



Algebra 1

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STANDARDS	PAGE REFERENCES
Grade Eight	
Number, Number Sense and Operations Standard	
<i>Number and Number Systems</i>	
1. Use scientific notation to express large numbers and small numbers between 0 and 1.	Student Edition: 372 #42-#47
2. Recognize that natural numbers, whole numbers, integers, rational numbers and irrational numbers are subsets of the real number system.	Student Edition: 46-52
<i>Meaning of Operations</i>	
3. Apply order of operations to simplify expressions and perform computations involving integer exponents and radicals.	Student Edition: 10-14, 15-20, 21-25, 92-97, 98-103, 117-121 358-364, 366-373, 528-534 <i>Graphing Calculator Lab 367</i>
4. Explain and use the inverse and identity properties and use inverse relationships (addition/subtraction, multiplication/division, squaring/square roots) in problem solving situations.	Student Edition: 21-25, 78-84, 85-90, 92-97, 98-103, 294-299, 301-307, 308-313, 541-546, 549-554 <i>Algebra Lab 77, 91, 300</i>

STANDARDS	PAGE REFERENCES
<i>Computation and Estimation</i>	
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.	Student Edition: 215 Ex 3, 216 Ex 4, 480-485
6. Estimate, compute and solve problems involving rational numbers, including ratio, proportion and percent, and judge the reasonableness of solutions.	Student Edition: 78-84, 85-90, 92-97, 98-103, 105-110, 111-115, 122-128, 260-265, 266-270, 272-278, 294-299, 301-307, 308-313 <i>Prerequisite Skills</i> 702-703 <i>Reading Mathematics</i> 116 <i>Spreadsheet Lab</i> 129
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., $\sqrt{130}$ is between 11 and 12.	Student Edition: 46-52
8. Add, subtract, multiply, divide and compare numbers written in scientific notation.	Student Edition: 372 #42-#47
Measurement Standard	
<i>Measurement Units</i>	
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.	Student Edition: 590-594
2. Use proportional relationships and formulas to convert units from one measurement system to another; e.g., degrees Fahrenheit to degrees Celsius.	Student Edition: 308 (introduction), 312 #38
<i>Use Measurement Techniques and Tools</i>	
3. Use appropriate levels of precision when calculating with measurements.	Student Edition: 417 #11 <i>Algebra Lab</i> 228, 365 <i>Graphing Calculator Lab</i> 203

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"> the surface area of a cylinder as a function of its height and radius; 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. 	<p>Student Edition: 70-76 (especially #47), 121 #34, 371 #13 <i>Algebra Lab</i> 72, 365</p>
<p>5. Determine surface area for pyramids by analyzing their parts.</p>	<p>Student Edition: 75 #47 (prism), 417 #11 <i>Algebra Lab</i> 72</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>Student Edition: 53-58</p>
<p>7. Apply proportional reasoning to solve problems involving indirect measurements or rates.</p>	<p>Student Edition: 105-110, 560-565</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 Glencoe's <i>Geometry</i> © 2008.</p>
<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>Page references to find surface area and volume for shapes without using formulas are included below.</p> <p>Student Edition: 75 #47, 417 #11 <i>Algebra Lab</i> 72, 142, 365</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>Student Edition: 121 334, 362 #47-#49, 371 #13, 373 #56, 380 #52-#53, 387 #31-#32, 451 #34, 599 #41, 605 #47 <i>Algebra Lab</i> 365</p>
<p>Geometry and Spatial Sense Standard</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>Student Edition: 168 #20-#21, 471-477, 549-554 <i>Algebra Lab</i> 237 <i>Graphing Calculator Lab</i> 478-479</p>

STANDARDS	PAGE REFERENCES
2. Recognize the angles formed and the relationship between the angles when two lines intersect and when parallel lines are cut by a transversal.	See Glencoe's <i>Geometry</i> © 2008.
3. Use proportions in several forms to solve problems involving similar figures (part-to-part, part-to-whole, corresponding sides between figures).	Student Edition: 560-565
Spatial Relationships	
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.	Student Edition: 236-241, 558 #30-#33, 559 #43
Transformations and Symmetry	
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.	Student Edition: <i>Graphing Calculator Lab</i> 210-211, 478-479, 504
Visualization and Geometric Models	
6. Draw nets for a variety of prisms, pyramids, cylinders and cones.	Student Edition: 417 #11 <i>Algebra Lab</i> 365
Patterns, Functions and Algebra Standard	
Use Patterns, Relations and Functions	
1. Relate the various representations of a relationship; i.e., relate a table to graph, description and symbolic form.	Student Edition: 143-148, 149-154, 155-161, 172-175 <i>Algebra Lab</i> 142, 145, 186 <i>Graphing Calculator Lab</i> 162
2. Generalize patterns and sequences by describing how to find the n th term.	Student Edition: 165-170 <i>Algebra Lab</i> 142 <i>Reading Mathematics</i> 171
3. Identify functions as linear or nonlinear based on information given in a table, graph or equation.	Student Edition: 155-161, 471-477

STANDARDS	PAGE REFERENCES
<i>Use Algebraic Representations</i>	
4. Extend the uses of variables to include covariants where y depends on x .	Student Edition: 53-58, 149-154 (especially #49-#50), 155-161, 187-195 <i>Algebra Lab 145</i>
5. Use physical models to add and subtract monomials and polynomials, and to multiply a polynomial by a monomial.	Student Edition: 390 (introduction), 404 <i>Algebra Lab 375, 382-383, 396-397</i>
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 y -intercept in real-world problems.	Student Edition: 187-195 (especially #18, #50, #53, & #56), 196-202, 204-209 (especially #46), 217 #37, 224 #38 <i>Algebra Lab 186</i> <i>Graphing Calculator Lab 197, 203</i>
7. Use symbolic algebra (equations and inequalities), graphs and tables to represent situations and solve problems.	Student Edition: 78-84, 85-90, 92-97, 98-103, 105-110, 111-115, 122-128, 148 #36, 172-176, 187-195, 196-202, 204-209, 213-218, 224 #36-#41, 227-233, 260-265, 266-270, 272-278, 280-284 <i>Graphing Calculator Lab 203</i> <i>Spreadsheet Lab 129</i>
8. Write, simplify and evaluate algebraic expressions (including formulas) to generalize situations and solve problems.	Student Edition: 6-9, 10-14, 15-20, 21-25, 26-31, 33-37, 70-76, 117-121
9. Solve linear equations and inequalities graphically, symbolically and using technology.	Student Edition: 78-84, 85-90, 92-97, 98-103, 105-110, 111-115, 122-128, 294-299, 301-307, 308-313, 315-320 <i>Algebra Lab 77, 91, 300</i> <i>Graphing Calculator Lab 309</i> <i>Reading Mathematics 116</i> <i>Spreadsheet Lab 129</i>
10. Solve 2 by 2 systems of linear equations graphically and by simple substitution.	Student Edition: 253-258, 260-265 <i>Algebra Lab 260</i> <i>Graphing Calculator Lab 259</i> <i>Spreadsheet Lab 252</i>
11. Interpret the meaning of the solution of a 2 by 2 system of equations; i.e., point, line, no solution.	Student Edition: 253-258, 262 Ex 2
12. Solve simple quadratic equations graphically; e.g., $y = x^2 - 16$.	Student Edition: 480-485

STANDARDS	PAGE REFERENCES
13. Compute and interpret slope, midpoint and distance given a set of ordered pairs.	Student Edition: 187-195, 213-218, 220-225, 227-233, 555-559 <i>Algebra Lab</i> 186
Analyze Change	
14. Differentiate and explain types of changes in mathematical relationships, such as linear vs. nonlinear, continuous vs. noncontinuous, direct variation vs. inverse variation.	Student Edition: 55-58, 149-154, 155-161, 196-202, 577-582 <i>Graphing Calculator Lab</i> 197, 219, 576
15. Describe and compare how changes in an equation affects the related graphs; e.g., for a linear equation changing the coefficient of x affects the slope and changing the constant affects the intercepts.	Student Edition: 196-202, 204-209, 236-241 <i>Graphing Calculator Lab</i> 197, 210-211, 478-479, 504
16. Use graphing calculators or computers to analyze change; e.g., interest compounded over time as a nonlinear growth pattern.	Student Edition: 502-508, 510-514 <i>Graphing Calculator Lab</i> 470, 478-479, 504, 515-516
Data Analysis and Probability Standard	
Data Collection	
1. Use, create and interpret scatterplots and other types of graphs as appropriate.	Student Edition: 227-233 <i>Algebra Lab</i> 228 <i>Graphing Calculator Lab</i> 203, 234-235, 470, 515-516
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.	Student Edition: <i>Prerequisite Skills</i> 713, 714-715
3. Differentiate between discrete and continuous data and appropriate ways to represent each.	Student Edition: 53-58 <i>Algebra Lab</i> 59
Statistical Methods	
4. Compare two sets of data using measures of center (mean, mode, median) and measures of spread (range, quartiles, interquartile range, percentiles).	Student Edition: <i>Prerequisite Skills</i> 711-712

STANDARDS	PAGE REFERENCES
5. Explain the mean's sensitivity to extremes and its use in comparison with the median and mode.	See Glencoe's <i>Pre-Algebra</i> © 2008.
6. Make conjectures about possible relationship in a scatterplot and approximate line of best fit.	Student Edition: 227-233 <i>Algebra Lab</i> 228 <i>Graphing Calculator Lab</i> 203, 234-235, 470, 515-516
7. Identify different ways of selecting samples, such as survey response, random sample, representative sample and convenience sample.	Student Edition: 642-648 <i>Reading Mathematics</i> 649
8. Describe how the relative size of a sample compared to the target population affects the validity of predictions.	The following pages can be integrated to meet this standard. Student Edition: 642-648
9. Construct convincing arguments based on analysis of data and interpretation of graphs.	Student Edition: 53-58, 147 #14-#21, 153 #39-#52, 155-161, 165-170, 216 Ex 4, 227-233 <i>Algebra Lab</i> 228 <i>Reading Mathematics</i> 171 The following pages can be integrated to meet this standard. 642-648
<i>Probability</i>	
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.	Student Edition: 650-654, 655-662
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.	Student Edition: 663-670, 672-676, 677-683

STANDARDS	PAGE REFERENCES
Grade Nine	
Number, Number Sense and Operations Standard	
<i>Number and Number Systems</i>	
1. Identify and justify whether properties (closure, identity, inverse, commutative and associative) hold for a given set and operations; e.g., even integers and multiplication.	Student Edition: 21-25, 26-31, 33-37 (especially #44-#45), 44 #43, 46-52 (especially #64)
2. Compare, order, and determine equivalent forms for rational and irrational numbers.	Student Edition: 46-52
<i>Meaning of Operations</i>	
3. Explain the effects of operations such as multiplication or division, and of computing powers and roots on the magnitude of quantities.	Student Edition: 6-9, 196-202, 358-364 <i>Algebra Lab</i> 365 <i>Graphing Calculator Lab</i> 197, 478-479
<i>Computation and Estimation</i>	
4. Demonstrate fluency in computations using real numbers.	Student Edition: 10-14, 15-20, 21-25, 26-31, 46-52, 78-84, 85-90, 92-97, 98-103, 105-110, 111-115, 117-121, 122-128, 165-170, 172-176, 187-195, 213-218, 220-225, 260-265, 266-270
5. Estimate the solutions for problem situations involving square and cube roots.	Student Edition: 46-52, 541-546
Measurement Standard	
<i>Measurement Units</i>	
1. Convert rates within the same measurement system; e.g., miles per hour to feet per second; kilometers per hour to meters per second.	Student Edition: 591 Ex 3, 592-594
<i>Use Measurement Techniques and Tools</i>	
2. Use unit analysis to check computations involving measurement.	Student Edition: 117-121, 590-594, 595-599
3. Use the ratio of lengths in similar two-dimensional figures or three-dimensional objects to calculate the ratio of their areas or volumes respectively.	Student Edition: 373 #56, 565 #31-#33 <i>Algebra Lab</i> 142, 365
4. Use scale drawings and right triangle trigonometry to solve problems that include unknown distances and angle measures.	Student Edition: 560-565

STANDARDS	PAGE REFERENCES
5. Solve problems involving unit conversion for situations involving distances, areas, volumes and rates within the same measurement system.	Student Edition: 117-121, 590-594, 595-599
Geometry and Spatial Sense Standard	
<i>Characteristics and Properties</i>	
1. Define the basic trigonometric ratios in right triangles: sine, cosine and tangent.	See Glencoe's <i>Geometry</i> © 2008.
2. Apply proportions and right triangle trigonometric ratios to solve problems involving missing lengths and angle measures in similar figures.	Student Edition: 560-565
<i>Visualization and Geometric Models</i>	
3. Analyze two-dimensional figures in a coordinate plane; e.g., use slope and distance formulas to show that a quadrilateral is a parallelogram.	Student Edition: 236-241, 558 #30-#33, 559 #43
Patterns, Functions and Algebra Standard	
<i>Use Patterns, Relations and Functions</i>	
1. Define function with ordered pairs in which each domain element is assigned exactly one range element.	Student Edition: 149-154
2. Generalize patterns using functions or relationships (linear, quadratic and exponential), and freely translate among tabular, graphical and symbolic representations.	Student Edition: 143-148, 149-154, 155-161, 165-170, 172-176, 187-195, 204-209, 227-233, 236-241, 471-477, 502-508 <i>Algebra Lab</i> 237 <i>Graphing Calculator Lab</i> 162-163, 210-211, 219, 470, 478-479, 504 <i>Reading Mathematics</i> 171
3. Describe problem situations (linear, quadratic and exponential) by using tabular, graphical and symbolic representations.	Student Edition: 143-148, 149-154, 155-161, 165-170, 172-176, 187-195, 196-202, 204-209, 213-218, 220-225, 227-233, 253-258, 280-284, 480-485 <i>Algebra Lab</i> 142, 186, 500-501 <i>Graphing Calculator Lab</i> 234-235 <i>Reading Mathematics</i> 171, 226

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4. Demonstrate the relationship among zeros of a function, roots of equations, and solutions of equations graphically and in words.	Student Edition: 480-485, 486-491, 493-499 (especially Ex 1) <i>Algebra Lab</i> 500-501 <i>Graphing Calculator Lab</i> 309
5. Describe and compare characteristics of the following families of functions: linear, quadratic and exponential functions; e.g., general shape, number of roots, domain, range, rate of change, maximum or minimum.	Student Edition: 155-161, 172-176, 187-195, 196-202, 204-209, 213-218, 220-225, 471-477, 480-486, 502-508 <i>Algebra Lab</i> 186 <i>Graphing Calculator Lab</i> 162-163, 197, 203, 210-211, 478-479, 504
<i>Use Algebraic Representations</i>	
6. Write and use equivalent forms of equations and inequalities in problem situations; e.g., changing a linear equation to the slope-intercept form.	Student Edition: 196-202, 204-209, 213-218, 220-225, 227-233, 236-241, 253-258, 334-339, 341-345 <i>Graphing Calculator Lab</i> 203, 234-235, 259, 340
7. Use formulas to solve problems involving exponential growth and decay.	Student Edition: 510-514 <i>Graphing Calculator Lab</i> 515-516
8. Find linear equations that represent lines that pass through a given set of ordered pairs, and find linear equations that represent lines parallel or perpendicular to a given line through a specific point.	Student Edition: 204-209, 213-218, 220-225, 227-233, 236-241 <i>Algebra Lab</i> 237 <i>Graphing Calculator Lab</i> 234-235
9. Solve and interpret the meaning of 2 by 2 systems of linear equations graphically, by substitution and by elimination, with and without technology.	Student Edition: 253-258, 260-265, 266-270, 272-278, 280-284 <i>Algebra Lab</i> 284 <i>Graphing Calculator Lab</i> 259 <i>Spreadsheet Lab</i> 252
10. Solve quadratic equations with real roots by factoring, graphing, using the quadratic formula and with technology.	Student Edition: 471-477, 480-485, 486-491, 493-499 <i>Algebra Lab</i> 500-501 <i>Graphing Calculator Lab</i> 478-479
11. Add, subtract, multiply and divide monomials and polynomials (division of polynomials by monomials only).	Student Edition: 358-364, 366-373, 376-381, 384-388, 390-395, 398-403, 404-409, 595-599, 601-606 <i>Algebra Lab</i> 365, 375, 382-383, 396-397 <i>Graphing Calculator Lab</i> 367
12. Simplify rational expressions by eliminating common factors and applying properties of integer exponents.	Student Edition: 366-373, 583-588, 590-594

STANDARDS	PAGE REFERENCES
<i>Analyze Change</i>	
13. Model and solve problems involving direct and inverse variation using proportional reasoning.	Student Edition: 196-202, 577-582 <i>Graphing Calculator Lab</i> 197, 576
14. Describe the relationship between slope and the graph of a direct variation and inverse variation.	Student Edition: 187-195, 196-202, 577-582 <i>Graphing Calculator Lab</i> 197, 576
15. Describe how a change in the value of a constant in a linear or quadratic equation affects the related graphs.	Student Edition: 196-202, 204-209, 471-477 <i>Graphing Calculator Lab</i> 197, 210-211, 478-479
Data Analysis and Probability Standard	
<i>Data Collection</i>	
1. Classify data as univariate (single variable) or bivariate (two variables) and as quantitative (measurement) or qualitative (categorical) data.	See Glencoe's <i>Algebra 2</i> © 2008.
2. Create a scatterplot for a set of bivariate data, sketch the line of best fit, and interpret the slope of the line of best fit.	Student Edition: 227-233 <i>Algebra Lab</i> 228 <i>Graphing Calculator Lab</i> 234-235, 515-516
<i>Statistical Methods</i>	
3. Analyze and interpret frequency distributions based on spread, symmetry, skewness, clusters and outliers.	Student Edition: <i>Prerequisite Skills</i> 713, 714-715
4. Describe and compare various types of studies (survey, observation, experiment), and identify possible misuses of statistical data.	Student Edition: 642-648 <i>Reading Mathematics</i> 649
5. Describe characteristics and limitations of sampling methods, and analyze the effects of random versus biased sampling; e.g., determine and justify whether the sample is likely to be representative of the population.	Student Edition: 642-648 <i>Reading Mathematics</i> 649
6. Make inferences about relationships in bivariate data, and recognize the difference between evidence of relationship (correlation) and causation.	See Glencoe's <i>Algebra 2</i> © 2008.

STANDARDS	PAGE REFERENCES
<i>Probability</i>	
7. Use counting techniques and the Fundamental Counting principle to determine the total number of possible outcomes for mathematical situations.	Student Edition: 650-654, 655-662, 663-670
8. Describe, create and analyze a sample space and use it to calculate probability.	Student Edition: 663-670, 672-676, 677-683
9. Identify situations involving independent and dependent events, and explain differences between, and common misconceptions about, probabilities associated with those events.	Student Edition: 663-670
10. Use theoretical and experimental probability, including simulations or random numbers, to estimate probabilities and to solve problems dealing with uncertainty; e.g., compound events, independent events, simple dependent events.	Student Edition: 677-683