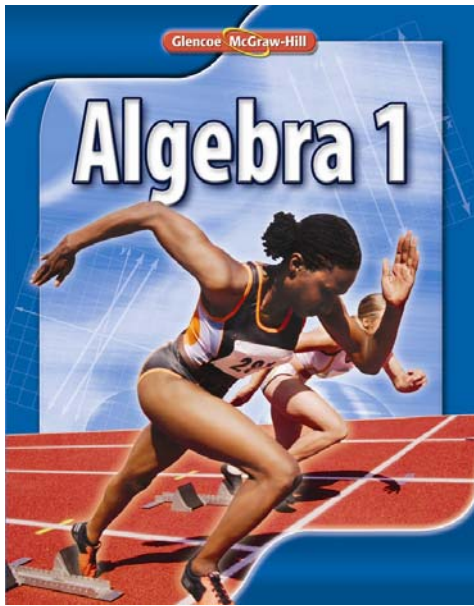




Glencoe

Academic Content Standards  
Mathematics  
Grade Eight



# Algebra 1

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STANDARDS	PAGE REFERENCES
<b>Number, Number Sense and Operations Standard</b>	
<i>Number and Number Systems</i>	
1. Use scientific notation to express large numbers and small numbers between 0 and 1.	<b>Student Edition:</b> <i>Check Your Understanding</i> 419 #1-#6 <i>Example</i> 416 <i>Extra Practice</i> 830 <i>Key Concept</i> 416 <i>Practice and Problem Solving</i> 419 #20-#27 <i>Real-World Example</i> 418 <i>Study Guide and Review</i> 461 #29-#31 <b>Teacher Edition:</b> AE 417; DI 417; SQ 416
2. Recognize that natural numbers, whole numbers, integers, rational numbers and irrational numbers are subsets of the real number system.	<b>Student Edition:</b> P7 <i>Example</i> P7 <i>Exercises</i> P10 #1-#12 <b>Teacher Edition:</b> AE P7; TOD P10; TT P7

Codes used for Teacher's Edition pages are the initial caps of headings on that page.

STANDARDS	PAGE REFERENCES
<i>Meaning of Operations</i>	
<p>3. Apply order of operations to simplify expressions and perform computations involving integer exponents and radicals.</p>	<p><b>Student Edition:</b>  10  <i>Check Your Understanding</i> 12  <i>Example</i> 10, 11  <i>Extra Practice</i> 815  <i>H.O.T. Problems</i> 14 #59  <i>Key Concept</i> 10  <i>Practice and Problem Solving</i> 13 #15-#29, #39-#48  <i>Study Guide and Review</i> 63 #18-#23  <i>Study Tip</i> 11</p> <p><b>Teacher Edition:</b>  AE 11; FMC 11; WO 12</p>
<p>4. Explain and use the inverse and identity properties and use inverse relationships (addition/subtraction, multiplication/division, squaring/square roots) in problem solving situations.</p>	<p><b>Student Edition:</b>  P11, 16, 17  <i>Example</i> P11  <i>H.O.T. Problems</i> 21 #55, #58  <i>Key Concept</i> 16</p> <p><b>Teacher Edition:</b>  TT 17</p>
<i>Computation and Estimation</i>	
<p>5. Determine when an estimate is sufficient and when an exact answer is needed in problem situations, and evaluate estimates in relation to actual answers; e.g., very close, less than, greater than.</p>	<p>The following page references can be extended during teacher/class discussion to meet this objective.</p> <p><b>Student Edition:</b>  P6  <i>Problem-Solving Handbook</i> 812</p> <p><b>Teacher Edition:</b>  TNT P6</p>
<p>6. Estimate, compute and solve problems involving rational numbers, including ratio, proportion and percent, and judge the reasonableness of solutions.</p>	<p><b>Student Edition:</b>  111, 119  <i>Check Your Understanding</i> 114, 121  <i>Example</i> P20, P21, 111, 112, 113, 119, 120, 121  <i>Exercises</i> P21-P22  <i>Key Concept</i> 112  <i>Practice and Problem Solving</i> 115-116, 122-123  <i>Real-World Example</i> 120  <i>Study Guide and Review</i> 142 #55-#60, 143 #61-#70</p>

STANDARDS	PAGE REFERENCES
<p>7. Find the square root of perfect squares, and approximate the square root of non-perfect squares as consecutive integers between which the root lies; e.g., <math>\sqrt{130}</math> is between 11 and 12.</p>	<p><b>Student Edition:</b>  P9  <i>Example</i> P9  <i>Exercises</i> P10 #23-#35  <i>Key Concept</i> P9  <i>Study Tip</i> P9  <b>Teacher Edition:</b>  AE P9</p>
<p>8. Add, subtract, multiply, divide and compare numbers written in scientific notation.</p>	<p><b>Student Edition:</b>  417  <i>Check Your Understanding</i> 419 #11-#18  <i>Example</i> 417, 418  <i>Extra Practice</i> 830  <i>H.O.T. Problems</i> 421 #70-#72  <i>Practice and Problem Solving</i> 420 #36-#53, #55-#62, 421 #67-#69  <i>Practice Test</i> 463 #11, #12  <i>Study Tip</i> 418  <b>Teacher Edition:</b>  AE 418</p>
<b>Measurement Standard</b>	
<i>Measurement Units</i>	
<p>1. Compare and order the relative size of common U.S. customary units and metric units; e.g., mile and kilometer, gallon and liter, pound and kilogram.</p>	<p><b>Student Edition:</b>  <i>Concepts and Skills Bank</i> 857, 858</p>
<p>2. Use proportional relationships and formulas to convert units from one measurement system to another; e.g., degrees Fahrenheit to degrees Celsius.</p>	<p>The following page references can be expanded to meet this objective.  <b>Student Edition:</b>  <i>Concepts and Skills Bank</i> 857, 858  <i>Practice Test</i> 205 #1</p>
<i>Use Measurement Techniques and Tools</i>	
<p>3. Use appropriate levels of precision when calculating with measurements.</p>	<p>The following page references can be used during teacher/class discussion to meet this objective.  <b>Student Edition:</b>  P23-P32  <i>Concepts and Skills Bank</i> 857-858  Also see <i>Pre-Algebra</i> © 2010, page 879.</p>

STANDARDS	PAGE REFERENCES
<p>4. Derive formulas for surface area and volume and justify them using geometric models and common materials. For example, find:</p> <ol style="list-style-type: none"> <li>the surface area of a cylinder as a function of its height and radius;</li> <li>that the volume of a pyramid (or cone) is one-third of the volume of a prism (or cylinder) with the same base area and height.</li> </ol>	<p>The following page references can be extended during class activities to meet this objective.</p> <p><b>Student Edition:</b>  <i>Mid-Chapter Quiz</i> 629 #29  <i>Practice and Problem Solving</i> 7 #29  <i>Spiral Review</i> 200 #29</p>
<p>5. Determine surface area for pyramids by analyzing their parts.</p>	<p>The following surface area references can be expanded to include pyramids.</p> <p><b>Student Edition:</b>  P31-P32  Also see <i>Pre-Algebra</i> © 2010, pages 702-703.</p>
<p>6. Solve and determine the reasonableness of the results for problems involving rates and derived measurements, such as velocity and density, using formulas, models and graphs.</p>	<p><b>Student Edition:</b>  134, 723  <i>Check Your Understanding</i> 135 #3-#5, 724 #5  <i>Practice and Problem Solving</i> 136 #11-#14, 724 #23, #24  <i>Real-World Example</i> 134, 135, 723  <i>Standardized Test Practice</i> 726 #41, #42</p> <p><b>Teacher Edition:</b>  AE 134, 135, 723</p>
<p>7. Apply proportional reasoning to solve problems involving indirect measurements or rates.</p>	<p><b>Student Edition:</b>  134, 723  <i>Check Your Understanding</i> 135 #3, #4, 724 #8  <i>Practice and Problem Solving</i> 136 #11-#13, 724 #23, #24  <i>Real-World Example</i> 134, 723</p> <p><b>Teacher Edition:</b>  AE 134, 723</p>
<p>8. Find the sum of the interior and exterior angles of regular convex polygons with and without measuring the angles with a protractor.</p>	<p>See <i>Pre-Algebra</i> © 2010, pages 618-621.</p>

STANDARDS	PAGE REFERENCES
<p>9. Demonstrate understanding of the concepts of perimeter, circumference and area by using established formulas for triangles, quadrilaterals, and circles to determine the surface area and volume of prisms, pyramids, cylinders, spheres and cones. (Note: Only volume should be calculated for spheres and cones.)</p>	<p>The following page references can be used during teacher/class discussion to meet this objective.</p> <p><b>Student Edition:</b>  P26, P29, P31  <i>Example</i> P26, P27, P29, P31  <i>Exercises</i> P28, P30, P32  <i>Key Concept</i> P31  <i>Spiral Review</i> 200 #29, 762 #36  <i>Standardized Test Review</i> 386 #46</p> <p><b>Teacher Edition:</b>  AE P27, P29, P31</p>
<p>10. Use conventional formulas to find the surface area and volume of prisms, pyramids and cylinders and the volume of spheres and cones to a specified level of precision.</p>	<p><b>Student Edition:</b>  P29  <i>Example</i> P29, P31  <i>Exercises</i> P30, P32  <i>Key Concept</i> P31  <i>Spiral Review</i> 29 #71, 200 #29, 762 #36</p> <p><b>Teacher Edition:</b>  AE P29, P31; NM P30; WO P32</p>
<p><b>Geometry and Spatial Sense Standard</b></p>	
<p><i>Characteristics and Properties</i></p>	
<p>1. Make and test conjectures about characteristics and properties (e.g., sides, angles, symmetry) of two-dimensional figures and three-dimensional objects.</p>	<p>The following page references can be used during teacher/class discussion to meet this objective.</p> <p><b>Student Edition:</b>  P23-P32</p> <p><b>Teacher Edition:</b>  TT P26</p>
<p>2. Recognize the angles formed and the relationship between the angles when two lines intersect and when parallel lines are cut by a transversal.</p>	<p>The following page references can be expanded to meet this objective.</p> <p><b>Student Edition:</b>  237-240</p> <p>Also see <i>Pre-Algebra</i> © 2010, pages 590-594, 611.</p>

STANDARDS	PAGE REFERENCES
<p>3. Use proportions in several forms to solve problems involving similar figures (part-to-part, part-to-whole, corresponding sides between figures).</p>	<p><b>Student Edition:</b>  642  <i>Check Your Understanding</i> 644  <i>Example</i> 642, 643, 662  <i>Extra Practice</i> 839  <i>Key Concept</i> 642  <i>Practice and Problem Solving</i> 645  <i>Practice Test</i> 661 #25  <i>Real-World Example</i> 644  <i>Study Guide and Review</i> 660 #60-#64</p> <p><b>Teacher Edition:</b>  AE 643, 64; FMC 644; WO 643</p>
<i>Spatial Relationships</i>	
<p>4. Represent and analyze shapes using coordinate geometry; e.g., given three vertices and the type of quadrilateral, find the coordinates of the fourth vertex.</p>	<p>The following page references involve coordinate geometry and can be expanded to meet this objective.</p> <p><b>Student Edition:</b>  P23, 39</p>
<i>Transformations and Symmetry</i>	
<p>5. Draw the results of translations, reflections, rotations and dilations of objects in the coordinate plane, and determine properties that remain fixed; e.g., lengths of sides remain the same under translations.</p>	<p>The following page references involve transformations of quadratic functions to meet this objective.</p> <p><b>Student Edition:</b>  544, 545  <i>Key Concept</i> 544, 545  Also see <i>Pre-Algebra</i> © 2010, pages 101-105, 307-311, 605-609.</p>
<i>Visualization and Geometric Models</i>	
<p>6. Draw nets for a variety of prisms, pyramids, cylinders and cones.</p>	<p>See <i>Pre-Algebra</i> © 2010, pages 690-692, 696, 697, 702, 704, 706.</p>

STANDARDS	PAGE REFERENCES
<b>Patterns, Functions and Algebra Standard</b>	
<i>Use Patterns, Relations and Functions</i>	
1. Relate the various representations of a relationship; i.e., relate a table to graph, description and symbolic form.	<b>Student Edition:</b> 39, 40 <i>Check Your Understanding</i> 41 #1, #2 <i>Example</i> 39 <i>Extra Practice</i> 816, 822 <i>Key Concept</i> 195 <i>Practice and Problem Solving</i> 41 #9-#14, 42 #27-#31 <i>Practice Test</i> 67 #16, #17 <i>Real-World Example</i> 196, 197 <i>Study Guide and Review</i> 65 #59-#64, 204 #44, #45 <i>Study Tip</i> 39
2. Generalize patterns and sequences by describing how to find the $n$ th term.	<b>Student Edition:</b> 188 <i>Check Your Understanding</i> 91 #5, #6 <i>Example</i> 189 <i>Extra Practice</i> 822 <i>Key Concept</i> 188 <i>Practice and Problem Solving</i> 191 #18-#21, 192 #24 <i>Standardized Test Practice</i> 208 #6, #16 <i>Study Guide and Review</i> 204 #41-#43 <b>Teacher Edition:</b> AE 189; DI 188
3. Identify functions as linear or nonlinear based on information given in a table, graph or equation.	The following page references can be extended to meet this objective. <b>Student Edition:</b> 48, 161, 525, 527, 567, 678

STANDARDS	PAGE REFERENCES
<i>Use Algebraic Representations</i>	
<p>4. Extend the uses of variables to include covariants where <math>y</math> depends on <math>x</math>.</p>	<p>The following page references can be expanded during teacher/class discussion to meet this objective.</p> <p><b>Student Edition:</b>  40  <i>Check Your Understanding</i> 41 #3-#6  <i>Practice and Problem Solving</i> 41 #15, #16  <i>Real-World Example</i> 40  <i>Study Tip</i> 215</p> <p><b>Teacher Edition:</b>  AE 40</p>
<p>5. Use physical models to add and subtract monomials and polynomials, and to multiply a polynomial by a monomial.</p>	<p><b>Student Edition:</b>  <i>Explore</i> 431-432</p> <p><b>Teacher Edition:</b>  DI 441</p>
<p>6. Describe the relationship between the graph of a line and its equation, including being able to explain the meaning of slope as a constant rate of change and <math>y</math>-intercept in real-world problems.</p>	<p><b>Student Edition:</b>  154  <i>Check Your Understanding</i> 157 #12, 175 #3  <i>Practice and Problem Solving</i> 158 #35, #42, #49, 159 #50, 164 #22, #23, 165 #44, 176 #18, #19, 177 #46, #47  <i>Real-World Example</i> 155, 163, 170, 171</p> <p><b>Teacher Edition:</b>  AE 155, 171, 172; TNT 155</p>
<p>7. Use symbolic algebra (equations and inequalities), graphs and tables to represent situations and solve problems.</p>	<p><b>Student Edition:</b>  <i>Check Your Understanding</i> 78 #9, #10, 86 #16, #17, 93 #8, 164 #9, 183 #9, 286 #11, 293 #1, 298 #1, #2, 318 #11  <i>Exercises</i> 327  <i>Mixed Problem Solving</i> 846, 847, 849  <i>Practice and Problem Solving</i> 78 #24-#29, 79 #44, #45, 86 #42, #43, 87 #62-#71, 94 #23, #40, #41, #51, #52, 101 #38-#40, 164 #22, #23, #36, #37, 165 #44, #45, 184 #28, #29, 185 #38-#44, 286, #34-#40, 293 #10, #11, #30-#34, 294 #39, #40, 299 #35-#41, 318 #30, #37, 319 #44  <i>Preparing for Standardized Tests</i> 326-327  <i>Real-World Example</i> 85, 92, 163, 182, 285, 291, 296, 317</p>

STANDARDS	PAGE REFERENCES
<p>8. Write, simplify and evaluate algebraic expressions (including formulas) to generalize situations and solve problems.</p>	<p><b>Student Edition:</b>            5  <i>Check Your Understanding</i> 7 #10, 12 #13, #14, 27 #1  <i>Practice and Problem Solving</i> 7 #29, #30, #34-#36, 13 #36-#38, #55-#58, 27 #11, #12, 28 #48  <i>Real-World Example</i> 6, 12, 24</p>
<p>9. Solve linear equations and inequalities graphically, symbolically and using technology.</p>	<p><b>Student Edition:</b>            161  <i>Check Your Understanding</i> 86, 93, 100, 164, 286, 293, 298  <i>Concept Summary</i> 99  <i>Example</i> 83, 84, 85, 91, 97, 98, 161, 283, 285, 291, 292, 296, 297  <i>Explore</i> 81-82, 90, 289  <i>Extend</i> 167-168  <i>Extra Practice</i> 818, 821, 825  <i>Practice and Problem Solving</i> 86-88, 94-95, 100-101, 164-165, 286-287, 293-294, 299-300  <i>Real-World Example</i> 85, 92, 291, 296  <b>Teacher Edition:</b>            AE 84, 85, 92, 98, 162, 284, 291, 297; DI 98; WO 84</p>
<p>10. Solve 2 by 2 systems of linear equations graphically and by simple substitution.</p>	<p><b>Student Edition:</b>            333, 342  <i>Check Your Understanding</i> 336, 345  <i>Concept Summary</i> 333  <i>Example</i> 334, 342, 343  <i>Extend</i> 340-341  <i>Extra Practice</i> 827  <i>Key Concept</i> 342  <i>Practice and Problem Solving</i> 336-337, 345-346  <i>Real-World Example</i> 335, 344  <i>Study Guide and Review</i> 389  <i>Study Tip</i> 334, 343  <b>Teacher Edition:</b>            AE 334, 343; DI 334</p>

STANDARDS	PAGE REFERENCES
<p>11. Interpret the meaning of the solution of a 2 by 2 system of equations; i.e., point, line, no solution.</p>	<p><b>Student Edition:</b> 333 <i>Concept Summary</i> 333 <i>Example</i> 334 <i>H.O.T. Problems</i> 338 #49, #50, 346 #30 <i>Study Tip</i> 334 <b>Teacher Edition:</b> AE 334; DI 334; FMC 335, 344</p>
<p>12. Solve simple quadratic equations graphically; e.g., <math>y = x^2 - 16</math>.</p>	<p><b>Student Edition:</b> 525, 537 <i>Check Your Understanding</i> 531 #17-#20 <i>Example</i> 529 <i>Key Concept</i> 529-537 <i>Practice and Problem Solving</i> 532 #52-#57 <b>Teacher Edition:</b> AE 529, 538</p>
<p>13. Compute and interpret slope, midpoint and distance given a set of ordered pairs.</p>	<p><b>Student Edition:</b> 172, 636 <i>Check Your Understanding</i> 175 #6-#11, 638 #1-#4, 639 #10-#17 <i>Example</i> 173, 174, 636 <i>Extra Practice</i> 821, 839 <i>Key Concept</i> 173, 636, 638 <i>Practice and Problem Solving</i> 176 #24-#35, 639 #18-#29, #37-#42 <i>Study Guide and Review</i> 203 #29, #30 <b>Teacher Edition:</b> AE 173, 174, 637, 638; DI 637; WO 638</p>
<i>Analyze Change</i>	
<p>14. Differentiate and explain types of changes in mathematical relationships, such as linear vs. nonlinear, continuous vs. noncontinuous, direct variation vs. inverse variation.</p>	<p>The following page references can be expanded during teacher/class discussion to meet this objective. <b>Student Edition:</b> 46, 48, 180, 525, 670 <i>Check Your Understanding</i> 673 #1-#4 <i>Example</i> 46, 670 <i>Explore</i> 669 <i>H.O.T. Problems</i> 675 #54, #56 <i>Practice and Problem Solving</i> 674 #14-#21</p>

STANDARDS	PAGE REFERENCES
<p>15. Describe and compare how changes in an equation affects the related graphs; e.g., for a linear equation changing the coefficient of <math>x</math> affects the slope and changing the constant affects the intercepts.</p>	<p><b>Student Edition:</b>            214  <i>Check Your Understanding</i> 217-218  <i>Example</i> 214, 215  <i>Explore</i> 213  <i>H.O.T. Problems</i> 220 #64  <i>Key Concept</i> 214  <i>Practice and Problem Solving</i> 218-219</p> <p><b>Teacher Edition:</b>            AE 215</p>
<p>16. Use graphing calculators or computers to analyze change; e.g., interest compounded over time as a nonlinear growth pattern.</p>	<p>The following page references can be expanded to include technology to meet this objective.</p> <p><b>Student Edition:</b>            126  <i>Check Your Understanding</i> 575 #2  <i>H.O.T. Problems</i> 576 #17  <i>Key Concept</i> 574  <i>Practice and Problem Solving</i> 575 #7-#10</p> <p><b>Teacher Edition:</b>            AE 574</p>
<p><b>Data Analysis and Probability Standard</b></p>	
<p><i>Data Collection</i></p>	
<p>1. Use, create and interpret scatterplots and other types of graphs as appropriate.</p>	<p><b>Student Edition:</b>            P40, P41, P42, 245, 246  <i>Check Your Understanding</i> 248  <i>Concept Summary</i> 245  <i>Example</i> P40, P41, P42  <i>Exercises</i> P43  <i>Extra Practice</i> 824  <i>Key Concept</i> 246  <i>Practice and Problem Solving</i> 248-250  <i>Real-World Example</i> 245, 246, 247</p> <p><b>Teacher Edition:</b>            AE P40, P41, P42, 245, 246, 247; DI 246</p>
<p>2. Evaluate different graphical representations of the same data to determine which is the most appropriate representation for an identified purpose; e.g., line graph for change over time, circle graph for part-to-whole comparison, scatterplot for relationship between two variants.</p>	<p>The following page references can be used during teacher/class discussion to meet this objective.</p> <p><b>Student Edition:</b>            P40-P43, 245</p>

STANDARDS	PAGE REFERENCES
3. Differentiate between discrete and continuous data and appropriate ways to represent each.	<p>The following page references can be used during teacher/class discussion to meet this objective.</p> <p><b>Student Edition:</b> 46 <i>Example 46</i> <i>Practice and Problem Solving 51 #48</i></p>
<i>Statistical Methods</i>	
4. Compare two sets of data using measures of center (mean, mode, median) and measures of spread (range, quartiles, interquartile range, percentiles).	<p><b>Student Edition:</b> P37, P38 <i>Concept Summary 746, 757</i> <i>Example P37, P38</i> <i>Exercises P39</i> <i>Extend 125</i></p> <p><b>Teacher Edition:</b> <a href="#">AE P37, P38; FMC 747</a></p>
5. Explain the mean's sensitivity to extremes and its use in comparison with the median and mode.	<p>The following page references can be used during teacher/class discussion to meet this objective.</p> <p><b>Student Edition:</b> P37 <i>Concept Summary 746</i> <i>Example P37</i> <i>H.O.T. Problems 754 #30</i></p> <p><b>Teacher Edition:</b> <a href="#">FMC 747</a></p>
6. Make conjectures about possible relationship in a scatterplot and approximate line of best fit.	<p>The following page references can be extended during teacher/class discussion to meet this objective.</p> <p><b>Student Edition:</b> 253 <i>Check Your Understanding 256 #1</i> <i>Example 253</i> <i>H.O.T. Problems 259 #19, #20</i> <i>Practice and Problem Solving 256 #4-#6, 257 #8, #10-#12, 258 #15-#18</i></p>

STANDARDS	PAGE REFERENCES
<p>7. Identify different ways of selecting samples, such as survey response, random sample, representative sample and convenience sample.</p>	<p><b>Student Edition:</b>            740, 741, 742  <i>Check Your Understanding</i> 743  <i>Example</i> 741, 742  <i>Extra Practice</i> 842  <i>H.O.T. Problems</i> 744 #21-#24  <i>Key Concept</i> 740, 742  <i>Practice and Problem Solving</i> 743-744  <i>Study Guide and Review</i> 794 #6-#8</p> <p><b>Teacher Edition:</b>            AE 741, 742; DI 742</p>
<p>8. Describe how the relative size of a sample compared to the target population affects the validity of predictions.</p>	<p>The following page references can be used during teacher/class discussion to meet this objective.</p> <p><b>Student Edition:</b>            740-744</p> <p><b>Teacher Edition:</b>            FMC 741</p>
<p>9. Construct convincing arguments based on analysis of data and interpretation of graphs.</p>	<p><b>Student Edition:</b>            P40-P43, 747  <i>Check Your Understanding</i> 750-751  <i>Concepts and Skills Bank</i> 866-867  <i>Example</i> 749  <i>Practice and Problem Solving</i> 751-754</p>
<i>Probability</i>	
<p>10. Calculate the number of possible outcomes for a situation, recognizing and accounting for when items may occur more than once or when order is important.</p>	<p><b>Student Edition:</b>            P33, P34, 764  <i>Example</i> P34, P35  <i>Exercises</i> P36  <i>Key Concept</i> P35</p> <p><b>Teacher Edition:</b>            AE P34, P35</p>

STANDARDS	PAGE REFERENCES
<p>11. Demonstrate an understanding that the probability of either of two disjoint events occurring can be found by adding the probabilities for each and that the probability of one independent event following another can be found by multiplying the probabilities.</p>	<p><b>Student Edition:</b>  771-774  <i>Check Your Understanding</i> 775  <i>Extra Practice</i> 844  <i>H.O.T. Problems</i> 777 #34  <i>Key Concept</i> 771, 772, 773, 774  <i>Practice and Problem Solving</i> 775-777  <i>Real-World Example</i> 771, 772, 773, 774</p> <p><b>Teacher Edition:</b>  AE 772, 773, 774</p>