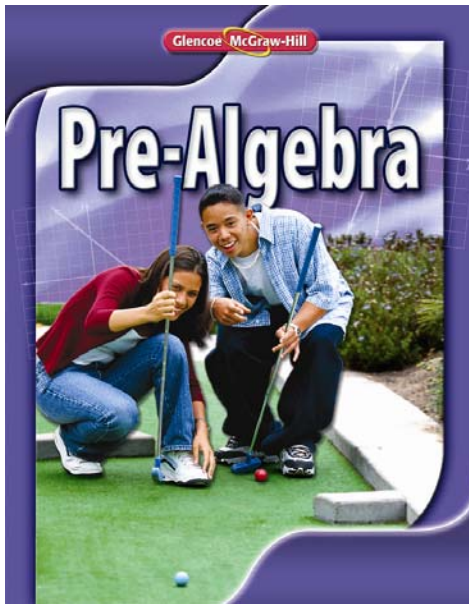




**Glencoe**

Academic Content Standards  
Grade Eight



# Pre-Algebra

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## Ohio Academic Content Standards, Grade 8, Correlated to Glencoe's *Ohio Pre-Algebra*

Lessons in which the benchmark and/or grade level indicator is the primary focus are indicated in **bold**.

<b>Standard 1 Number, Number Sense and Operations</b>			
<b>Number and Number Systems</b>		<b>Lesson(s)</b>	<b>Page Number(s)</b>
<b>N1.</b>	Use scientific notation to express large numbers and small numbers between 0 and 1.	<b>9-5</b>	<b>493-498</b>
<b>N2.</b>	Recognize that natural numbers, whole numbers, integers, rational numbers and irrational numbers are subsets of the real number system.	<b>2-1, 3-2, 10-2</b>	<b>61-66, 128-133, 543-548</b>
<b>Meaning of Operations</b>			
<b>N3.</b>	Apply order of operations to simplify expressions and perform computations involving integer exponents and radicals.	<b>1-2, 4-2, 9-1, 9-6</b>	<b>11-16, 178-183, 471-475, 499-503</b>
<b>N4.</b>	Explain and use the inverse and identity properties and use inverse relationships (addition/subtraction, multiplication/division, squaring/square roots) in problem solving situations.	<i>Used throughout the book. For example: 1-3, 4-3, 4-5, 5-5</i>	<i>Used throughout the book. For example: 18-23, 184-189, 199-204, 248-253</i>

\*The first letter of each Content Standard has been affixed to the Indicator for ease of reference.

LA = Looking Ahead to Next Year; CSB = Concepts and Skills Bank

<b>Computation and Estimation</b>			
<b>N5.</b>	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.	7-1, 7-2	331-342
<b>N6.</b>	Estimate, compute and solve problems involving rational numbers, including ratio, proportion and percent, and judge the reasonableness of solutions.	<b>Explore 2-2, 2-2, Explore 2-3, 2-3, Explore 2-4, 2-4, Explore 2-5, 2-5, 3-3, 3-4, 3-5, 3-6, 6-1, 6-4, 6-5, 6-6, 6-7, 6-9, 7-2, 7-3, 7-4, 7-5, 7-6, 7-7, Extend 7-7</b>	<b>67-80, 82-95, 134-139, 141-158, 265-269, 281-285, 287-292, 294-299, 301-306, 313-317, 337-342, 345-355, 357-362, 364-375</b>
<b>N7.</b>	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.	<b>Explore 10-1, 10-1, Explore 10-4, 10-4, 10-5, 10-6</b>	<b>535-542, 557-563, 565-570, 571-576</b>
<b>N8.</b>	Add, subtract, multiply, divide and compare numbers written in scientific notation.	<b>9-5, OHxxx</b>	<b>493-498, OHxxx</b>
<b>Standard 2 Measurement</b>			
<b>Measurement Units</b>			
<b>M1.</b>	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.	<b>6-3</b>	<b>275-280</b>
<b>M2.</b>	Use proportional relationships and formulas to convert units from one measurement system to another; e.g., degrees Fahrenheit to degrees Celsius.	<b>6-3, OHxxx</b>	<b>275-280, OHxxx</b>
<b>Use Measurement Techniques and Tools</b>			
<b>M3.</b>	Use appropriate levels of precision when calculating with measurements.	<b>CSB-12</b>	<b>879</b>
<b>M4.</b>	Derive formulas for surface area and volume and justify them using geometric models and common materials. For example, find: <b>a.</b> the surface area of a cylinder as a function of its height and radius; <b>b.</b> 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.	<b>Explore 12-2, 12-2, 12-3, Explore 12-4, 12-4, Explore 12-5, 12-5, Explore 12-6, 12-6</b>	<b>670-688, 690-701</b>
<b>M5.</b>	Determine surface area for pyramids by analyzing their parts.	<b>12-7</b>	<b>702-707</b>
<b>M6.</b>	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.	<b>6-1, 6-2, 6-3, 6-5, 8-4, 8-5</b>	<b>265-280, 287-292, 412-424</b>
<b>M7.</b>	Apply proportional reasoning to solve problems involving indirect measurements or rates.	<b>6-2, 6-7, 6-9</b>	<b>270-274, 301-306, 313-317</b>
<b>M8.</b>	Find the sum of the interior and exterior angles of regular convex polygons with and without measuring the angles with a protractor.	<b>11-4, Explore 11-5, 11-5</b>	<b>611-622</b>

<b>M9.</b>	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.)	<b>12-2, 12-3, Explore 12-4, 12-4, Explore 12-5, 12-5, Explore 12-6, 12-6, 12-7</b>	<b>671-688, 690-707</b>
<b>M10.</b>	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.	<b>Explore 12-2, 12-2, 12-3, Explore 12-4, 12-4, Explore 12-5, 12-5, Explore 12-6, 12-6, 12-7</b>	<b>670-688, 690-707</b>
<b>Standard 3 Geometry and Spatial Sense</b>			
<b>Characteristics and Properties</b>			
<b>G1.</b>	Make and test conjectures about characteristics and properties (e.g., sides, angles, symmetry) of two-dimensional figures and three dimensional objects.	<b>Explore 10-3, 10-3, 10-4, 10-6, 11-2, 11-4, 11-5, 12-1</b>	<b>549-555, 558-563, 571-576, 598-604, 611-615, 617-622, 664-669</b>
<b>G2.</b>	Recognize the angles formed and the relationship between the angles when two lines intersect and when parallel lines are cut by a transversal.	<b>11-1</b>	<b>589-595</b>
<b>G3.</b>	Use proportions in several forms to solve problems involving similar figures (part-to-part, part-to-whole, corresponding sides between figures).	<b>Explore 6-7, 6-7, 6-8, 6-9</b>	<b>300-306, 307-317</b>
<b>Spatial Relationships</b>			
<b>G4.</b>	Represent and analyze shapes using coordinate geometry; e.g., given three vertices and the type of quadrilateral, find the coordinates of the fourth vertex.	<b>OHxxx</b>	<b>OHxxx</b>
<b>Transformations and Symmetry</b>			
<b>G5.</b>	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.	<b>2-7, 6-8, 11-3</b>	<b>101-106, 307-312, 605-610</b>
<b>Visualization and Geometric Models</b>			
<b>G6.</b>	Draw nets for a variety of prisms, pyramids, cylinders and cones.	<b>Explore 12-5, 12-5, Explore 12-6, 12-6, 12-7</b>	<b>690-707</b>
<b>Standard 4 Patterns, Functions and Algebra</b>			
<b>Use Patterns, Relations and Functions</b>			
<b>P1.</b>	Relate the various representations of a relationship; i.e., relate a table to graph, description and symbolic form.	<i>Used throughout the book. For example: 1-5, 4-3, 4-6, 7-5</i>	<i>Used throughout the book. For example: 33-37, 184-189, 205-209, 357-362</i>
<b>P2.</b>	Generalize patterns and sequences by describing how to find the <i>n</i> th term.	<b>Explore 1-2, 8-2, 8-5</b>	<b>10, 401-405, 418-424</b>
<b>P3.</b>	Identify functions as linear or nonlinear based on information given in a table, graph or equation.	<b>9-7</b>	<b>504-509</b>

<b>Use Algebraic Representation</b>			
<b>P4.</b>	Extend the uses of variables to include covariants where $y$ depends on $x$ .	<b>8-1, 8-3, 8-7, 8-8</b>	<b>395-400, 406-411, 433-438, 441-447</b>
<b>P5.</b>	Use physical models to add and subtract monomials and polynomials, and to multiply a polynomial by a monomial.	<b>LA 2, LA 3, LA 4</b>	<b>LA6-LA15,</b>
<b>P6.</b>	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.	<b>8-3, 8-4, 8-5, Explore 8-6, 8-6, 8-7, Extend 8-7, 8-8</b>	<b>406- 424, 426-431, 433-447</b>
<b>P7.</b>	Use symbolic algebra (equations and inequalities), graphs and tables to represent situations and solve problems.	<i>Used throughout the book. For example: 4-6, 5-2, 5-4, 5-5</i>	<i>Used throughout the book. For example: 229-233, 229-233, 241-253</i>
<b>P8.</b>	Write, simplify and evaluate algebraic expressions (including formulas) to generalize situations and solve problems.	<i>Used throughout the book. For example: 1-2, 1-5, 4-2, 5-1</i>	<i>Used throughout the book. For example: 11-16, 33-37, 178-183, 221-226</i>
<b>P9.</b>	Solve linear equations and inequalities graphically, symbolically and using technology.	<b>4-3, 4-4, Explore 4-5, 4-5, 4-6, 5-1, Explore 5-2, 5-2, 5-3, 5-4, 5-5</b>	<b>184-189, 191-209, 221-239, 241-253</b>
<b>P10</b>	Solve 2 by 2 systems of linear equations graphically and by simple substitution.	<b>8-10</b>	<b>453-457</b>
<b>P11</b>	Interpret the meaning of the solution of a 2 by 2 system of equations; i.e., point, line, no solution.	<b>8-10</b>	<b>453-457</b>
<b>P12</b>	Solve simple quadratic equations graphically; e.g., $y = x^2 - 16$ .	<b>9-8, Extend 9-8</b>	<b>510-515</b>
<b>P13</b>	Compute and interpret slope, midpoint and distance given a set of ordered pairs.	<b>8-6, 8-7, 8-8, 10-5</b>	<b>427-431, 433-438, 441-447, 565-570</b>
<b>Analyze Change</b>			
<b>P14</b>	Differentiate and explain types of changes in mathematical relationships, such as linear vs. nonlinear, continuous vs. noncontinuous, direct variation vs. inverse variation.	Extend 6-5, <b>8-3, Explore 8-7, 9-7</b>	293, <b>406-411, 432, 504-509</b>
<b>P15</b>	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.	<b>Extend 8-7, Extend 9-8</b>	<b>439-440, 515</b>
<b>P16</b>	Use graphing calculators or computers to analyze change; e.g., interest compounded over time as a nonlinear growth pattern.	<b>Extend 7-7, Explore 8-6</b>	<b>375, 426</b>
<b>Standard 5 Data Analysis and Probability Standard</b>			
<b>Data Collection</b>			
<b>D1.</b>	Use, create and interpret scatterplots and other types of graphs as appropriate.	<b>Explore 1-6, 1-6, Extend 1-6, 7-8, 8-9, 13-2, 13-4, Extend 13-4, 13-5, Extend 13-5</b>	<b>38-48, 376-381, 448-452, 737-742, 750-763</b>

<b>D2.</b>	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.	<b>CSB14</b>	<b>882-883</b>
<b>D3.</b>	Differentiate between discrete and continuous data and appropriate ways to represent each.	OHxxx	OHxxx
<b>Statistical Methods</b>			
<b>D4.</b>	Compare two sets of data using measures of center (mean, mode, median) and measures of spread (range, quartiles, interquartile range, percentiles).	<b>13-2, 13-3, 13-4, Extend 13-4</b>	<b>737-756</b>
<b>D5.</b>	Explain the mean's sensitivity to extremes and its use in comparison with the median and mode.	<b>13-1, Extend 13-1</b>	<b>730-736</b>
<b>D6.</b>	Make conjectures about possible relationship in a scatterplot and approximate line of best fit.	<b>1-6, Extend 1-6, 8-9</b>	<b>40-48, 448-452</b>
<b>D7.</b>	Identify different ways of selecting samples, such as survey response, random sample, representative sample and convenience sample.	<b>13-7</b>	<b>771-776</b>
<b>D8.</b>	Describe how the relative size of a sample compared to the target population affects the validity of predictions.	<b>13-7</b>	<b>771-776</b>
<b>D9.</b>	Construct convincing arguments based on analysis of data and interpretation of graphs.	<b>CSB15</b>	<b>884-885</b>
<b>Probability</b>			
<b>D10</b>	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.	<b>13-8, Extend 13-8, 13-9</b>	<b>777-788</b>
<b>D11</b>	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.	<b>13-10</b>	<b>790-795</b>
<b>Standard 6 Mathematical Processes</b>			
<b>Benchmark: Grade Band 8-10</b>			
<b>MPA.</b>	Formulate a problem or mathematical model in response to a specific need or situation, determine information required to solve the problem, choose method for obtaining this information, and set limits for acceptable solution.	<i>Used throughout the book. For example: 1-4, Explore 4-2, 4-6, 6-9,</i>	<i>Used throughout the book. For example: 25-30, 177, 205-209, 313-317</i>
<b>MPB.</b>	Apply mathematical knowledge and skills routinely in other content areas and practical situations.	<i>Used throughout the book. For example: 3-6, 6-6, 9-4, 12-4</i>	<i>Used throughout the book. For example: 153-158, 294-299, 486-491, 683-688</i>

<b>MPC.</b>	Recognize and use connections between equivalent representations and related procedures for a mathematical concept; e.g., zero of a function and the x-intercept of the graph of the function, apply proportional thinking when measuring, describing functions, and comparing probabilities.	<i>Used throughout the book. For example: 3-2, 6-3, 8-3, 13-6</i>	<i>Used throughout the book. For example: 128-133, 275-280, 406-411, 765-770</i>
<b>MPD.</b>	Apply reasoning processes and skills to construct logical verifications or counter-examples to test conjectures and to justify and defend algorithms and solutions.	<i>Used throughout the book. For example: 2-4, 4-3, 7-7, Explore 12-2</i>	<i>Used throughout the book. For example: 83-88, 184-189, 370-374, 670</i>
<b>MPE.</b>	Use a variety of mathematical representations flexibly and appropriately to organize record and communicate mathematical ideas.	<i>Used throughout the book. For example: 1-6, 3-1, 5-4, 6-7</i>	<i>Used throughout the book. For example: 40-46, 121-127, 241-247, 301-306</i>
<b>MPF.</b>	Use precise mathematical language and notations to represent problem situations and mathematical ideas.	<i>Used throughout the book. For example: 2-1, 4-4, 8-1, 8-7</i>	<i>Used throughout the book. For example: 61-66, 191-196, 395-400, 433-438</i>
<b>MPG</b>	Write clearly and coherently about mathematical thinking and ideas.	<i>Used throughout the book. For example: 2-7, 4-6, 6-7, 7-5</i>	<i>Used throughout the book. For example: 101-106, 205-209, 301-306, 357-362</i>
<b>MPH.</b>	Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.	8-9	448-452