 346</i></p> <p>Teacher’s Guide: E T340-T344; M T347-T349; SS T344</p>
<p>3. Apply the properties of geometric shapes.</p> <ul style="list-style-type: none"> • Parallel lines - transversal, alternate interior angles, corresponding angles • Triangles <ul style="list-style-type: none"> a. Conditions for congruence b. Segment joining midpoints of two sides is parallel to and half the length of the third side c. Triangle inequality • Minimal conditions for a shape to be a special quadrilateral • Circles - arcs, central and inscribed angles, chords, tangents • Self-similarity 	<p>Student Edition: 151 #5, 326-328, 329-334, 336 #1, 337 #3, 338 #2, 339 #1, 340 #3, 383-388</p> <p>Teacher’s Guide: N T329, T331</p>
<p>4. Use reasoning and some form of proof to verify or refute conjectures and theorems.</p> <ul style="list-style-type: none"> • Verification or refutation of proposed proofs • Simple proofs involving congruent triangles • Counterexamples to incorrect conjectures 	<p>Student Edition: 263 #3, 328 #3, 339 #2, 363-364 #3, 368 #1</p> <p>Teacher’s Guide: E T339 #2; M T263; O T368 #1d</p>

STANDARDS	PAGE REFERENCES
B. Transforming Shapes	
1. Determine, describe, and draw the effect of a transformation, or a sequence of transformations, on a geometric or algebraic object, and, conversely, determine whether and how one object can be transformed to another by a transformation or a sequence of transformations.	Student Edition: 334, 395-396, 403-406, 408-410, 413-415, 443, 449 <i>Checkpoint</i> 289, 389, 407 Teacher's Guide: E T403-T406; M T395-T396, T408-T410; SS T389
2. Recognize three-dimensional figures obtained through transformations of two-dimensional figures (e.g., cone as rotating an isosceles triangle about an altitude), using software as an aid to visualization.	Student Edition: 334 #9, 337 #3 <i>Checkpoint</i> 334 Teacher's Guide: E T334 #9, R T338 #2
3. Determine whether two or more given shapes can be used to generate a tessellation.	Student Edition: 390-392, 405-407, 411 #4, 414-415, 417 #2 <i>Checkpoint</i> 391, 407 <i>Think About This Situation</i> 383 Teacher's Guide: E T392, T405-T407
4. Generate and analyze iterative geometric patterns. <ul style="list-style-type: none"> • Fractals (e.g., Sierpinski's Triangle) • Patterns in areas and perimeters of self-similar figures • Outcome of extending iterative process indefinitely 	Student Edition: 288 #4, 293 #2, 399 #6, 401 #6, 432 #3, 436 #1, 454 #3 <i>Checkpoint</i> 391, 407 <i>Investigation</i> 2 443 <i>On Your Own</i> 427 Teacher's Guide: M T399 #6, T454 #3
C. Coordinate Geometry	
1. Use coordinate geometry to represent and verify properties of lines. <ul style="list-style-type: none"> • Distance between two points • Midpoint and slope of a line segment • Finding the intersection of two lines • Lines with the same slope are parallel • Lines that are perpendicular have slopes whose product is -1 	Student Edition: 183 #2, 184 #3c, 185 #4c, 186 #6b, 190 #2a, 192 Reflecting #2, 195 #2b, 196 #3, 205 #1 <i>Checkpoint</i> 96, 187 <i>On Your Own</i> 201 Teacher's Guide: E T183-T186; M T188-T191

STANDARDS	PAGE REFERENCES
2. Show position and represent motion in the coordinate plane using vectors. <ul style="list-style-type: none"> Addition and subtraction of vectors 	Representation of motion without the use of vectors is shown in the following examples. Student Edition: 150 #5, 183 #2c, 184 #3c, 186, 193 #3d Teacher's Guide: E T183 #2c; M T150 #5; T193 #3d
D. Units of Measurement	
1. Understand and use the concept of significant digits.	Student Edition: 4-6 Teacher's Guide: E T4-T6; N T5
2. Choose appropriate tools and techniques to achieve the specified degree of precision and error needed in a situation. <ul style="list-style-type: none"> Degree of accuracy of a given measurement tool Finding the interval in which a computed measure (e.g., area or volume) lies, given the degree of precision of linear measurements 	Student Edition: 4-6, 66 #2, 67 #4, 513-517 Teacher's Guide: E T4-T6, T72 #1c, T485; N T5
E. Measuring Geometric Objects	
1. Use techniques of indirect measurement to represent and solve problems. <ul style="list-style-type: none"> Similar triangles Pythagorean theorem Right triangle trigonometry (sine, cosine, tangent) 	Student Edition: 158, 159-161, 172 #4, 177 #4, 357 #4 <i>On Your Own</i> 359 Teacher's Guide: A T161; E T160-T161; M T172, T177; SS T161
2. Use a variety of strategies to determine perimeter and area of plane figures and surface area and volume of 3D figures. <ul style="list-style-type: none"> Approximation of area using grids of different sizes Finding which shape has minimal (or maximal) area, perimeter, volume, or surface area under given conditions using graphing calculators, dynamic geometric software, and/or spreadsheets Estimation of area, perimeter, volume, and surface area 	Student Edition: 332 #5, 376 #9, 377 #1, #2c-d, 378 #3b, 379 #3, 380 #2, #4, 381-382 Teacher's Guide: M T381-T382; N T381; SS T332

STANDARDS	PAGE REFERENCES
<p>Standard 4.3 (Patterns and Algebra) ALL STUDENTS WILL REPRESENT AND ANALYZE RELATIONSHIPS AMONG VARIABLE QUANTITIES AND SOLVE PROBLEMS INVOLVING PATTERNS, FUNCTIONS, AND ALGEBRAIC CONCEPTS AND PROCESSES.</p>	
<p>A. Patterns</p>	
<p>1. Use models and algebraic formulas to represent and analyze sequences and series.</p> <ul style="list-style-type: none"> • Explicit formulas for n^{th} terms • Sums of finite arithmetic series • Sums of finite and infinite geometric series 	<p>Student Edition: 100 #4, 114 #2, 116-120, 119 #3, 132-134, 183 #2, 337 #4, 422 #4, 435 #5, 441 #2-#3 <i>Checkpoint 112</i> <i>Think About This Situation 99, 181</i></p> <p>Teacher’s Guide: A T113; N T442</p>
<p>2. Develop an informal notion of limit.</p>	<p>Student Edition: 441, 445-447, 448-454 <i>Checkpoint 430, 442</i> <i>On Your Own 442-443, 448</i> <i>Think About This Situation 440</i></p> <p>Teacher’s Guide: SS T430, T442</p>
<p>3. Use inductive reasoning to form generalizations.</p>	<p>Student Edition: 100 #4, 114 #2, 116-120, 132-134 <i>Checkpoint 112</i> <i>Think About This Situation 99, 181</i></p> <p>Teacher’s Guide: A T113</p>
<p>B. Functions and Relationships</p>	
<p>1. Understand relations and functions and select, convert flexibly among, and use various representations for them, including equations or inequalities, tables, and graphs.</p>	<p>Student Edition: 105 #5, 106-107 #3, 109 #2, 122 #1, 123 #6, 124 #7, 128 #4, 131 #8, 134 #3e, 139 #2, 142-143, 144-146 <i>Checkpoint 125, 143, 146</i> <i>On Your Own 101, 125</i> <i>Think About This Situation 121, 141</i></p> <p>Teacher’s Guide: A T113, T144; C T101; E T144; SS T146</p>

STANDARDS	PAGE REFERENCES
<p>2. Analyze and explain the general properties and behavior of functions of one variable, using appropriate graphing technologies.</p> <ul style="list-style-type: none"> • Slope of a line or curve • Domain and range • Intercepts • Continuity • Maximum/minimum • Estimating roots of equations • Intersecting points as solutions of systems of equations • Rates of change 	<p>Student Edition: 127, 142-143, 144-146, 150 #5, 175 #1, 178 #4-#5, 183 #2c, 184 #3c, 186, 188 #1, 193 #3d, 206 #3, 213 #3 <i>Checkpoint</i> 143, 146 <i>Think About This Situation</i> 141</p> <p>Teacher's Guide: A T144; C T101; E T144, T183 #2c; M T150 #5, T193 #3d; SS T146</p>
<p>3. Understand and perform transformations on commonly-used functions.</p> <ul style="list-style-type: none"> • Translations, reflections, dilations • Effects on linear and quadratic graphs of parameter changes in equations • Using graphing calculators or computers for more complex functions 	<p>Student Edition: 398 #3, 411 #3</p> <p>Teacher's Guide: M T411 #3</p>
<p>4. Understand and compare the properties of classes of functions, including exponential, polynomial, rational, and trigonometric functions.</p> <ul style="list-style-type: none"> • Linear vs. non-linear • Symmetry • Increasing/decreasing on an interval 	<p>Student Edition: 142-143, 144-146 <i>Checkpoint</i> 143, 146 <i>Think About This Situation</i> 141</p> <p>Teacher's Guide: A T144; C T101; E T144; SS T146</p>

STANDARDS	PAGE REFERENCES
C. Modeling	
<p>1. Use functions to model real-world phenomena and solve problems that involve varying quantities.</p> <ul style="list-style-type: none"> Linear, quadratic, exponential, periodic (sine and cosine), and step functions (e.g., price of mailing a first-class letter over the past 200 years) Direct and inverse variation Absolute value Expressions, equations and inequalities Same function can model variety of phenomena Growth/decay and change in the natural world Applications in mathematics, biology, and economics (including compound interest) 	<p>Student Edition: 116-117, 119 #4, 129 #6, 131 #8, 139, 213, 215, 220, 225 #2d, 238 #b-#d, 239-242, 246 <i>Checkpoint</i> 115, 237, 248 <i>Think About This Situation</i> 121</p> <p>Teacher’s Guide: M T216 #2; O T205 #4b; SS T115</p>
<p>2. Analyze and describe how a change in an independent variable leads to change in a dependent one.</p>	<p>Student Edition: 122-124, 134 #3e, 139 #2 <i>Checkpoint</i> 125 <i>Think About This Situation</i> 121</p> <p>Teacher’s Guide: A T132; E T131, T139 #2; M T139 #2</p>
<p>3. Convert recursive formulas to linear or exponential functions (e.g., Tower of Hanoi and doubling).</p>	<p>Student Edition: 100 #4, 114 #2, 116-120, 132-134, 183 #2, 337 #4, 422 #4, 435 #5, 441 #2-#3 <i>Checkpoint</i> 112 <i>Think About This Situation</i> 99, 181</p> <p>Teacher’s Guide: A T113</p>
D. Procedures	
<p>1. Evaluate and simplify expressions.</p> <ul style="list-style-type: none"> Add and subtract polynomials Multiply a polynomial by a monomial or binomial Divide a polynomial by a monomial 	<p>Student Edition: 136 #2-#3, 193 #3, 236 #5, 239 #1, 240 #4, 241 #1, 247 #5b, 425 #5c, 433 #1, 480 #5 <i>Checkpoint</i> 237</p> <p>Teacher’s Guide: N T480; O T150 #4; R T151 #4</p>

STANDARDS	PAGE REFERENCES
<p>2. Select and use appropriate methods to solve equations and inequalities.</p> <ul style="list-style-type: none"> Linear equations - algebraically Quadratic equations - factoring (when the coefficient of x^2 is 1) and using the quadratic formula All types of equations using graphing, computer, and graphing calculator techniques 	<p>Student Edition: 213 #3, 214 #5-#6, 216 #1, 218 #1-#2, 219 #2, 220 #2, 221 #4-#6, 222 #7, 225 #2d, 238 #b-#d, 239-242 <i>Checkpoint 237</i> <i>On Your Own 215</i></p> <p>Teacher's Guide: CMT T222; E T184 #3b; M T224 #3d; R T225 #4b</p>
<p>3. Judge the meaning, utility, and reasonableness of the results of symbol manipulations, including those carried out by technology.</p>	<p>Student Edition: 35 #4h, 44 #4, 45 #1d, 63 #2b, 67 #3, 220 #1, 221 #6a, 225 #3d, #4, 226 #2, 232 #4, 246 #3d, 436 #5 <i>Checkpoint 214, 237</i> <i>Think About This Situation 47</i></p> <p>Teacher's Guide: E T221 #6a; M T208 #2b</p>
<p>Standard 4.4 (Data Analysis, Probability, and Discrete Mathematics) ALL STUDENTS WILL DEVELOP AN UNDERSTANDING OF THE CONCEPTS AND TECHNIQUES OF DATA ANALYSIS, PROBABILITY, AND DISCRETE MATHEMATICS, AND WILL USE THEM TO MODEL SITUATIONS, SOLVE PROBLEMS, AND ANALYZE AND DRAW APPROPRIATE INFERENCES FROM DATA.</p>	
<p>A. Data Analysis</p>	
<p>1. Use surveys and sampling techniques to generate data and draw conclusions about large groups.</p> <ul style="list-style-type: none"> Advantages/disadvantages of sample selection methods (e.g., convenience sampling, responses to survey, random sampling) 	<p>Student Edition: 47-51, 52-54, 55-62, 63-65, 66-73, 100 #4, 160 #1, 487 #3, 499 #1, 500 #4, 506 #1d-#1e <i>Checkpoint 6, 501</i> <i>Think About This Situation 159</i></p> <p>Teacher's Guide: CMT T51; E T501 #4e; I T48, T52; LO T47</p>
<p>2. Evaluate the use of data in real-world contexts.</p> <ul style="list-style-type: none"> Accuracy and reasonableness of conclusions drawn Bias in conclusions drawn (e.g., influence of how data is displayed) Statistical claims based on sampling 	<p>Student Edition: 47-50, 63-65, 66-67 <i>Checkpoint 65</i> <i>On Your Own 51</i> <i>Think About This Situation 47</i></p> <p>Teacher's Guide: A T51; E T63-T65, T66; SS T65</p>

STANDARDS	PAGE REFERENCES
3. Design a statistical experiment, conduct the experiment, and interpret and communicate the outcome.	Student Edition: 100 #4, 160 #1, 487 #3, 499 #1, 500 #4, 506 #1d-#1e <i>Checkpoint 501</i> <i>Think About This Situation 159</i> Teacher's Guide: E T501 #4e
4. Estimate or determine lines of best fit (or curves of best fit if appropriate) with technology, and use them to interpolate within the range of the data.	Student Edition: 19-21, 23-28, 76 #2, 77 #3, 195 #2, 196 #3, 197 #4-#5, 202 #2, 203 #3, 204 #4, 207 #1, 208 #3, 209 #4 <i>Checkpoint 78</i> Teacher's Guide: E T20-T23; M T24-T29; SS T23
5. Analyze data using technology, and use statistical terminology to describe conclusions. <ul style="list-style-type: none"> • Measures of dispersion: variance, standard deviation, outliers • Correlation coefficient • Normal distribution (e.g., approximately 95% of the sample lies between two standard deviations on either side of the mean) 	Student Edition: 16 #25, 19, 36 #65, 61-62 #1, #4, 72-73 <i>Checkpoint 51</i> Teacher's Guide: E T16 #2b, T19, T36 #6b; M T62 #1, #4, T72-T73; SS T51
B. Probability	
1. Calculate the expected value of a probability-based game, given the probabilities and payoffs of the various outcomes, and determine whether the game is fair.	Student Edition: 508 #5, 525 #3 Teacher's Guide: M T508 #5, T 525 #3
2. Use concepts and formulas of area to calculate geometric probabilities.	Student Edition: 494 #5 Teacher's Guide: M T495 #5
3. Model situations involving probability with simulations (using spinners, dice, calculators and computers) and theoretical models, and solve problems using these models.	Student Edition: 485, 487 #3, 490 #d, 491 #1a, #2b, 492 #3c, 495 #4, 497 #5c, 499-501 <i>Checkpoint 528</i> Teacher's Guide: E T485, T 487 #3

STANDARDS	PAGE REFERENCES
<p>4. Determine probabilities in complex situations.</p> <ul style="list-style-type: none"> • Conditional events • Complementary events • Dependent and independent events 	<p>Student Edition: 492 #3, 495 #2, #4, 496 #2, 497 #6, 505 #1, 506 #2, 507 #3, 511 #4, 512 #5 <i>Think About This Situation</i> 484</p> <p>Teacher’s Guide: M T492 #3</p>
<p>5. Estimate probabilities and make predictions based on experimental and theoretical probabilities.</p>	<p>Student Edition: 486 #1d-#1e, 487 #4, 488 #6e-#6f, 490 #f, 491 #1c, 492 #2d, #3e</p> <p>Teacher’s Guide: A T490 #f; E T488 #6e-#6f</p>
<p>6. Understand 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: 493 #d-#e, 497 #6b, 501 #e, 513-517, 522 #3 <i>Checkpoint</i> 489 #a, 517 <i>Think About This Situation</i> 522 #3</p> <p>Teacher’s Guide: E T513-T517; M T493 #d-#e, T522 #3; SS T489 #a</p>
<p>C. Discrete Mathematics -- Systematic Listing and Counting</p>	
<p>1. Calculate combinations with replacement (e.g., the number of possible ways of tossing a coin 5 times and getting 3 heads) and without replacement (e.g., number of possible delegations of 3 out of 23 students).</p>	<p>Student Edition: 421 #1, 422 #3, 424-427, 485 #1, 487 #3, 489 #7, 495 #4, 509 #4 <i>On Your Own</i> 423</p> <p>Teacher’s Guide: N T422</p>
<p>2. Apply the multiplication rule of counting in complex situations, recognize the difference between situations with replacement and without replacement, and recognize the difference between ordered and unordered counting situations.</p>	<p>Student Edition: 421 #1, 422 #3, 424-427, 485 #1, 487 #3, 489 #7, 495 #4, 509 #4 <i>On Your Own</i> 423</p> <p>Teacher’s Guide: N T422</p>
<p>3. Justify solutions to counting problems.</p>	<p>Student Edition: 425 #5e, 429 #5d, 434 #3, 437 #2d, 438 #4e <i>Checkpoint</i> 430</p> <p>Teacher’s Guide: E T429 #5d; M T434 #3</p>

STANDARDS	PAGE REFERENCES
<p>4. Recognize and explain relationships involving combinations and Pascal’s Triangle, and apply those methods to situations involving probability.</p>	<p>The following examples are foundational to the study of combinations and Pascal’s Triangle in the study of probability.</p> <p>Student Edition: 421 #1, 422 #3, 424-427, 485 #1, 487 #3, 489 #7, 495 #4, 509 #4 <i>On Your Own</i> 423</p> <p>Teacher’s Guide: N T422</p>
<p>D. Discrete Mathematics -- Vertex-Edge Graphs and Algorithms</p>	
<p>1. Use vertex-edge graphs and algorithmic thinking to represent and solve practical problems.</p> <ul style="list-style-type: none"> • Circuits that include every edge in a graph • Circuits that include every vertex in a graph • Scheduling problems (e.g., when project meetings should be scheduled to avoid conflicts) using graph coloring • Applications to science (e.g., who-eats-whom graphs, genetic trees, molecular structures) 	<p>Student Edition: 213, 215, 246, 398-399 #3 <i>Checkpoint</i> 248</p> <p>Teacher’s Guide: M T216 #2; O T205 #4b</p>
<p>2. Explore strategies for making fair decisions.</p> <ul style="list-style-type: none"> • Combining individual preferences into a group decision (e.g., determining winner of an election or selection process) • Determining how many Student Council representatives each class (9th, 10th, 11th, and 12th grade) gets when the classes have unequal sizes (apportionment) 	<p>Student Edition: 213, 215, 246, 327, 329-334, 336-338, 340-344, 398, 399 #3 <i>Checkpoint</i> 248, 328</p> <p>Teacher’s Guide: M T216 #2; O T205 #4b</p>
<p>Standard 4.5 (Mathematical Processes) ALL STUDENTS WILL USE MATHEMATICAL PROCESSES OF PROBLEM SOLVING, COMMUNICATION, CONNECTIONS, REASONING, REPRESENTATIONS, AND TECHNOLOGY TO SOLVE PROBLEMS AND COMMUNICATE MATHEMATICAL IDEAS.</p>	
<p>Cumulative Progress Indicators At each grade level, with respect to content appropriate for that grade level, students will:</p>	
<p>A. Problem Solving</p>	
<p>1. Learn mathematics through problem solving, inquiry, and discovery.</p>	<p>Student Edition: 3-6, 142-143, 162-163, 220-222, 265-264, 347, 462-464, 485-490 <i>On Your Own</i> 79, 101, 442-443</p> <p>Teacher’s Guide: E T333, T390; M T347</p>

STANDARDS	PAGE REFERENCES
<p>2. Solve problems that arise in mathematics and in other contexts (cf. workplace readiness standard 8.3).</p> <ul style="list-style-type: none"> • Open-ended problems • Non-routine problems • Problems with multiple solutions • Problems that can be solved in several ways 	<p>Student Edition: 99-100, 122, 225 #4, 443-444, 449 #2, 469 #3 <i>Checkpoint</i> 78, 101, 248 <i>Think About This Situation</i> 99</p> <p>Teacher’s Guide: E T443</p>
<p>3. Select and apply a variety of appropriate problem-solving strategies (e.g., try a simpler problem or make a diagram) to solve problems.</p>	<p>Student Edition: 118-119 Organizing, 135, 162, 213, 220, 272 #3f, 379 #2, 462-464 <i>Checkpoint</i> 358 <i>Think About This Situation</i> 121</p> <p>Teacher’s Guide: L T121</p>
<p>4. Pose problems of various types and levels of difficulty.</p>	<p>Student Edition: 72 Extending #1, 92-93 Extending, 119-120, 216-219, 263-264, 366-372, 387 #4 <i>On Your Own</i> 386-388, 427-430</p> <p>Teacher’s Guide: E T405</p>
<p>5. Monitor their progress and reflect on the process of their problem-solving activity.</p>	<p>Student Edition: 7 #1, 11, 220, 240 #4, 368 #1d <i>Checkpoint</i> 6, 11, 163</p> <p>Teacher’s Guide: L T420; LO T110; SS T6; T11, T13, T361</p>
<p>B. Communication</p>	
<p>1. Use communication to organize and clarify their mathematical thinking.</p> <ul style="list-style-type: none"> • Reading and writing • Discussion, listening, and questioning 	<p>Student Edition: 176 #2, 186 #7, 225 #1, 276 #4c, 422 #4 <i>Checkpoint</i> 125, 146, 430 <i>On Your Own</i> 156</p> <p>Teacher’s Guide: L T420</p>
<p>2. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing.</p>	<p>Student Edition: 114 #3, 176 #2, 186 #7, 426 #6c <i>Checkpoint</i> 115, 125, 143 <i>On Your Own</i> 156</p> <p>Teacher’s Guide: SS T332, T376, T391</p>

STANDARDS	PAGE REFERENCES
3. Analyze and evaluate the mathematical thinking and strategies of others.	Student Edition: 7 #1, 11, 220, 240 #4, 368 #1d <i>Checkpoint</i> 6, 11, 163 Teacher's Guide: L T420; LO T110; SS T6; T11, T13, T361
4. Use the language of mathematics to express mathematical ideas precisely.	Student Edition: 422 #4 <i>Checkpoint</i> 112, 125, 211, 214, 442 <i>On Your Own</i> 187-188, 248 Teacher's Guide: SS T125, T248
C. Connections	
1. Recognize recurring themes across mathematical domains (e.g., patterns in number, algebra, and geometry).	Student Edition: 29 #2, 132 #1, 135 #1 <i>Checkpoint</i> 211, 228, 365, 418, 442 <i>Investigation 2</i> 144-146 Teacher's Guide: M T371-T372; SS T228
2. Use connections among mathematical ideas to explain concepts (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).	Student Edition: 29 #2, 132 #1, 135 #1 <i>Checkpoint</i> 211, 228, 365, 418, 442 <i>Investigation 2</i> 144-146 Teacher's Guide: M T371-T372; SS T228
3. Recognize that mathematics is used in a variety of contexts outside of mathematics.	Student Edition: 122, 378 #4, 435 #1, 465-466, 474-476 <i>Checkpoint</i> 13 <i>On Your Own</i> 187-189 Think About This Situation 99 Teacher's Guide: SS T426
4. Apply mathematics in practical situations and in other disciplines.	Student Edition: 139 #3, 147 #1, 153 #3, 155 #2, 158-161, 254-257, 470 #6 Teacher's Guide: E T254-T257

STANDARDS	PAGE REFERENCES
5. Trace the development of mathematical concepts over time and across cultures (cf. world languages and social studies standards).	Student Edition: 26-27 #4, 29 #1, 111-112, 158, 203-204 #4 <i>Think About This Situation</i> 101 Teacher's Guide: M T27 #4, T29 #1
6. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	Student Edition: 94-96, 243-247, 321-323, 477-481, 531-544 <i>Checkpoint</i> 248, 545 Teacher's Guide: SS T545
D. Reasoning	
1. Recognize that mathematical facts, procedures, and claims must be justified.	Student Edition: 142, 153 #3, 206 #3b, 222 Teacher's Guide: A T222; E T142; M T206 #3b
2. Use reasoning to support their mathematical conclusions and problem solutions.	Student Edition: 220 #1, 221 #6a, 225 #3d, 226 #2, 246 #3d <i>Checkpoint</i> 214, 237 Teacher's Guide: E T221 #6a; M T208 #2b1
3. Select and use various types of reasoning and methods of proof.	Student Edition: 35 #4h, 44 #4, 45 #1d, 63 #2b, 67 #3, 220 #1, 225 #4, 232 #4, 436 #5 <i>Think About This Situation</i> 47
4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.	Student Edition: 263 #3, 328 #3, 339 #2, 363-364 #3, 368 #1 Teacher's Guide: E T339 #2; M T263; O T368 #1d
5. Make and investigate mathematical conjectures. <ul style="list-style-type: none"> • Counterexamples as a means of disproving conjectures • Verifying conjectures using informal reasoning or proofs 	Student Edition: 263 #3, 328 #3, 339 #2, 363-364 #3, 368 #1 Teacher's Guide: E T339 #2; M T263; O T368 #1d
6. Evaluate examples of mathematical reasoning and determine whether they are valid.	Student Edition: 263 #3, 328 #3, 339 #2, 363-364 #3, 368 #1 Teacher's Guide: E T339 #2; M T263; O T368 #1d

STANDARDS	PAGE REFERENCES
E. Representations	
<p>1. Create and use representations to organize, record, and communicate mathematical ideas.</p> <ul style="list-style-type: none"> Concrete representations (e.g., base-ten blocks or algebra tiles) Pictorial representations (e.g., diagrams, charts, or tables) Symbolic representations (e.g., a formula) Graphical representations (e.g., a line graph) 	<p>Student Edition: 52, 55, 70 #3b, 107 #4 <i>Investigation 2</i> 80-83, 126-131, 162-163 <i>On Your Own</i> 84, 161, 164 <i>Think About This Situation</i> 99</p> <p>Teacher’s Guide: A T84, E T131</p>
<p>2. Select, apply, and translate among mathematical representations to solve problems.</p>	<p>Student Edition: 118-119 Organizing, 135, 162, 165-168, 175, 213, 220, 272 #3f, 379 #2, 462-464 <i>Checkpoint</i> 358 <i>Think About This Situation</i> 121</p> <p>Teacher’s Guide: L T121</p>
<p>3. Use representations to model and interpret physical, social, and mathematical phenomena.</p>	<p>Student Edition: 26-27 #4, 29 #1, 111-112, 119 #1, 158, 203-204 #4, 259 #2 <i>Think About This Situation</i> 101</p> <p>Teacher’s Guide: M T27 #4, T29 #1</p>
F. Technology	
<p>1. Use technology to gather, analyze, and communicate mathematical information.</p>	<p>Student Edition: 114, 120 #3, 127, 221 #3, 223 <i>On Your Own</i> 115</p> <p>Teacher’s Guide: E T114 #2-#3, T221</p>
<p>2. Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information.</p>	<p>Student Edition: 19-23, 127, 174 #a <i>Checkpoint</i> 23</p> <p>Teacher’s Guide: E T19-T23; SS T23</p>

STANDARDS	PAGE REFERENCES
3. Use graphing calculators and computer software to investigate properties of functions and their graphs.	Student Edition: 114 #2, 116-120, 122 #1a, 127 <i>Checkpoint</i> 115 <i>On Your Own</i> 115, 215 Teacher's Guide: M T118
4. Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).	Student Edition: 19-23, 114 #2, 116-120, 223, 425 #1 <i>Checkpoint</i> 115, 504 <i>On Your Own</i> 115 Teacher's Guide: E T19-T23
5. Use computer software to make and verify conjectures about geometric objects.	Student Edition: 168 #c, 172 #d, 174 #a, 426 #6b <i>Checkpoint</i> 504 #5 Teacher's Guide: E T426 #6b; N T420
6. Use computer-based laboratory technology for mathematical applications in the sciences.	Student Edition: <i>On Your Own</i> 467-468