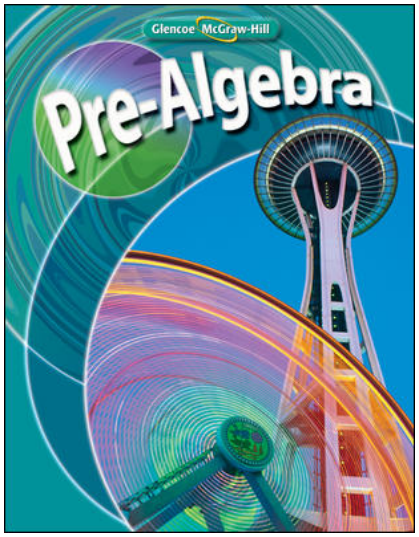
Glencoe

Model Academic Standards for
Mathematics Grade 12

Wisconsin



Pre-Algebra

STANDARDS	PAGE REFERENCES
Mathematical Processes Performance Standards A Grade 12	
By the end of **grade twelve**, students will:	
A.12.1 Use reason and logic to • evaluate information • perceive patterns • identify relationships • formulate questions, pose problems, and make and test conjectures • pursue ideas that lead to further understanding and deeper insight	**Student Edition:** 26-30, 63 #3, 104 #61, 109 #32, 133, 158-161, 300 #23 *Algebra Lab* 60, 84-85, 208, 273, 383 *Geometry Lab* 531, 596, 607 *Smart Start* 1-14 *Spreadsheet Lab* 42, 168, 337 *Standardized Test Practice* 287 #13 *U.S. Data File* 18-21 **Teacher Resources:** *Quick Review Math Handbook Book 3* 65, 158, 171, 180, 230, 258-261

STANDARDS	PAGE REFERENCES
A.12.2 Communicate logical arguments and clearly show • why a result does or does not make sense • why the reasoning is or is not valid • an understanding of the difference between examples that support a conjecture and a proof of the conjecture	**Student Edition:** 26-30, 58 #53, 63 #3, 104 #61, 133, 300 #23, 509 #13, 655 #19 *Algebra Lab* 60, 84-85, 208, 273, 383 *Geometry Lab* 531, 596, 607 *Smart Start* 1-14 *Spreadsheet Lab* 42, 168, 337 *U.S. Data File* 18-21 **Teacher Resources:** *Quick Review Math Handbook Book 3* 158, 171, 258-261
A.12.3 Analyze non-routine* problems and arrive at solutions by various means, including models* and simulations, often starting with provisional conjectures and progressing, directly or indirectly, to a solution, justification, or counter-example	**Student Edition:** 26-30, 109 #32, 115 #58, 325 #26, 343-347, 497-502, 529 #22, 818-824 *Algebra Lab* 273, 307, 688-689 *Cross-Curricular Project* 459, 623, 730 *Graphing Calculator Lab* 390, 681 *Smart Start* 1-14 *U.S. Data File* 18-21, 144 #44 **Teacher Resources:** *Quick Review Math Handbook Book 3* 158, 171, 258-261, 264
A.12.4 Develop effective oral and written presentations employing correct mathematical terminology, notation, symbols, and conventions for mathematical arguments and display of data	**Student Edition:** 30 #28, 83 #75, 115 #58, 190 #55-#57, 214-218 *Algebra Lab* 84-85, 273 *Cross-Curricular Project* 459, 623 *Graphing Calculator Lab* 67, 68 *Reading Math* 429, 475 *U.S. Data File* 18-21, 144 #44 **Teacher Resources:** *Quick Review Math Handbook Book 3* 158, 171, 182-186, 196-199, 236, 262, 441
A.12.5 Organize work and present mathematical procedures and results clearly, systematically, succinctly, and correctly	**Student Edition:** 104 #61, 115 #58, 190 #55-#57 *Algebra Lab* 273 *Cross-Curricular Project* 23, 177, 459 *U.S. Data File* 18-21, 144 #44 **Teacher Resources:** *Quick Review Math Handbook Book 3* 158, 171, 200, 230, 262

STANDARDS	PAGE REFERENCES
A.12.6 Read and understand • mathematical texts and other instructional materials • writing about mathematics (e.g., articles in journals) and mathematical ideas as they are used in other contexts	**Student Edition:** 139 #29, 362 #29, 542 #25 *Cross-Curricular Project* 23, 177 *Real World Link* 28, 56, 122, 131, 192, 421, 641, 707 *Spreadsheet Lab* 337 **Teacher Resources:** *Quick Review Math Handbook Book 3* 158, 171, 200, 214, 262
Mathematics, Standard B: Number Operations And Relationships **Performance Standards - Grade 12** By the end of **grade twelve**, students will:	
B.12.1 Use complex counting procedures such as union and intersection of sets and arrangements (permutations* and combinations*) to solve problems	After defining the terms, the following page references may be used to meet this standard. **Student Edition:** 191, 192, 196, 649, 652, 655 #16-#17, 676-680 **Teacher Resources:** *Quick Review Math Handbook Book 3* 232-239, 266-269, 271
B.12.2 Compare real numbers using • order relations (>,<) and transitivity* • ordinal scales including logarithmic (e.g., Richter, pH rating) • arithmetic differences • ratios, proportions, percents, rates of change	**Student Edition:** 78-79, 81, 180-184, 205 #10, 216, 230, 258, 292-296, 302-306, 315, 332-336, 338-342, 371-375, 376-381, 384-389, 465-468, 469-474, 742 *Reading Math* 301 *Spreadsheet Lab* 337 **Teacher Resources:** *Quick Review Math Handbook Book 3* 75, 112-113, 124, 129, 130, 131, 140-141, 147-148, 168-169, 230, 308-311
B.12.3 Perform and explain operations on real numbers (add, subtract, multiply, divide, raise to a power, extract a root, take opposites and reciprocals, determine absolute value)	**Student Edition:** 80, 86-90, 93-97, 100-104, 106-110, 117, 118, 136, 181-184, 203-207, 209-213, 245-249, 263-267, 363, 465-468, 745, 747-749, 750 *Algebra Lab* 84-85, 92, 99, 105 **Teacher Resources:** *Quick Review Math Handbook Book 3* 92-95, 97, 116-125, 132-137, 168-169, 172-174, 176-178, 264, 442

STANDARDS	PAGE REFERENCES
B.12.4 In problem-solving situations involving the application of different number systems (natural, integers, rational*, real*) select and use appropriate • computational procedures • properties (e.g., commutativity*, associativity*, inverses*) • modes of representation (e.g., rationals as repeating decimals, indicated roots as fractional exponents)	**Student Edition:** 26-30, 43-47, 88 #5, 97 #60, 109, 136, 183 #53-#55, 228-233, 234-238, 241, 245-249, 469-474 *Algebra Lab* 208 *Spreadsheet Lab* 337 **Teacher Resources:** *Quick Review Math Handbook Book 3* 78, 80, 92-94, 108, 121, 125, 142, 149-150, 158, 171, 262, 284-285
B.12.5 Create and critically evaluate numerical arguments presented in a variety of classroom and real-world situations (e.g., political, economic, scientific, social)	**Student Edition:** 26-30, 190 #55-#57, 300 #22 *Algebra Lab* 273 *Cross-Curricular Project* 23, 177, 459 *Graphing Calculator Lab* 67-68 **Teacher Resources:** *Quick Review Math Handbook Book 3* 108, 227, 230, 262, 285, 293, 306
B.12.6 Routinely assess the acceptable limits of error when • evaluating strategies • testing the reasonableness of results • using technology to carry out computations	**Student Edition:** 2-13, 28 #3, 94 #3, 154 #3, 237 #49, 308-312, 343-347, 467 #29, #30, 610-611 #4 *Algebra Lab* 307 **Teacher Resources:** *Quick Review Math Handbook Book 3* 76, 77, 80, 150, 223, 262
Mathematics, Standard C: Geometry Performance Standards - Grade 12	
By the end of **grade twelve**, students will:	
C.12.1 Identify, describe, and analyze properties of figures, relationships among figures, and relationships among their parts by • constructing physical models • drawing precisely with paper-and-pencil, hand calculators, and computer software • using appropriate transformations* (e.g., translations, rotations, reflections, enlargements) • using reason and logic	**Student Edition:** 497-502, 517 #34, 518-523, 524-529, 535 #28, #29, 577, 579 *Cross-Curricular Project* 459, 463 *Foldables* 510 *Geometry Lab* 531, 544 **Teacher Resources:** *Quick Review Math Handbook Book 3* 360-365, 447-449

STANDARDS	PAGE REFERENCES
C.12.2 Use geometric models* to solve mathematical and real-world problems	**Student Edition:** 516 #26, 523 #24, 529 #20, 554 #26 *Cross-Curricular Project* 459, 623 **Teacher Resources:** *Quick Review Math Handbook Book 3* 349 #15, 354, 361, 366, 368, 371, 386, 449
C.12.3 Present convincing arguments by means of demonstration, informal proof, counter-examples, or any other logical means to show the truth of • statements (e.g., these two triangles are not congruent) • generalizations (e.g., the Pythagorean* theorem holds for all right triangles)	**Student Edition:** 476-481, 485-490, 492-496, 518-523, 530 #39, 535 #28, #29, 541 *Algebra Lab* 483-484 *Mid-Chapter Quiz* 537 #6 *Standardized Test Practice* 59 #13 **Teacher Resources:** *Quick Review Math Handbook Book 3* 354, 371, 391, 394-396
C.12.4 Use the two-dimensional rectangular coordinate system* and algebraic procedures to describe and characterize geometric properties and relationships such as slope*, intercepts*, parallelism, and perpendicularity	**Student Edition:** 384-389, 391-394, 493 #2, 517 *Algebra Lab* 383 *Cross-Curricular Project* 459, 623 *Graphing Calculator Lab* 395-396 **Teacher Resources:** *Quick Review Math Handbook Book 3* 320-323, 324-334
C.12.5 Identify and demonstrate an understanding of the three ratios used in right-triangle trigonometry (sine, cosine, tangent)	For understanding of trigonometry, see Glencoe's *Geometry* © 2008 Lesson 8-4. **Teacher Resources:** *Quick Review Math Handbook Book 3* 398-400
Mathematics Performance Standards D Grade 12	
By the end of **grade twelve,** students will:	
D.12.1 Identify, describe, and use derived attributes* (e.g., density, speed, acceleration, pressure) to represent and solve problem situations	**Student Edition:** 205 #4, #10, 213 #70, 215 #3, 295 #47, 362 #29, 405 #7-#9, 438 #35-#37, 471 #4, 473 #43, #53, 481 #62, 587 #29 **Teacher Resources:** *Quick Review Math Handbook Book 3* 139 #30, 293, 386

STANDARDS	PAGE REFERENCES
D.12.2 Select and use tools with appropriate degree of precision to determine measurements directly* within specified degrees of accuracy and error (tolerance)	**Student Edition:** 166 #28, 184 #66, 205 #10, 211 #9, #35, 215 #3, 241 #6, 343-347, 405 #7-#9, 587 #30, #31, #33 *Algebra Lab* 208, 273, 307 *Geometry Lab* 531, 582 *Reading Math* 614 **Teacher Resources:** *Quick Review Math Handbook Book 3* 200, 214, 410, 434-435, 444-449
D.12.3 Determine measurements indirectly*, using • estimation • proportional reasoning, including those involving squaring and cubing (e.g., reasoning that areas of circles are proportional to the squares of their radii) • techniques of algebra, geometry, and right triangle trigonometry • formulas in applications (e.g., for compound interest, distance formula) • geometric formulas to derive lengths, areas, or volumes of shapes and objects (e.g., cones, parallelograms, cylinders, pyramids) • geometric relationships and properties of circles and polygons (e.g., size of central angles, area of a sector of a circle) • conversion constants to relate measures in one system to another (e.g., meters to feet, dollars to Deutschmarks	**Student Edition:** 109 #33, 145 #48, 163, 166 #32, #33, 271, 302-306, 308-312, 427 #35, 485-490, 492-496, 497-502, 518-523, 545-550, 551-556, 583-588, 589-594, 807-808 *Cross-Curricular Project* 459 *Geometry Lab* 582, 607 *Mid-Chapter Quiz* 595 #13, #14 *Reading Math* 614 *Spreadsheet Lab* 337, 557, 563 *Standardized Test Practice* 508 #2 **Teacher Resources:** *Quick Review Math Handbook Book 3* 62, 124, 294-295, 308-311, 382-385, 390-392, 425-427

STANDARDS	PAGE REFERENCES
Mathematics, Standard E: Statistics and Probability **Performance Standards - Grade 12**	
By the end of **grade twelve,** students will:	
E.12.1 Work with data in the context of real-world situations by • formulating hypotheses that lead to collection and analysis of one- and two-variable data • designing a data collection plan that considers random sampling, control groups, the role of assumptions, etc. • conducting an investigation based on that plan • using technology to generate displays, summary statistics*, and presentations	**Student Edition:** 61-66, 139 #29, 266 #36, 343-347, 352 *Algebra Lab* 60, 273 *Cross-Curricular Project* 177, 289, 623 *Graphing Calculator Lab* 67-68 *U.S. Data File* 18-21 **Teacher Resources:** *Quick Review Math Handbook Book 3* 196-201, 214-217, 250, 258-259, 452-456
E.12.2 Organize and display data from statistical investigations using • frequency distributions • percentiles*, quartiles, deciles • line of best fit* (estimated regression line) • matrices	**Student Edition:** 61-66, 139 #29, 266 #36, 274-279, 403-407, 633-637 *Algebra Lab* 273 *Cross-Curricular Project* 177, 289, 623 *U.S. Data File* 18-21 **Teacher Resources:** *Quick Review Math Handbook Book 3* 199-201, 206, 218-221
E.12.3 Interpret and analyze information from organized and displayed data when given • measures of dispersion*, including standard deviation and variance • measures of reliability • measures of correlation*	**Student Edition:** 139 #29, 266 #36, 274-279, 626-631, 633-637 *Algebra Lab* 273 *Cross-Curricular Project* 177, 623 After including the definitions of the terms, the following page references also may be used to meet this standard. *Graphing Calculator Lab* 280 *Standardized Test Practice* 287 #13 *U.S. Data File* 18-21 **Teacher Resources:** *Quick Review Math Handbook Book 3* 214-217, 228

STANDARDS	PAGE REFERENCES
E.12.4 Analyze, evaluate, and critique the methods and conclusions of statistical experiments reported in journals, magazines, news media, advertising, etc.	**Student Edition:** 139 #29, 266 #36 *Algebra Lab* 273 *Cross-Curricular Project* 177, 289, 623 *Reading Math* 664 *U.S. Data File* 18-21 **Teacher Resources:** *Quick Review Math Handbook Book 3* 214, 245
E.12.5 Determine the likelihood of occurrence of complex events by • using a variety of strategies (e.g., combinations*) to identify possible outcomes • conducting an experiment • designing and conducting simulations* • applying theoretical probability	**Student Edition:** 665-669, 676-680 *Algebra Lab* 688-689 *Cross-Curricular Project* 177, 289, 623 *Graphing Calculator Lab* 681 *U.S. Data File* 18-21 **Teacher Resources:** *Quick Review Math Handbook Book 3* 232-238, 240-243, 245
Mathematics, Standard F: Algebraic Relationships **Performance Standards - Grade 12**	
By the end of **grade twelve,** students will:	
F.12.1 Analyze and generalize patterns of change (e.g., direct and inverse variation) and numerical sequences, and then represent them with algebraic expressions and equations	**Student Edition:** 2-3, 110 #45, 129-133, 154 #3, 158-161, 184 #71, 338-342, 371-375, 376-381, 389 #31 *Cross-Curricular Project* 289 *Spreadsheet Lab* 337 **Teacher Resources:** *Quick Review Math Handbook Book 3* 65-66, 158, 276-280, 283, 300-306

STANDARDS	PAGE REFERENCES
F.12.2 Use mathematical functions* (e.g., linear*, exponential*, quadratic*, power) in a variety of ways, including • recognizing that a variety of mathematical and real-world phenomena can be modeled* by the same type of function • translating different forms of representing them (e.g., tables, graphs, functional notation*, formulas) • describing the relationships among variable quantities in a problem • using appropriate technology to interpret properties of their graphical representations (e.g., intercepts, slopes, rates of change, changes in rates of change, maximum*, minimum*)	**Student Edition:** 359-363, 365-369, 371-375, 376-381, 383-389, 391-394, 397-402, 720-725, 729 #34, #35, #36 *Algebra Lab* 358, 383 *Graphing Calculator Lab* 364, 395-396, 731 *Reading Math* 370 **Teacher Resources:** *Quick Review Math Handbook Book 3* 108, 223, 262, 281, 293, 294, 324-334
F.12.3 Solve linear and quadratic equations, linear inequalities, and systems of linear equations and inequalities • numerically • graphically, including use of appropriate technology • symbolically, including use of the quadratic formula	**Student Edition:** 365-369, 376-381, 397-402, 411, 420-423, 424-428, 430-434, 435-439, 441-445, 446-450, 452-454, 726-730 *Cross-Curricular Project* 289 *Graphing Calculator Lab* 395, 731 *Mid-Chapter Quiz* 440 #19-#24 *Practice Test* 455, 735 *Standardized Test Practice* 415 #12, 457 #14 **Teacher Resources:** *Quick Review Math Handbook Book 3* 296-304, 313-314
F.12.4 Model and solve a variety of mathematical and real-world problems by using algebraic expressions, equations, and inequalities	**Student Edition:** 37-41, 49-53, 71, 88 #5, 109 #33, 131 #3, 138 #4, 142 #2, 145 #48, 148 #2, 154 #3, 391-392, 397-398, 411, 421 #3, 424-425, 433 #40, #41, 437 #4, 438 #35-#37, 447 #3, 453-454, 801 *Algebra Lab* 134-135, 418-419 *Cross-Curricular Project* 289, 459 *Practice Test* 455 **Teacher Resources:** *Quick Review Math Handbook Book 3* 276-281, 285, 294-305, 312, 313