

Pre- Algebra Middle School Course (PA) (this curriculum is used for 7th grade and 8th grade)

Focus Statement: Pre- Algebra students will perform operations with real numbers, solve and graph equations. **This curriculum addresses the following college readiness standards and score ranges:**

Basic Operations and Applications: 13-23

Probability, Statistics, and Data Analysis: 13-23

Numbers: Concepts, and Properties: 13-32

Expressions, Equations, and Inequalities: 13-23

Graphical Representations: 13-23

Properties of Plane Figures: Not Applicable

Measurement: Not Applicable

Functions: Not Applicable

PA:1 Students will perform calculations, evaluate expressions, and solve and one-step equations.

Illinois Learning Standards: 6B, 8A, 8B, 8C, 8D, 9A, 10A

PA:1-1 Use a four-step plan to solve problems and choose an appropriate method of computation.

PA:1-2 Evaluate numerical expressions using the order of operations and translate phrases into numerical expressions.

PA:1-3 Evaluate algebraic expressions containing variables and translate phrases into algebraic expressions.

PA:1-4 Recognize and demonstrate the use of the commutative, associative, identity, and zero properties.

PA:1-5 Solve one-step equations, identify properties of equality, and translate sentences into equations.

PA:1-6 Identify and graph ordered pairs, and use tables and graphs to represent relations.

PA:1-7 Construct and interpret scatter plots.

PA:2 Students will perform calculations, simplify expressions with integers, and graph algebraic relationships.

Illinois Learning Standards: 6A, 6B, 8A, 8B, 9A, 9B, 10A

PA:2-1 Compare and order integers, and find the absolute value of expressions.

PA:2-2 Perform all operations with integers.

PA:2-3 Evaluate and simplify expressions containing variables.

PA:2-4 Analyze data using mean, median, and mode as measures of central tendency.

PA:2-5 Graph points on a coordinate plane, and graph algebraic relationships.

PA:3

Students will use the Distributive Property to combine like terms, solve equations using properties of equality, solve and write two-step equations, and use formulas to solve real-world problems.

Illinois Learning Standards: 6B, 7C, 8A, 8C, and 8D

- PA:3-1 Use the Distributive Property to write equivalent numerical expressions, and equivalent algebraic expressions.
- PA:3-2 Use the Distributive Property to simplify algebraic expressions.
- PA:3-3 Solve equations using the Addition and Subtraction Properties of Equality.
- PA:3-4 Solve equations using the Division and Multiplication Properties of Equality.
- PA:3-5 Solve two-step equations.
- PA:3-6 Write and solve verbal sentences as two-step equations.
- PA:3-7 Solve problems using formulas. (For example: perimeters and areas of rectangles.)

PA:4

Students will examine factors and monomials, evaluate expressions containing exponents, and simplify algebraic expressions using the greatest common factor (GCF).

Illinois Learning Standards: 6A, 6B, 8A, 8C, and 8D

- PA:4-1 Determine whether one number is a factor of another and determine whether an expression is a monomial.
- PA:4-2 Write expressions using exponents, and evaluate expressions containing exponents.
- PA:4-3 Write the prime factorization of composite numbers, and factor monomials.
- PA:4-4 Find the Greatest Common Factor (GCF) of two or more numbers or monomials, and use the Distributive Property to factor algebraic expressions.
- PA:4-5 Simplify fractions using the GCF, and simplify algebraic fractions.
- PA:4-6 Multiply and divide monomials.
- PA:4-7 Write expressions using negative exponents, and evaluate numerical expressions containing negative exponents.
- PA:4-8 Express numbers in standard form and in scientific notation, and compare and order numbers written in scientific notation.
- PA:4-9 Perform operations with rational numbers.
- PA:4-10 Solve equations containing rational numbers.

PA:5 Students will solve problems involving ratios, proportions, and percents.
Illinois Learning Standards: 6A, and 6D

- PA:5-1 Write ratios as fractions in simplest form, and determine unit rates.
- PA:5-2 Solve proportions and use proportions to solve real-world problems.
- PA:5-3 Use the percent proportion to solve problems.
- PA:5-4 Solve percent problems using percent equations, and solve real-life problems involving discount and interest.
- PA:5-5 Find percent of increase and decrease.

PA:6 Students will solve equations involving grouping symbols, and equations with variables on both sides of the equal sign. They will write, graph, and solve inequalities.

Illinois Learning Standards: 8A, 8C, and 8D

- PA:6-1 Solve equations with variables on each side of the equal sign.
- PA:6-2 Solve multi-step equations that involve grouping symbols, and identify equations that have no solution or an infinite number of solutions.
- PA:6-3 Write and graph inequalities.
- PA:6-4 Solve inequalities using inverse operations.
- PA:6-5 Solve multi-step inequalities that involve more than one operation.

PA:7 Students will apply formulas to determine the total surface area, and the volume of three-dimensional figures. Students will apply the Pythagorean Theorem to justify a triangle as a right triangle, and to determine the measure of a missing side.

Illinois Learning Standards: 7C, and 9C

- PA:7-1 Recognize perfect squares, and find square roots.
- PA:7-2 Analyze the relationship between sides of right triangles, and apply the Pythagorean Theorem to solve for a missing side in a triangle.
- PA:7-3 Determine if a triangle is a right triangle using the Pythagorean Theorem.
- PA:7-4 Find the area of irregular shapes.
- PA:7-5 Calculate the surface area and volume of a cube, a triangular prism, and a rectangular prism.
- PA:7-6 Calculate the surface area and volume of a pyramid, cylinder, and cone.

- PA:8 Students will identify functions, and solve and graph linear equations.
Illinois Learning Standards: 8A, 8B, and 8D
- PA:8-1 Determine whether relations are functions, and use functions to describe relationships between two quantities.
 - PA:8-2 Solve linear equations with two variables, and graph linear equations using ordered pairs.
 - PA:8-3 Find x- and y-intercepts, and graph linear equations using x- and y-intercepts.
 - PA:8-4 Find the slope of a line.
 - PA:8-5 Find rates of change, and solve problems involving direct variation.
 - PA:8-6 Determine the slope and the y-intercept of a line, and graph linear equations using the slope and y-intercept.
- PA:9 Students will classify and analyze triangles.
Illinois Learning Standards: 7C, and 9D
- PA:9-1 Identify and use properties of similar triangles to find missing sides and angles.
 - PA:9-2 Use trigonometric ratios to solve problems.
 - PA:9-3 Apply properties of parallel and perpendicular lines to solve problems.
 - PA:9-4 Use properties of congruent triangles to solve problems.
 - PA:9-5 Classify and find angle measures of polygons.
- PA:10 Students will perform operations with polynomials.
Illinois Learning Standards: 8C, and 8D
- PA:10-1 Identify and classify polynomials.
 - PA:10-2 Add and subtract polynomials.
 - PA:10-3 Multiply polynomials.
- PA:11 Students will display and interpret data from graphs. They will also calculate measures of variation, and use the Fundamental Counting Principle.
Illinois Learning Standards: 10A, 10B, and 10C
- PA:11-1 Display and interpret data in stem-and-leaf plots.
 - PA:11-2 Find measures of variation, and use them to interpret and compare data.
 - PA:11-3 Display and interpret data in box-and-whisker plots.
 - PA:11-4 Display and interpret data in histograms.
 - PA:11-5 Use tree diagrams and the Fundamental Counting Principle to count outcomes and find the probability of an event.