

**New York State Mathematics Core Curriculum
2005
6th and 7th Grade Content Standards**

GRADE 6

NYS Mathematics Core Curriculum 2005 Content Standards

Number Sense and Operations Strand

Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.

Number Systems

- 6.N.1 Read and write whole numbers to trillions
- 6.N.2 Define and identify the commutative and associative properties of addition and multiplication
- 6.N.3 Define and identify the distributive property of multiplication over addition
- 6.N.4 Define and identify the identity and inverse properties of addition and multiplication
- 6.N.5 Define and identify the zero property of multiplication
- 6.N.6 Understand the concept of ratio
- 6.N.7 Express equivalent ratios as a proportion
- 6.N.8 Distinguish the difference between rate and ratio
- 6.N.9 Solve proportions using equivalent fractions
- 6.N.10 Verify the proportionality using the product of the means equals the product of the extremes
- 6.N.11 Read, write, and identify percents of a whole (0% to 100%)
- 6.N.12 Solve percent problems involving percent, rate, and base
- 6.N.13 Define absolute value and determine the absolute value of rational numbers (including positive and negative)
- 6.N.14 Locate rational numbers on a number line (including positive and negative)
- 6.N.15 Order rational numbers (including positive and negative)

Students will understand meanings of operations and procedures, and how they relate to one another.

Operations

- 6.N.16 Add and subtract fractions with unlike denominators
- 6.N.17 Multiply and divide fractions with unlike denominators.
- 6.N.18 Add, subtract, multiply, and divide mixed numbers with unlike denominators
- 6.N.19 Identify the multiplicative inverse (reciprocal) of a number
- 6.N.20 Represent fractions as terminating or repeating decimals
- 6.N.21 Find multiple representations of rational numbers (fractions, decimals, and percents 0 to 100)
- 6.N.22 Evaluate numerical expressions using order of operations (may include exponents of two and three)
- 6.N.23 Represent repeated multiplication in exponential form
- 6.N.24 Represent exponential form as repeated multiplication
- 6.N.25 Evaluate expressions having exponents where the power is an exponent of one, two, or three

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Students will compute accurately and make reasonable estimates.

Estimation

- 6.N.26 Estimate a percent of quantity (0% to 100%)
 6.N.27 Justify the reasonableness of answers using estimation (including rounding)

Algebra Strand

Students will represent and analyze algebraically a wide variety of problem solving situations.

Variables and Expressions

- 6.A.1 Translate two-step verbal expressions into algebraic expressions

Students will perform algebraic procedures accurately.

Variables and Expressions

- 6.A.2 Use substitution to evaluate algebraic expressions (may include exponents of one, two and three)

Equations and Inequalities

- 6.A.3 Translate two-step verbal sentences into algebraic equations
 6.A.4 Solve and explain two-step equations involving whole numbers using inverse operations
 6.A.5 Solve simple proportions within context
 6.A.6 Evaluate formulas for given input values (circumference, area, volume, distance, temperature, interest, etc.)

Geometry Strand

Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.

Shapes

- 6.G.1 Calculate the length of corresponding sides of similar triangles, using proportional reasoning
 6.G.2 Determine the area of triangles and quadrilaterals (squares, rectangles, rhombi, and trapezoids) and develop formulas
 6.G.3 Use a variety of strategies to find the area of regular and irregular polygons
 6.G.4 Determine the volume of rectangular prisms by counting cubes and develop the formula
 6.G.5 Identify radius, diameter, chords and central angles of a circle
 6.G.6 Understand the relationship between the diameter and radius of a circle

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- 6.G.7 Determine the area and circumference of a circle, using the appropriate formula
- 6.G.8 Calculate the area of a sector of a circle, given the measure of a central angle and the radius of the circle
- 6.G.9 Understand the relationship between the circumference and the diameter of a circle

Students will apply coordinate geometry to analyze problem solving situations.

Coordinate Geometry

- 6.G.10 Identify and plot points in all four quadrants
- 6.G.11 Calculate the area of basic polygons drawn on a coordinate plane (rectangles and shapes composed of rectangles having sides with integer lengths)

Measurement Strand

Students will determine what can be measured and how, using appropriate methods and formulas.

Units of Measurement

- 6.M.1 Measure capacity and calculate volume of a rectangular prism
- 6.M.2 Identify customary units of capacity (cups, pints, quarts, and gallons)
- 6.M.3 Identify equivalent customary units of capacity (cups to pints, pints to quarts, and quarts to gallons)
- 6.M.4 Identify metric units of capacity (liter and milliliter)
- 6.M.5 Identify equivalent metric units of capacity (milliliter to liter and liter to milliliter)

Tools and Methods

- 6.M.6 Determine the tool and technique to measure with an appropriate level of precision: capacity

Students will develop strategies for estimating measurements.

Estimation

- 6.M.7 Estimate volume, area, and circumference (see figures identified in geometry strand)
- 6.M.8 Justify the reasonableness of estimates
- 6.M.9 Determine personal references for capacity

Statistics and Probability Strand

Students will collect, organize, display, and analyze data.

Collection of Data

- 6.S.1 Develop the concept of sampling when collecting data from a population and decide the best method to collect data for a particular question

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Organization and Display of Data

- 6.S.2 Record data in a frequency table
- 6.S.3 Construct Venn diagrams to sort data
- 6.S.4 Determine and justify the most appropriate graph to display a given set of data (pictograph, bar graph, line graph, histogram, or circle graph)

Analysis of Data

- 6.S.5 Determine the mean, mode and median for a given set of data
- 6.S.6 Determine the range for a given set of data
- 6.S.7 Read and interpret graphs

Students will make predictions that are based upon data analysis.*Predictions from Data*

- 6.S.8 Justify predictions made from data

Students will understand and apply concepts of probability.*Probability*

- 6.S.9 List possible outcomes for compound events
- 6.S.10 Determine the probability of dependent events
- 6.S.11 Determine the number of possible outcomes for a compound event by using the fundamental counting principle and use this to determine the probabilities of events when the outcomes have equal probability

GRADE 7

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Number Sense and Operations Strand

Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.

Number Systems

- 7.N.1 Distinguish between the various subsets of real numbers (counting/natural numbers, whole numbers, integers, rational numbers, and irrational numbers)
- 7.N.2 Recognize the difference between rational and irrational numbers (e.g., explore different approximations of π)
- 7.N.3 Place rational and irrational numbers (approximations) on a number line and justify the placement of the
- 7.N.4 Develop the laws of exponents for multiplication and division
- 7.N.5 Write numbers in scientific notation
- 7.N.6 Translate numbers from scientific notation into standard form
- 7.N.7 Compare numbers written in scientific notation

Number Theory

- 7.N.8 Find the common factors and greatest common factor of two or more numbers
- 7.N.9 Determine multiples and least common multiple of two or more numbers
- 7.N.10 Determine the prime factorization of a given number and write in exponential form

Students will understand meanings of operations and procedures, and how they relate to one another.

Operations

- 7.N.11 Simplify expressions using order of operations (Note: Expressions may include absolute value and/or integral exponents greater than 0.)
- 7.N.12 Add, subtract, multiply, and divide integers
- 7.N.13 Add and subtract two integers (with and without the use of a number line)
- 7.N.14 Develop a conceptual understanding of negative and zero exponents with a base of ten and relate to fractions and decimals (e.g., $10^{-2} = .01 = 1/100$)
- 7.N.15 Recognize and state the value of the square root of a perfect square (up to 225)
- 7.N.16 Determine the square root of non-perfect squares using a calculator
- 7.N.17 Classify irrational numbers as non-repeating/non-terminating decimals

Students will compute accurately and make reasonable estimates.

Estimation

- 7.N.18 Identify the two consecutive whole numbers between which the square root of a non-perfect square whole number less than 225 lies (with and without the use of a number line)
- 7.N.19 Justify the reasonableness of answers using estimation

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Algebra Strand

Students will represent and analyze algebraically a wide variety of problem solving situations.

Variables and Expressions

7.A.1 Translate two-step verbal expressions into algebraic expressions

Students will perform algebraic procedures accurately.

Variables and Expressions

7.A.2 Add and subtract monomials with exponents of one

7.A.3 Identify a polynomial as an algebraic expression containing one or more terms

Students will perform algebraic procedures accurately.

Equations and Inequalities

7.A.4 Solve multi-step equations by combining like terms, using the distributive property, or moving variables to one side of the equation

7.A.5 Solve one-step inequalities (positive coefficients only) (See 7.G.10)

7.A.6 Evaluate formulas for given input values (surface area, rate, and density problems)

Students will recognize, use, and represent algebraically patterns, relations, and functions.

Patterns, Relations, and Functions

7.A.7 Draw the graphic representation of a pattern from an equation or from a table of data

7.A.8 Create algebraic patterns using charts/tables, graphs, equations, and expressions

7.A.9 Build a pattern to develop a rule for determining the sum of the interior angles of polygons

7.A.10 Write an equation to represent a function from a table of values

Geometry Strand

Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.

Shapes

7.G.1 Calculate the radius or diameter, given the circumference or area of a circle

7.G.2 Calculate the volume of prisms and cylinders, using a given formula and a calculator

7.G.3 Identify the two-dimensional shapes that make up the faces and bases of three-dimensional shapes (prisms, cylinders, cones, and pyramids)

7.G.4 Determine the surface area of prisms and cylinders, using a calculator and a variety of methods

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Students will identify and justify geometric relationships, formally and informally.

Geometric Relationships

- 7.G.5 Identify the right angle, hypotenuse, and legs of a right triangle
- 7.G.6 Explore the relationship between the lengths of the three sides of a right triangle to develop the Pythagorean Theorem
- 7.G.7 Find a missing angle when given angles of a quadrilateral
- 7.G.8 Use the Pythagorean Theorem to determine the unknown length of a side of a right triangle
- 7.G.9 Determine whether a given triangle is a right triangle by applying the Pythagorean Theorem and using a calculator

Students will apply coordinate geometry to analyze problem solving situations.

Coordinate Geometry

- 7.G.10 Graph the solution set of an inequality (positive coefficients only) on a number line (See 7.A.5)

Measurement Strand

Students will determine what can be measured and how, using appropriate methods and formulas.

Units of Measurement

- 7.M.1 Calculate distance using a map scale
- 7.M.2 Convert capacities and volumes within a given system
- 7.M.3 Identify customary and metric units of mass
- 7.M.4 Convert mass within a given system
- 7.M.4 Calculate unit price using proportions
- 7.M.4 Compare unit prices
- 7.M.4 Convert money between different currencies with the use of an exchange rate table and a calculator
- 7.M.4 Draw central angles in a given circle using a protractor (circle graphs)

Tools and Methods

- 7.M.9 Determine the tool and technique to measure with an appropriate level of precision: mass

Students will develop strategies for estimating measurements.

Estimation

- 7.M.10 Identify the relationships between relative error and magnitude when dealing with large numbers (e.g., money, population)
- 7.M.11 Estimate surface area

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- 7.M.12 Determine personal references for customary /metric units of mass
 7.M.13 Justify the reasonableness of the mass of an object

Statistics and Probability Strand

Students will collect, organize, display, and analyze data.

Collection of Data

- 7.S.1 Identify and collect data using a variety of methods

Organization and Display of Data

- 7.S.2 Display data in a circle graph
 7.S.3 Convert raw data into double bar graphs and double line graphs

Analysis of Data

- 7.S.4 Calculate the range for a given set of data
 7.S.5 Select the appropriate measure of central tendency
 7.S.6 Read and interpret data represented graphically (pictograph, bar graph, histogram, line graph, double line/bar graphs or circle graph)

Students will make predictions that are based upon data analysis.

Predictions from Data

- 7.S.7 Identify and explain misleading statistics and graphs

Students will understand and apply concepts of probability.

Probability

- 7.S.8 Interpret data to provide the basis for predictions and to establish experimental probabilities
 7.S.9 Determine the validity of sampling methods to predict outcomes
 7.S.10 Predict the outcome of an experiment
 7.S.11 Design and conduct an experiment to test predictions
 7.S.12 Compare actual results to predicted results