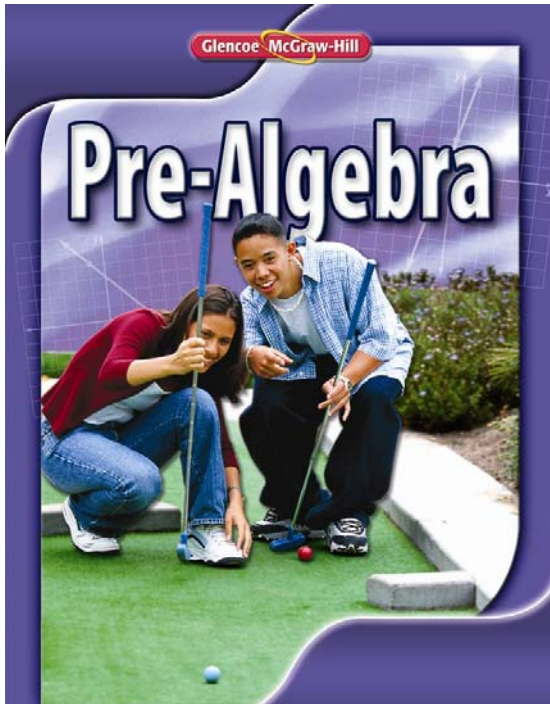




Glencoe

Model Academic Standards for
Mathematics Grade 12



STANDARDS	PAGE REFERENCES
Mathematical Processes Performance Standards A Grade 12	
By the end of grade twelve , students will:	
<p>A.12.1 Use reason and logic to</p> <ul style="list-style-type: none"> • 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 	<p>Student Edition: 77 <i>Example P14</i> <i>Exercises P15</i> <i>Pretest P4 #2, #32, #37</i> <i>Posttest P22 #2</i> <i>Real-World Example P8</i></p>
<p>A.12.2 Communicate logical arguments and clearly show</p> <ul style="list-style-type: none"> • 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 	<p>The following page references use the concept of ratios and proportions to meet this standard.</p> <p>Student Edition: 281 <i>H.O.T. Problems 268 #37, 273 #28, 284 #20, 291 #41, 305 #19</i></p>

STANDARDS	PAGE REFERENCES
<p>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</p>	<p>Student Edition: <i>Chapter Project</i> 116, 168, 218, 262 Preparing for Standardized Tests 164-165, 464-465, 722-723</p>
<p>A.12.4 Develop effective oral and written presentations employing correct mathematical terminology, notation, symbols, and conventions for mathematical arguments and display of data</p>	<p>Student Edition: <i>Chapter Project</i> 58, 116, 168, 218, 262, 328, 392, 468, 532, 586, 660, 726</p>
<p>A.12.5 Organize work and present mathematical procedures and results clearly, systematically, succinctly, and correctly</p>	<p>Student Edition: <i>Chapter Project</i> 58, 116, 168, 218, 262, 328, 392, 468, 532, 586, 660, 726</p>
<p>A.12.6 Read and understand</p> <ul style="list-style-type: none"> • mathematical texts and other instructional materials • writing about mathematics (e.g., articles in journals) and mathematical ideas as they are used in other contexts 	<p>Student Edition: P3, 4, 49, 60, 107, 118, 159, 170, 210, 220, 254, 264, 318, 328, 330, 394, 458, 470, 522, 534, 577, 588, 650, 662, 716, 728, 798</p>
<p>Mathematics, Standard B: Number Operations And Relationships Performance Standards - Grade 12</p>	
<p>By the end of grade twelve, students will:</p>	
<p>B.12.1 Use complex counting procedures such as union and intersection of sets and arrangements (permutations* and combinations*) to solve problems</p>	<p>Student Edition: 783 <i>Check Your Understanding</i> 785 <i>Example</i> 783, 784 <i>Extra Practice</i> 842 <i>Practice and Problem Solving</i> 786-787 <i>Real-World Example</i> 784 Teacher Edition: AE 784</p>
<p>B.12.2 Compare real numbers using</p> <ul style="list-style-type: none"> • order relations (>,<) and transitivity* • ordinal scales including logarithmic (e.g., Richter, pH rating) • arithmetic differences • ratios, proportions, percents, rates of change 	<p>Student Edition: 543 <i>Check Your Understanding</i> 415, 546 #5-#9 <i>Example</i> 544 <i>Practice and Problem Solving</i> 415-416, 546 #26-#31 <i>Real-World Example</i> 414 Teacher Edition: AE 544</p>

STANDARDS	PAGE REFERENCES
<p>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)</p>	<p>Student Edition: 69, 76, 83, 90, 471 <i>Check Your Understanding</i> 72, 78, 86, 92, 136, 144, 473, 540 <i>Concepts and Skills Bank</i> 862-863 <i>Example</i> 70, 71, 76, 77, 83, 85, 91, 134, 135, 142, 143, 537 <i>Explore</i> 535-536 <i>Key Concept</i> 69, 70, 76, 83, 84, 90, 91, 134, 141, 142, 537 <i>Practice and Problem Solving</i> 72, 78, 86, 93, 137-138, 144, 474, 540-541 <i>Real-World Example</i> 472 Teacher Edition: AE 70, 77, 84, 91, 142; DI 71</p>
<p>B.12.4 In problem-solving situations involving the application of different number systems (natural, integers, rational*, real*) select and use appropriate</p> <ul style="list-style-type: none"> • computational procedures • properties (e.g., commutativity*, associativity*, inverses*) • modes of representation (e.g., rationals as repeating decimals, indicated roots as fractional exponents) 	<p>Student Edition: 121, 122 <i>Check Your Understanding</i> 124 #14, #15 <i>Key Concept</i> 18, 19 <i>Practice and Problem Solving</i> 125 #5, #52, #57, #58 <i>Real-World Example</i> 124 Teacher Edition: DI 122</p>
<p>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)</p>	<p>The following page references use the concept of biased and misleading graphs and can be used during teacher/class discussion to meet this standard.</p> <p>Student Edition: <i>Concept and Skills Bank</i> 884-885 <i>Concept Summary</i> 772 <i>Exercises</i> 885 <i>H.O.T. Problems</i> 775 #19, #20</p>
<p>B.12.6 Routinely assess the acceptable limits of error when</p> <ul style="list-style-type: none"> • evaluating strategies • testing the reasonableness of results • using technology to carry out computations 	<p>Student Edition: <i>Problem-Solving Tip</i> 673 <i>Standardized Test Example</i> 201 <i>Study Tip</i> 346, 545, 785, 791</p>

STANDARDS	PAGE REFERENCES
Mathematics, Standard C: Geometry Performance Standards - Grade 12	
By the end of grade twelve , students will:	
<p>C.12.1 Identify, describe, and analyze properties of figures, relationships among figures, and relationships among their parts by</p> <ul style="list-style-type: none"> • 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 	<p>Student Edition: 101, 102, 617 <i>Check Your Understanding</i> 104 <i>Example</i> 103 <i>Extra Practice</i> 814 <i>H.O.T. Problems</i> 621 #38 <i>Practice and Problem Solving</i> 104-105</p> <p>Teacher Edition: AE 103</p>
<p>C.12.2 Use geometric models* to solve mathematical and real-world problems</p>	<p>The following page references can be expanded to meet this standard.</p> <p>Student Edition: 671-673, 677-680, 683-685, 691-693, 697-698, 702-704 <i>Explore</i> 682, 696, 708</p> <p>Teacher Edition: DI 672, 684, 692, 698</p>
<p>C.12.3 Present convincing arguments by means of demonstration, informal proof, counter-examples, or any other logical means to show the truth of</p> <ul style="list-style-type: none"> • statements (e.g., these two triangles are not congruent) • generalizations (e.g., the Pythagorean* theorem holds for all right triangles) 	<p>Student Edition: 19 <i>Example</i> 19 <i>Explore</i> 300 #5, 557, 596-597, 708 <i>H.O.T. Problems</i> 22 #47, 305 #17-#20, 603 #24-#26, 714 #23-#24</p> <p>Teacher Edition: AE 19; DI 19</p>
<p>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</p>	<p>Student Edition: 408, 590 <i>Check Your Understanding</i> 409, 429 <i>Example</i> 408, 428 <i>Extra Practice</i> 826, 827 <i>Practice and Problem Solving</i> 409-410, 430</p> <p>Teacher Edition: AE 408, 428</p>

STANDARDS	PAGE REFERENCES
C.12.5 Identify and demonstrate an understanding of the three ratios used in right-triangle trigonometry (sine, cosine, tangent)	<p>Student Edition: <i>Concepts and Skills Bank</i> 875 <i>Example</i> 876, 877 <i>Exercises</i> 876, 878 <i>Key Concept</i> 877 <i>Real-World Example</i> 875, 878</p> <p>Teacher Edition: AE 875, 877, 878</p>
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	<p>Student Edition: 270 <i>Check Your Understanding</i> 278 <i>Example</i> 277 <i>Extra Practice</i> 820 <i>Practice and Problem Solving</i> 278-279 <i>Real-World Example</i> 275, 276</p> <p>Teacher Edition: AE 276</p>
D.12.2 Select and use tools with appropriate degree of precision to determine measurements directly* within specified degrees of accuracy and error (tolerance)	<p>Student Edition: <i>Concepts and Skills Bank</i> 879 <i>Example</i> 879 <i>Exercises</i> 879</p>

STANDARDS	PAGE REFERENCES
<p>D.12.3 Determine measurements indirectly*, using</p> <ul style="list-style-type: none"> 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) 	<p>Student Edition: <i>Check Your Understanding</i> 223, 297, 560, 568, 627, 673, 679, 686 <i>Example</i> 222, 624, 625, 671, 672, 677, 683, 684, 685 <i>Extra Practice</i> 821, 833, 836, 837, 838 <i>Key Concept</i> 222, 624, 625, 626, 671, 677, 683, 684, 685 <i>Practice and Problem Solving</i> 224-225, 297, 561-562, 568-569, 627-628, 674, 679, 686 <i>Real-World Example</i> 295, 559, 566, 626, 672, 685</p> <p>Teacher Edition: AE 222, 295, 566, 625</p>
<p>Mathematics, Standard E: Statistics and Probability Performance Standards - Grade 12</p>	
<p>By the end of grade twelve, students will:</p>	
<p>E.12.1 Work with data in the context of real-world situations by</p> <ul style="list-style-type: none"> 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 	<p>Student Edition: 771 <i>Check Your Understanding</i> 773 <i>Concept Summary</i> 771 <i>Example</i> 772 <i>Explore</i> 39 <i>Extra Practice</i> 842 <i>H.O.T. Problems</i> 775 #17-#20 <i>Practice and Problem Solving</i> 774-775 <i>Real-World Example</i> 751, 752, 772, 773</p> <p>Teacher Edition: AE 752, 772, 773; DI 449, 755, 772</p>

STANDARDS	PAGE REFERENCES
<p>E.12.2 Organize and display data from statistical investigations using</p> <ul style="list-style-type: none"> • frequency distributions • percentiles*, quartiles, deciles • line of best fit* (estimated regression line) • matrices 	<p>Student Edition: 448, 744 <i>Check Your Understanding</i> 450, 747, 759 <i>Example</i> 744, 758 <i>Extra Practice</i> 828, 840, 841 <i>Practice and Problem Solving</i> 450-451, 747-748, 760-761 <i>Real-World Example</i> 448, 449, 746</p> <p>Teacher Edition: AE 449, 744; DI 744</p>
<p>E.12.3 Interpret and analyze information from organized and displayed data when given</p> <ul style="list-style-type: none"> • measures of dispersion*, including standard deviation and variance • measures of reliability • measures of correlation* 	<p>The related topics on the following pages can be expanded to meet this standard.</p> <p>Student Edition: 730-735, 750-756, 757-763</p>
<p>E.12.4 Analyze, evaluate, and critique the methods and conclusions of statistical experiments reported in journals, magazines, news media, advertising, etc.</p>	<p>The following page references can be used during class activities to meet this standard.</p> <p>Student Edition: 771 <i>Check Your Understanding</i> 773 <i>Concepts and Skills Bank</i> 884 <i>Concept Summary</i> 771, 772 <i>Example</i> 884 <i>Exercises</i> 885 <i>H.O.T. Problems</i> 775 #20 <i>Practice and Problem Solving</i> 774-775 <i>Real-World Example</i> 772, 773</p>
<p>E.12.5 Determine the likelihood of occurrence of complex events by</p> <ul style="list-style-type: none"> • using a variety of strategies (e.g., combinations*) to identify possible outcomes • conducting an experiment • designing and conducting simulations* • applying theoretical probability 	<p>Student Edition: 765 <i>Check Your Understanding</i> 768 <i>Example</i> 765, 766 <i>Extra Practice</i> 841 <i>H.O.T. Problems</i> 769 #22-#25 <i>Practice and Problem Solving</i> 768-769</p> <p>Teacher Edition: AE 766; DI 770</p>

STANDARDS	PAGE REFERENCES
<p>Mathematics, Standard F: Algebraic Relationships Performance Standards - Grade 12</p>	
<p>By the end of grade twelve, students will:</p>	
<p>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</p>	<p>The following page references can be expanded to meet this standard.</p> <p>Student Edition: 420 <i>Check Your Understanding</i> 422 <i>Exercises</i> P15 <i>Explore</i> 10 <i>H.O.T. Problems</i> 423 #14 <i>Key Concept</i> 420 <i>Practice and Problem Solving</i> 422-423 <i>Real-World Example</i> 421</p>
<p>F.12.2 Use mathematical functions* (e.g., linear*, exponential*, quadratic*, power) in a variety of ways, including</p> <ul style="list-style-type: none"> • 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*) 	<p>The following page references can be used during teacher/class discussion to meet this standard.</p> <p>Student Edition: 395, 406, 510, 516 <i>Check Your Understanding</i> 409, 512, 518 <i>Example</i> 406, 408, 510, 511, 517, 518 <i>Extend</i> 515, 521 <i>Extra Practice</i> 831, 832 <i>Practice and Problem Solving</i> 409, 512, 519</p> <p>Teacher Edition: AE 407, 408, 511, 517, 518</p>
<p>F.12.3 Solve linear and quadratic equations, linear inequalities, and systems of linear equations and inequalities</p> <ul style="list-style-type: none"> • numerically • graphically, including use of appropriate technology • symbolically, including use of the quadratic formula 	<p>Student Edition: 184, 453 <i>Check Your Understanding</i> 187, 194, 202, 244, 251, 455 <i>Example</i> 185, 186, 191, 192, 193, 199, 200, 241, 242, 248, 249, 250, 453, 454, 455 <i>Explore</i> 197 <i>Extra Practice</i> 817, 829 <i>Practice and Problem Solving</i> 187, 194, 202, 245, 251, 456 <i>Real-World Example</i> 71, 192</p> <p>Teacher Edition: AE 185, 192, 193, 200, 242, 249, 454; DI 201, 454</p>

STANDARDS	PAGE REFERENCES
<p>F.12.4 Model and solve a variety of mathematical and real-world problems by using algebraic expressions, equations, and inequalities</p>	<p>Student Edition: <i>Practice and Problem Solving</i> 188 #39, #40, 194 #41-#43, 202 #29, #30, #37, #42, 207-208, 231 #16, #17, #24-#29, 238 #36-#38, 245 #37, #38, #52, 252 #38, #45, #46 <i>Real-World Example</i> 172, 180, 186, 192, 206, 230, 235, 243 <i>Standardized Test Example</i> 201, 249</p>