

## Grade 7 Math Standards and Expectations

1. Problem solving - Uses a variety of strategies in the problem-solving process\*
  1. Solves single-step and multiple-step math problems
  2. Brainstorms possible approaches before starting a problem
  3. Breaks complex problems into simpler parts
  4. Identifies extraneous or insufficient information in problems
  5. Chooses a method for solving a problem - some methods more helpful than others
  6. Checks reasonableness of results of each part of problem solving process
  7. Constructs a physical representation for complex problems
  8. Understands there is more than one way to solve mathematical problems
  9. Can determine information required to solve a problem, choosing methods and setting limits for acceptable solution
  
2. Concept of Numbers - Understands and applies basic and advanced properties of the concept of numbers\*
  1. Checks reasonableness of results through estimation - estimates measurements with appropriate precision
  2. Uses standard rounding to estimate
  3. Uses order of magnitude to estimate
  4. Uses number sense to estimate
  5. Represents, compares, and orders numbers; fractions and decimals
  6. Describes and applies properties of numbers
  7. Classifies numbers by divisibility
  8. Demonstrates ways of performing operations
  9. Uses place value; writes numbers in standard, expanded, and exponential form
  10. Uses and interprets operational and relationship symbols
  11. Solves equations and inequalities
  12. Uses variable expressions to model situations
  13. Explores numerical patterns
  14. Understands the basic relationship of fractions to decimals and fractions to whole numbers and percents to decimals
  15. Identifies prime and composite numbers
  16. Communicates mathematical concepts through writing and speaking
  17. Understands the concepts of ratio, proportion, and percent and the relationships among them
  18. Understands the characteristic and uses of exponents and scientific notation
  19. Uses number theory concepts, e.g. divisibility and remainders, factors, multiples, prime, relatively prime to solve problems
  
3. Computation - Uses basic and advanced procedures while performing the process of computation\*
  1. Adds, subtracts, multiplies, and divides whole number, fractions, decimals, integers and rational numbers
  2. Rounds decimals and fractions
  3. Uses order of operations effectively
  4. Selects and uses appropriate computational methods for a given situation
  
4. Measurement - Understands and applies basic and advanced properties of the concept of measurement\*
  1. Measures length/distance, time, temperature, weight, mass, and volume
  2. Identifies and uses appropriate units of measurement
  3. Selects and uses appropriate units and tools, depending on degree of accuracy required to find measurements for real-world problems
  4. Converts units within a system, e.g. feet to inches, quarts to pints, hours to minutes
  5. Estimates, calculates, and compares perimeter, area, and volume
  6. Applies given measurement formulas for perimeter, area, circumference, volume, and surface area in problem situations

7. Understands procedures for basic indirect measurements, e.g., using grids to estimate area of irregular figures
- 5. Geometry - Understands and applies basic and advanced properties of the concepts of geometry\***
1. Understands the relationships between two- and three-dimensional representations of a figure, e.g., scale drawings, blueprints, planar cross sections
  2. Understands the mathematical concepts of similarity and congruency
  3. Understands the basic concept of the Pythagorean theorem (introduction)
  4. Compares shapes in terms of such concepts as parallel, perpendicular, congruence, and symmetry (turns, flips, slides to investigate concepts of symmetry, similarity, and congruence)
  5. Identifies, classifies, and compares geometric figures
  6. Describes geometric properties, patterns, and relationships
  7. Applies the concepts of perimeter, area, and volume
  8. Solves real-world problems involving area of geometric figures
- 6. Data analysis - Understands and applies basic and advanced concepts of statistics and data analysis**
1. Gathers and records data to make generalizations\*
  2. Understands that data comes in many different forms and that collecting, organizing and displaying data can be done in many ways
  3. Finds mean, median, mode, and range
  4. Reads, interprets, organizes, and displays data in charts, tables, plots, and graphs
  5. Reads amounts on scales of bar and line graphs
  6. Locates amounts in specific cells of a table
  7. Compares quantities to determine ranks, sums or differences, and to find ratios
  8. Uses tables and graphs to determine rates or identify trends, understand underlying or functional relationships, and generalize or draw conclusions
  9. Understands basic concepts about how samples are chosen
- 7. Probability - Understands and applies basic concepts of probability**
1. Applies probability concepts and counting rules
  2. Understands and applies measures of central tendency and variability
  3. Identifies common errors in the presentation of statistics
  4. Understands probabilities and the ways they can be expressed
  5. Understands how predictions are based on data and probabilities
  6. Determines probability using simulations or experiments
- 8. Functions and Algebra - Understands and applies basic concepts of functions and algebra**
1. Constructs a pattern and articulates why the pattern works
  2. Understands that a variable can be used in many ways
  3. Understands basic operations of algebraic expressions, e.g., combining like terms, expanding, substituting for unknowns
  4. Understands various representations of patterns and functions and the relationships among them
  5. Solves real-world problems involving formulas with one variable