



Geometry

Concepts and Applications

© 2006

STANDARDS		PAGE REFERENCES
Grade Ten		
Number, Number Sense and Operations Standard		
<i>Number and Number Systems</i>		
1. Connect physical, verbal and symbolic representations of irrational numbers; e.g., construct $\sqrt{2}$ as a hypotenuse or on a number line.	Student Edition: 51, 54 #4, 67 #26, 127 #27, 479, 548 <i>Test 85 #2</i>	Teacher Wraparound Edition: AN 54
<i>Meaning of Operations</i>		
2. Explain the meaning of the n th root.	The text defines the square root, which can be extended to higher order roots. Student Edition: 548	Teacher Wraparound Edition: TT 549
<i>Computation and Estimation</i>		
3. Use factorial notation and computations to represent and solve problem situations involving arrangements.	Student Edition: 138 Ex #1 Factorial notation is not explicit in Example #1, but the computation is of the factorial type.	

STANDARDS	PAGE REFERENCES
4. Approximate the n th root of a given number greater than zero between consecutive integers when n is an integer; e.g., the 4th root of 50 is between 2 and 3.	Student Edition: 548-549 Teacher Wraparound Edition: TT 549
Measurement Standard	
<i>Use Measurement Techniques and Tools</i>	
1. Explain how a small error in measurement may lead to a large error in calculated results.	Student Edition: 58, 428 #1 <i>Graphing Calculator Exploration 428 #3</i> Teacher Wraparound Edition: EA 59; OEA 61; RA 59; TT 428
2. Calculate relative error.	Student Edition: 58 <i>Percent of error</i> in the text defines the relative precision of a measurement. It is sometimes called relative error.
3. Explain the difference between absolute error and relative error in measurement.	Student Edition: 58 <i>Percent of error</i> in the text defines the relative precision of a measurement. It is sometimes called relative error. In this definition of precision, <i>greatest possible error</i> could be called <i>absolute error</i> .
4. Give examples of how the same absolute error can be problematic in one situation but not in another; e.g., compare “accurate to the nearest foot” when measuring the height of a person versus when measuring the height of a mountain.	Student Edition: 58, 59 #3 Teacher Wraparound Edition: OEA 61; RA 59 <i>Greatest possible error</i> is sometimes called <i>absolute error</i> . It describes the precision of the measuring tool. The larger the object being measured, the less significant is the precision of the tool.
5. Determine the measures of central and inscribed angles and their associated major and minor arcs.	Student Edition: 462-464, 466 #13-#24, 586-591 Teacher Wraparound Edition: IE 463-465, 586-589; OEA 467; T 462

STANDARDS	PAGE REFERENCES
Geometry and Spatial Sense Standard	
<i>Characteristics and Properties</i>	
<p>1. Formally define and explain key aspects of geometric figures, including:</p> <ul style="list-style-type: none"> a. interior and exterior angles of polygons; b. segments related to triangles (median, altitude, midsegment); c. points of concurrency related to triangles (centroid, incenter, orthocenter, circumcenter); d. circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle). 	<p>Student Edition: 148-151, 228-230, 234-237, 282-285, 312, 454-456, 462-465 <i>Hands-On Geometry</i> 283, 408 <i>Investigation</i> 244-245 Teacher Wraparound Edition: ICE 235, 409, 455, 463</p>
<p>2. Recognize and explain the necessity for certain terms to remain undefined, such as point, line and plane.</p>	<p>Student Edition: 12-14, 15 #1 <i>Reading Geometry</i> 12 Teacher Wraparound Edition: A 17; T 12; TT 14</p>
<p>3. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including:</p> <ul style="list-style-type: none"> a. prove the Pythagorean Theorem; b. prove theorems involving triangle similarity and congruence; c. prove theorems involving properties of lines, angles, triangles and quadrilaterals; d. test a conjecture using basic constructions made with a compass and straightedge or technology. 	<p>Student Edition: 62-65, 96-98, 256-259, 362-365, 638-640 <i>Graphing Calculator Exploration</i> 193, 316-317 <i>Hands-On Geometry</i> 65, 99 <i>Investigation</i> 101-103, 432-433 Teacher Wraparound Edition: ICE 365; TT 257</p>
<i>Spatial Relationships</i>	
<p>4. Construct right triangles, equilateral triangles, parallelograms, trapezoids, rectangles, rhombuses, squares and kites, using compass and straightedge or dynamic geometry software.</p>	<p>Student Edition: 210-212, 215-217, 474 <i>Hands-On Geometry</i> 210, 474, 559 <i>Investigation</i> 102-103, 380-381 Teacher Wraparound Edition: ICE 475; ML 559</p>

STANDARDS	PAGE REFERENCES
5. Construct congruent figures and similar figures using tools, such as compass, straightedge, and protractor or dynamic geometry software.	Student Edition: 356-358 <i>Hands-On Geometry</i> 210, 362, 388, 425 <i>Investigation</i> 432-433 Teacher Wraparound Edition: ML 356
<i>Transformation and Symmetry</i>	
6. Identify the reflection and rotation symmetries of two- and three dimensional figures.	Student Edition: 198-200, 267 #32, 321 #33, 707 #25 Teacher Wraparound Edition: FA 706; ICE 199; TT 693
7. Perform reflections and rotations using compass and straightedge constructions and dynamic geometry software.	Student Edition: 267 #32, 321 #33 <i>Graphing Calculator Exploration</i> 700 <i>Hands-On Geometry</i> 692 Teacher Wraparound Edition: EC 201; ML 203; MW 691
8. Derive coordinate rules for translations, reflections and rotations of geometric figures in the coordinate plane.	Student Edition: 262-264, 266 #28, 687-688, 689 #4 Teacher Wraparound Edition: EC 201; ICE 688; OEA 267, 690
9. Show and describe the results of combinations of translations, reflections and rotations (compositions); e.g., perform compositions and specify the result of a composition as the outcome of a single motion, when applicable.	Student Edition: 202 #27, 695 #14, 703-704 <i>Investigation</i> 708-709 <i>Math In the Workplace</i> 691 Teacher Wraparound Edition: ML 703; TT 693
<i>Visualization and Geometric Models</i>	
10. Solve problems involving chords, radii and arcs within the same circle.	Student Edition: 454-456, 458 #31, 462-465, 466 #30-#35, 468-471, 473 #27-#29 Teacher Wraparound Edition: EC 466; ICE 463, 470; OEA 473

STANDARDS	PAGE REFERENCES
Patterns, Functions and Algebra Standard	
<i>Use Patterns, Relations and Functions</i>	
1. Define function formally and with $f(x)$ notation.	Student Edition: 492 Ex #2
2. Describe and compare characteristics of the following families of functions: square root, cubic, absolute value and basic trigonometric functions; e.g., general shape, possible number of roots, domain and range.	Student Edition: 548-551, 564-567, 572-574, 578-580 Teacher Wraparound Edition: ICE 574; ML 564
<i>Use Algebraic Representations</i>	
3. Solve equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height.	Student Edition: 272-273, 373 #28, 450 Ex #1, 467 #43, 653 #13-#15 Teacher Wraparound Edition: EC 653
4. Use algebraic representations and functions to describe and generalize geometric properties and relationships.	Student Edition: 56-57, 104-107, 202 #29, 327-329 Teacher Wraparound Edition: ICE 57, 190
5. Solve simple linear and nonlinear equations and inequalities having square roots as coefficients and solutions.	Student Edition: 185 #2, 256-259, 260 #25-#28, 458 #38, 470, 548-551, 552 #4-#14, 594, 673 #7 Teacher Wraparound Edition: ICE 550, 551
6. Solve equations and inequalities having rational expressions as coefficients and solutions.	Student Edition: 9 #39, 350-352, 365 Ex #3, 368-371, 383 #2 Teacher Wraparound Edition: ICE 365; ML 276
7. Solve systems of linear inequalities.	Student Edition: 296-298, 298 #2 Teacher Wraparound Edition: 5MC 296
8. Graph the quadratic relationship that defines circles.	Student Edition: 618-620, 621 #26-#27 Teacher Wraparound Edition: ICE 619

STANDARDS	PAGE REFERENCES
9. Recognize and explain that the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals.	Student Edition: 168-170 <i>Graphing Calculator Exploration</i> 170 <i>Hands-On Geometry</i> 169 Teacher Wraparound Edition: ICE 171
10. Solve real-world problems that can be modeled using linear, quadratic, exponential or square root functions.	Student Edition: 139 #5, 177 #12, 178 #35, 179 #36, 258 #3, 264 #3, 265 #11, 266 #28, 545 #10, 551 #9, 553 #43, 594 #2 Teacher Wraparound Edition: ICE 264; ML 548
11. Solve real-world problems that can be modeled, using systems of linear equations and inequalities.	Student Edition: 677 #3, 680 #24, 683 #3, 684 #11, 685 #29 Teacher Wraparound Edition: ICE 677
<i>Analyze Change</i>	
12. Describe the relationship between slope of a line through the origin and the tangent function of the angle created by the line and the positive x-axis.	Student Edition: 168-171, 564-567 Teacher Wraparound Edition: TT 565, 567
Data Analysis and Probability Standard	
<i>Data Collection</i>	
1. Describe measures of center and the range verbally, graphically and algebraically.	Student Edition: 224, 307 #5 <i>Math In the Workplace</i> 339 Teacher Wraparound Edition: TT 339
2. Represent and analyze bivariate data using appropriate graphical displays (scatterplots, parallel box-and-whisker plots, histograms with more than one set of data, tables, charts, spreadsheets) with and without technology.	Student Edition: 184-185 <i>Math In the Workplace</i> 339 <i>Preparing for Standardized Tests</i> 139 #10, 347 #10 Teacher Wraparound Edition: TT 339
3. Display bivariate data where at least one variable is categorical.	Student Edition: 185 #3

STANDARDS	PAGE REFERENCES
4. Identify outliers on a data display; e.g., use interquartile range to identify outliers on a box-and-whisker plot.	Student Edition: <i>Math In the Workplace</i> 339 Teacher Wraparound Edition: TT 339
<i>Statistical Methods</i>	
5. Provide examples and explain how a statistic may or may not be an attribute of the entire population; e.g., intentional or unintentional bias may be present.	Student Edition: 46-47, 133 #33, 267 #34 <i>Preparing for Standardized Tests</i> 185 #1 Teacher Wraparound Edition: EA 32; OEA 34
6. Interpret the relationship between two variables using multiple graphical displays and statistical measures; e.g., scatterplots, parallel box-and-whisker plots, and measures of center and spread.	Student Edition: 184-185 <i>Math In the Workplace</i> 339 Teacher Wraparound Edition: TT 339
<i>Probability</i>	
7. Model problems dealing with uncertainty with area models (geometric probability).	Student Edition: 138-139
8. Differentiate and explain the relationship between the probability of an event and the odds of an event, and compute one given the other.	Student Edition: <i>Preparing for Standardized Tests</i> 139 #10, 185 #9, 347 #2, 451 #6, 629 #2
Grade Eleven	
Number, Number Sense and Operations Standard	
<i>Number and Number Systems</i>	
1. Determine what properties hold for matrix addition and matrix multiplication; e.g., use examples to show addition is commutative and when multiplication is not commutative.	Student Edition: 279 <i>Matrix addition or multiplication</i> is not described. <i>Properties of addition and multiplication</i> are mentioned.
2. Determine what properties hold for vector addition and multiplication, and for scalar multiplication.	Student Edition: <i>Investigation</i> 74-75 Teacher Wraparound Edition: A 75
3. Represent complex numbers on the complex plane.	See Glencoe's <i>Algebra 2</i> © 2008. <i>Algebra Lab</i> 262

STANDARDS	PAGE REFERENCES
<i>Meaning of Operations</i>	
4. Use matrices to represent given information in a problem situation.	See Glencoe's <i>Algebra 2</i> © 2008.
5. Model, using the coordinate plane, vector addition and scalar multiplication.	Student Edition: <i>Investigation 74-75</i> Teacher Wraparound Edition: A 75; ML 74
<i>Computation and Estimation</i>	
6. Compute sums, differences and products of matrices using paper and pencil calculations for simple cases, and technology for more complicated cases.	See Glencoe's <i>Algebra 2</i> © 2008.
7. Compute sums, differences, products and quotients of complex numbers.	See Glencoe's <i>Algebra 2</i> © 2008.
8. Use fractional and negative exponents as optional ways of representing and finding solutions for problem situations; e.g., $27^{2/3} = (27^{1/3})^2 = 9$.	Student Edition: <i>Preparing for Standardized Tests 185 #2</i> Also see Glencoe's <i>Algebra 2</i> © 2008.
9. Use vector addition and scalar multiplication to solve problems.	Student Edition: 56-57 <i>Investigation 74-75</i> Teacher Wraparound Edition: A 75; ML 74
Measurement Standard	
<i>Measurement Units</i>	
1. Determine the number of significant digits in a measurement.	Student Edition: 59 #3, 266 #30, 427 <i>Graphing Calculator Exploration 427-428</i> <i>Math In the Workplace 431</i> <i>Preparing for Standardized Tests 628 Example 1</i> Teacher Wraparound Edition: A 61; EA 59

STANDARDS	PAGE REFERENCES
2. Use radian and degree angle measures to solve problems and perform conversions as needed.	<p>Student Edition: 96-98, 100-101, 109 #24, 121 #30, 412 #17-#19, 444 #20 <i>Math In the Workplace</i> 115</p> <p>Teacher Wraparound Edition: EC 444; RA 100</p> <p>Also see Glencoe's <i>Algebra 2</i> © 2008 for discussion of radian measures.</p>
<i>Use Measurement Techniques and Tools</i>	
3. Derive a formula for the surface area of a cone as a function of its slant height and the circumference of its base.	<p>Student Edition: 518-519, 520 #3</p> <p>Teacher Wraparound Edition: A 521; TT 519</p>
4. Calculate distances, areas, surface areas and volumes of composite three-dimensional objects to a specified number of significant digits.	<p>Typical measurements of three-dimensional objects are listed in page references below.</p> <p>Student Edition: 504-509, 510-515, 516-521, 522-527, 528-533</p>
5. Solve real-world problems involving area, surface area, volume and density to a specified degree of precision.	<p>Student Edition: 414 Example 2, 417 #23-#24, 421 Example 4, 430 #16-#17, 508 Example 4, 509 #18, 512 Example 4, 514 #23-#24, 521 #16, #18, 525 #7, 526 #21-#22</p>
Geometry and Spatial Sense Standard	
<i>Spatial Relationships</i>	
1. Use polar coordinates to specify locations on a plane.	<p>Introduction of polar coordinates can be paired with the following examples.</p> <p>Student Edition: 68-73</p> <p>Teacher Wraparound Edition: A 73; ML 68</p>
<i>Transformations and Symmetry</i>	
2. Represent translations using vectors.	<p>Student Edition: <i>Investigation</i> 74-75</p> <p>Teacher Wraparound Edition: M 75; ML 74</p>

STANDARDS	PAGE REFERENCES
3. Describe multiplication of a vector and a scalar graphically and algebraically, and apply to problem situations.	Student Edition: <i>Investigation 74-75</i> Teacher Wraparound Edition: A 75; M 75
4. Use trigonometric relationships to determine lengths and angle measures; i.e., Law of Sines and Law of Cosines.	Student Edition: 572-577, 637 #42-#45 <i>Preparing for Standardized Tests</i> 628 Example 2, 673 #3 <i>Study Guide and Assessment</i> 580 #31-#32 <i>Test</i> 581 #16-#18 Teacher Wraparound Edition: C 581; IE 573-574
<i>Visualization and Geometric Models</i>	
5. Identify, sketch and classify the cross sections of three-dimensional objects.	Student Edition: 533 #22 <i>Investigation</i> 502-503 <i>Preparing for Standardized Tests</i> 673 #5
Patterns, Functions and Algebra Standard	
<i>Use Patterns, Relations and Functions</i>	
1. Identify and describe problem situations involving an iterative process that can be represented as a recursive function; e.g., compound interest.	Student Edition: 174-179, 351-354, 501 #33 <i>Preparing for Standardized Tests</i> 493 #1, #10 Teacher Wraparound Edition: TT 351
2. Translate a recursive function into a closed form expression or formula for the n th term to solve a problem situation involving an iterative process; e.g., find the value of an annuity after 7 years.	Student Edition: 174-179, 351-354, 501 #33 <i>Preparing for Standardized Tests</i> 492 Example 2, 493 #4, #6 Teacher Wraparound Edition: IE 176; TT 351
3. Describe and compare the characteristics of the following families of functions: quadratics with complex roots, polynomials of any degree, logarithms, and rational functions; e.g., general shape, number of roots, domain and range, asymptotic behavior.	Student Edition: 81 #35, 101 #34, 174, 507, 515 #30, 563 #23 <i>Preparing for Standardized Tests</i> 493 #10, 545 #10, 714-715 Teacher Wraparound Edition: A 715; RA 80; TT 175

STANDARDS	PAGE REFERENCES
4. Identify the maximum and minimum points of polynomial, rational and trigonometric functions graphically and with technology.	See Glencoe's <i>Algebra 2</i> © 2008.
5. Identify families of functions with graphs that have rotation symmetry or reflection symmetry about the y -axis, x -axis or $y = x$.	The following page references introduce rotational symmetry and translations on a coordinate plane. Student Edition: 435-439, 444 #21, 458 #33, 687-689 <i>Study Guide and Assessment</i> 448 Lesson 10-6
<i>Use Algebraic Representations</i>	
6. Represent the inverse of a function symbolically and graphically as a reflection about $y = x$.	Student Edition: 567 Example 4, 573 Example 3 Teacher Wraparound Edition: TT 573
7. Model and solve problems with matrices and vectors.	Student Edition: <i>Investigation</i> 74-75 Teacher Wraparound Edition: A 75; M 75; ML 74
8. Solve equations involving radical expressions and complex roots.	Student Edition: 618 <i>Preparing for Standardized Tests</i> 493 #4
9. Solve 3 by 3 systems of linear equations by elimination and using technology, and interpret graphically what the solution means (a point, line, plane, or no solution).	The following examples cover solving systems of 2-linear equations using elimination. Student Edition: 682-686 Teacher Wraparound Edition: A 686; IE 682-683
10. Describe the characteristics of the graphs of conic sections.	See Glencoe's <i>Algebra 2</i> © 2008.
<i>Analyze Change</i>	
11. Describe how a change in the value of a constant in an exponential, logarithmic or radical equation affects the graph of the equation.	See Glencoe's <i>Algebra 2</i> © 2008.

STANDARDS	PAGE REFERENCES
Data Analysis and Probability Standard	
<i>Data Collection</i>	
1. Design a statistical experiment, survey or study for a problem; collect data for the problem; and interpret the data with appropriate graphical displays, descriptive statistics, concepts of variability, causation, correlation and standard deviation.	Statistical experiments, surveys, and studies can be designed after the examples listed here. Student Edition: 438 #29, 484, 486 #7, #24-#25 <i>Preparing for Standardized Tests</i> 138 Example 2, 347 #2, 451 #6, 545 #5, 629 #2
2. Describe the role of randomization in a well-designed study, especially as compared to a convenience sample, and the generalization of results from each.	The use and importance of randomization can be stressed with the following page references. Student Edition: 438 #29, 484, 486 #7, #24-#25 <i>Preparing for Standardized Tests</i> 138 Example 2, 347 #2, 451 #6, 545 #5, 629 #2
<i>Statistical Methods</i>	
3. Describe how a linear transformation of univariate data affects range, mean, mode and median.	Student Edition: 22 #39, 351, 418 #3, 665 #32 <i>Math In the Workplace</i> 336 <i>Preparing for Standardized Tests</i> 224, 225 #1, #3, #7, 307 #5, 399 #8
4. Create a scatterplot of bivariate data, identify trends, and find a function to model the data.	Student Edition: 9 #36 <i>Preparing for Standardized Tests</i> 185 #7
5. Use technology to find the Least Squares Regression Line, the regression coefficient, and the correlation coefficient for bivariate data with a linear trend, and interpret each of these statistics in the context of the problem situation.	Trends are introduced in the following page references without explicitly using <i>Least Squares Regression Line</i> , <i>regression coefficient</i> , and <i>correlation coefficient</i> . Student Edition: 7 Example 5, 9 #36, 133 #33, 267 #34 <i>Preparing for Standardized Tests</i> 185 #7, #10 Teacher Wraparound Edition: IE 7
6. Use technology to compute the standard deviation for a set of data, and interpret standard deviation in relation to the context or problem situation.	See Glencoe's <i>Algebra 2</i> © 2008.
7. Describe the standard normal curve and its general properties, and answer questions dealing with data assumed to be normal.	See Glencoe's <i>Algebra 2</i> © 2008.

STANDARDS	PAGE REFERENCES
8. Analyze and interpret univariate and bivariate data to identify patterns, note trends, draw conclusions, and make predictions.	Student Edition: 7 Example 5, 9 #36, 133 #33, 267 #34 <i>Preparing for Standardized Tests</i> 185 #7, #10 Teacher Wraparound Edition: IE 7
9. Evaluate validity of results of a study based on characteristics of the study design, including sampling method, summary statistics and data analysis techniques.	Evaluation of results can occur after performing statistical experiments, surveys, and studies from the page references listed below. Student Edition: 438 #29, 484, 486 #7, #24-#25 <i>Preparing for Standardized Tests</i> 138 Example 2, 347 #2, 451 #6, 545 #5, 629 #2
<i>Probability</i>	
10. Understand and use the concept of random variable, and compute and interpret the expected value for a random variable in simple cases.	Student Edition: <i>Preparing for Standardized Tests</i> 138 Example 2, 139 #4, #10, 347 #2, 545 #5, 629 #2
11. Examine statements and decisions involving risk; e.g., insurance rates and medical decisions.	Student Edition: <i>Preparing for Standardized Tests</i> 451 #6