

**Pennsylvania Academic Standards
correlated to
Merit Software Math Programs**

Revised in January 2003, The Math Standards describe what students should know and be able to do at four grade levels (third, fifth, eighth and eleventh). They reflect the increasing complexity and sophistication that students are expected to achieve as they progress through school.

Although the standards are not a curriculum or a prescribed series of activities, school entities will use them to develop a local school curriculum that will meet local students' needs.

Merit's Math programs address the following Pennsylvania Academic Standards:

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Grade 3

Subhead	Content	Standard	Merit Software
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.3.A. Count using whole numbers (to 10,000) and by 2's, 3's, 5's, 10's, 25's and 100's	Word Problem Shape-Up Set 1, 2, 3
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.3.B. Use whole numbers and fractions to represent quantities.	Word Problem Shape-Up Set 1, 2, 3; Fraction Shape-Up
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.3.C. Represent equivalent forms of the same number through the use of concrete objects, drawings, word names and symbols.	Word Problem Shape-Up Set 1, 2, 3
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.3.D. Use drawings, diagrams or models to show the concept of fraction as part of a whole.	Word Problem Shape-Up Set 1, 2, 3
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.3.E. Count, compare and make change using a collection of coins and one-dollar bills.	Word Problem Shape-Up Set 1, 2, 3
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.3.F. Apply number patterns (even and odd) and compare values of numbers on the hundred board.	Word Problem Shape-Up Set 1, 2, 3

Math	2.1. Numbers, Number Systems and Number Relationships	2.1.3.G. Use concrete objects to count, order and group.	Word Problem Shape-Up Set 1, 2, 3
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.3.H. Demonstrate an understanding of one-to-one correspondence.	Word Problem Shape-Up Set 1, 2, 3
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.3.I. Apply place-value concepts and numeration to counting, ordering and grouping.	Word Problem Shape-Up Set 1, 2, 3
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.3.J. Estimate, approximate, round or use exact numbers as appropriate.	Word Problem Shape-Up Set 1, 2, 3
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.3.K. Describe the inverse relationship between addition and subtraction.	Word Problem Shape-Up Set 1, 2, 3
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.3.L. Demonstrate knowledge of basic facts in four basic operations.	Word Problem Shape-Up Set 1, 2, 3
Math	2.2. Computation and Estimation	2.2.3.A. Apply addition and subtraction in everyday situations using concrete objects.	Word Problem Shape-Up Set 1, 2, 3
Math	2.2. Computation and Estimation	2.2.3.B. Solve single- and double-digit addition and subtraction problems with regrouping in vertical form.	Word Problem Shape-Up Set 1, 2, 3
Math	2.2. Computation and Estimation	2.2.3.C. Demonstrate the concept of multiplication as repeated addition and arrays.	Word Problem Shape-Up Set 1, 2, 3
Math	2.2. Computation and Estimation	2.2.3.E. Use estimation skills to arrive at conclusions.	Word Problem Shape-Up Set 1, 2, 3

Math	2.2. Computation and Estimation	2.2.3.F. Determine the reasonableness of calculated answers.	Word Problem Shape-Up Set 1, 2, 3
Math	2.2. Computation and Estimation	2.2.3.G. Explain addition and subtraction algorithms with regrouping.	Word Problem Shape-Up Set 1, 2, 3
Math	2.3. Measurement and Estimation	2.3.3.A. Compare measurable characteristics of different objects on the same dimensions (e.g., time, temperature, area, length, weight, capacity, perimeter).	Word Problem Shape-Up Set 1, 2, 3
Math	2.3. Measurement and Estimation	2.3.3.B. Determine the measurement of objects with non-standard and standard units (e.g., US customary and metric).	Word Problem Shape-Up Set 1, 2, 3
Math	2.3. Measurement and Estimation	2.3.3.E. Determine the appropriate unit of measure.	Word Problem Shape-Up Set 1, 2, 3
Math	2.3. Measurement and Estimation	2.3.3.F. Use concrete objects to determine area and perimeter.	Word Problem Shape-Up Set 1, 2, 3
Math	2.3. Measurement and Estimation	2.3.3.G. Estimate and verify measurements.	Word Problem Shape-Up Set 1, 2, 3
Math	2.3. Measurement and Estimation	2.3.3.H. Demonstrate that a single object has different attributes that can be measured in different ways (e.g., length, mass, weight, time, area, temperature, capacity, perimeter).	Word Problem Shape-Up Set 1, 2, 3
Math	2.4. Mathematical Reasoning and Connections	2.4.3.A. Make, check and verify predictions about the quantity, size and shape of objects and groups of objects	Word Problem Shape-Up Set 1, 2, 3
Math	2.4. Mathematical Reasoning and Connections	2.4.3.B. Use measurements in everyday situations (e.g., determine the geography of the school building).	Word Problem Shape-Up Set 1, 2, 3; Fraction Shape-Up

Math	2.5. Mathematical Problem Solving and Communication	2.5.3.A. Use appropriate problem-solving strategies (e.g., guess and check, working backwards).	Word Problem Shape-Up Set 1, 2, 3
Math	2.5. Mathematical Problem Solving and Communication	2.5.3.B. Determine when sufficient information is present to solve a problem and explain how to solve a problem.	Word Problem Shape-Up Set 1, 2, 3
Math	2.5. Mathematical Problem Solving and Communication	2.5.3.C. Select and use an appropriate method, materials and strategy to solve problems, including mental mathematics, paper and pencil and concrete objects.	Word Problem Shape-Up Set 1, 2, 3
Math	2.6. Statistics and Data Analysis	2.6.3.A. Gather, organize and display data using pictures, tallies, charts, bar graphs and pictographs.	Word Problem Shape-Up Set 1, 2, 3
Math	2.6. Statistics and Data Analysis	2.6.3.B. Formulate and answer questions based on data shown on graphs.	Word Problem Shape-Up Set 1, 2, 3
Math	2.6. Statistics and Data Analysis	2.6.3.C. Predict the likely number of times a condition will occur based on analyzed data.	Word Problem Shape-Up Set 1, 2, 3
Math	2.6. Statistics and Data Analysis	2.6.3.D. Form and justify an opinion on whether a given statement is reasonable based on a comparison to data.	Word Problem Shape-Up Set 1, 2, 3
Math	2.7. Probability and Predictions	2.7.3.A. Predict and measure the likelihood of events and recognize that the results of an experiment may not match predicted outcomes.	Word Problem Shape-Up Set 1, 2, 3
Math	2.7. Probability and Predictions	2.7.3.C. List or graph the possible results of an experiment.	Word Problem Shape-Up Set 1, 2, 3
Math	2.7. Probability and Predictions	2.7.3.D. Analyze data using the concepts of largest, smallest, most often, least often and middle.	Word Problem Shape-Up Set 1, 2, 3

Math	2.8. Algebra and Functions	2.8.3.A. Recognize, describe, extend, create and replicate a variety of patterns including attribute, activity, number and geometric patterns.	Word Problem Shape-Up Set 1, 2, 3; Fraction Shape-Up
Math	2.8. Algebra and Functions	2.8.3.B. Use concrete objects and trial and error to solve number sentences and check if solutions are sensible and accurate.	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.3.C. Substitute a missing addend in a number sentence.	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.3.D. Create a story to match a given combination of symbols and numbers.	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.3.E. Use concrete objects and symbols to model the concepts of variables, expressions, equations and inequalities.	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.3.F. Explain the meaning of solutions and symbols.	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.3.G. Use a table or a chart to display information.	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.3.H. Describe and interpret the data shown in tables and charts.	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.3.I. Demonstrate simple function rules.	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.3.J. Analyze simple functions and relationships and locate points on a simple grid.	Word Problem Shape-Up Set 1, 2, 3

Grade 5

Subhead	Content	Standard	Merit Software
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.5.B. Apply number theory concepts to rename a number quantity (e.g., six, 6, 3×2 , $10 - 4$).	Pre-Algebra Shape-Up;
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.5.C. Demonstrate that mathematical operations can represent a variety of problem situations.	Word Problem Shape-Up Set 1, 2, 3
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.5.D. Use models to represent fractions and decimals.	Word Problem Shape-Up Set 1, 2, 3; Fraction Shape-Up
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.5.F. Use simple concepts of negative numbers (e.g., on a number line, in counting, in temperature).	Word Problem Shape-Up Set 1, 2, 3
Math	2.2. Computation and Estimation	2.2.5.A. Create and solve word problems involving addition, subtraction, multiplication and division of whole numbers.	Word Problem Shape-Up Set 1, 2, 3
Math	2.2. Computation and Estimation	2.2.5.B. Develop and apply algorithms to solve word problems that involve addition, subtraction, and/or multiplication with decimals with and without regrouping.	Word Problem Shape-Up Set 1, 2, 3; Fraction Shape-Up
Math	2.2. Computation and Estimation	2.2.5.D. Demonstrate the ability to round numbers.	Word Problem Shape-Up Set 1, 2, 3
Math	2.2. Computation and Estimation	2.2.5.E. Determine through estimations the reasonableness of answers to problems involving addition, subtraction, multiplication and division of whole numbers.	Word Problem Shape-Up Set 1, 2, 3
Math	2.2. Computation and Estimation	2.2.5.F. Demonstrate skills for using fraction calculators to verify conjectures confirm computations and explore complex problem-solving situations.	Word Problem Shape-Up Set 1, 2, 3; Fraction Shape-Up
Math	2.2. Computation and Estimation	2.2.5.G. Apply estimation strategies to a variety of problems including time and money.	Word Problem Shape-Up Set 1, 2, 3

Math	2.2. Computation and Estimation	2.2.5.I. Select a method for computation and explain why it is appropriate.	Word Problem Shape-Up Set 1, 2, 3
Math	2.3. Measurement and Estimation	2.3.5.A. Select and use appropriate instruments and units for measuring quantities (e.g., perimeter, volume, area, weight, time, temperature).	Word Problem Shape-Up Set 1, 2, 3; Fraction Shape-Up
Math	2.3. Measurement and Estimation	2.3.5.B. Select and use standard tools to measure the size of figures with specified accuracy, including length, width, perimeter and area.	Word Problem Shape-Up Set 1, 2, 3
Math	2.3. Measurement and Estimation	2.3.5.C. Estimate, refine and verify specified measurements of objects.	Word Problem Shape-Up Set 1, 2, 3
Math	2.3. Measurement and Estimation	2.3.5.E. Add and subtract measurements.	Word Problem Shape-Up Set 1, 2, 3
Math	2.4. Mathematical Reasoning and Connections	2.4.5.B. Use models, number facts, properties and relationships to check and verify predictions and explain reasoning.	Word Problem Shape-Up Set 1, 2, 3
Math	2.4. Mathematical Reasoning and Connections	2.4.5.C. Draw inductive and deductive conclusions within mathematical contexts.	Word Problem Shape-Up Set 1, 2, 3
Math	2.4. Mathematical Reasoning and Connections	2.4.5.D. Distinguish between relevant and irrelevant information in a mathematical problem.	Word Problem Shape-Up Set 1, 2, 3; Fraction Shape-Up
Math	2.4. Mathematical Reasoning and Connections	2.4.5.E. Interpret statements made with precise language of logic (e.g., “all”, “or”, “every”, “none”, “some”, “or”, “many”).	Word Problem Shape-Up Set 1, 2, 3
Math	2.4. Mathematical Reasoning and Connections	2.4.5.F. Use statistics to quantify issues (e.g., in social studies, in science).	Word Problem Shape-Up Set 1, 2, 3

Math	2.5. Mathematical Problem Solving and Communication	2.5.5.A. Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense and explain how the problem was solved.	Word Problem Shape-Up Set 1, 2, 3
Math	2.5. Mathematical Problem Solving and Communication	2.5.5.B. Use appropriate mathematical terms, vocabulary, language symbols and graphs to explain clearly and logically solutions to problems.	Word Problem Shape-Up Set 1, 2, 3; Fraction Shape-Up
Math	2.5. Mathematical Problem Solving and Communication	2.5.5.C. Show ideas in a variety of ways, including words, numbers, symbols, pictures, charts, graphs, tables, diagrams and models.	Word Problem Shape-Up Set 1, 2, 3
Math	2.5. Mathematical Problem Solving and Communication	2.5.5.D. Connect, extend and generalize problem solutions to other concepts, problems and circumstances in mathematics.	Word Problem Shape-Up Set 1, 2, 3
Math	2.5. Mathematical Problem Solving and Communication	2.5.5.E. Select, use and justify the methods, materials and strategies used to solve problems.	Word Problem Shape-Up Set 1, 2, 3; Fraction Shape-Up
Math	2.5. Mathematical Problem Solving and Communication	2.5.5.F. Use appropriate problem-solving strategies (e.g., solving a simpler problem, drawing a picture or diagram).	Word Problem Shape-Up Set 1, 2, 3; Fraction Shape-Up
Math	2.6. Statistics and Data Analysis	2.6.5.A. Organize and display data using pictures, tallies, tables, charts, bar graphs and circle graphs.	Word Problem Shape-Up Set 1, 2, 3
Math	2.6. Statistics and Data Analysis	2.6.5.B. Describe data sets using mean, median, mode and range.	Word Problem Shape-Up Set 1, 2, 3
Math	2.6. Statistics and Data Analysis	2.6.5.C. Sort data using Venn diagrams.	Word Problem Shape-Up Set 1, 2, 3

Math	2.6. Statistics and Data Analysis	2.6.5.D. Predict the likely number of times a condition will occur based on analyzed data.	Word Problem Shape-Up Set 1, 2, 3
Math	2.6. Statistics and Data Analysis	2.6.5.E. Construct and defend simple conclusions based on data.	Word Problem Shape-Up Set 1, 2, 3
Math	2.7. Probability and Predictions	2.7.5.C. Express probabilities as fractions and decimals.	Word Problem Shape-Up Set 1, 2, 3; Fraction Shape-Up
Math	2.7. Probability and Predictions	2.7.5.E. Calculate the probability of a simple event.	Word Problem Shape-Up Set 1, 2, 3
Math	2.7. Probability and Predictions	2.7.5.F. Determine patterns generated as a result of an experiment.	Word Problem Shape-Up Set 1, 2, 3
Math	2.7. Probability and Predictions	2.7.5.G. Determine the probability of an event involving "and", "or" or "not".	Word Problem Shape-Up Set 1, 2, 3
Math	2.7. Probability and Predictions	2.7.5.H. Predict and determine why some outcomes are certain, more likely, less likely, equally likely or impossible.	Word Problem Shape-Up Set 1, 2, 3
Math	2.7. Probability and Predictions	2.7.5.I. Find all possible combinations and arrangements involving a limited number of variables.	Word Problem Shape-Up Set 1, 2, 3
Math	2.7. Probability and Predictions	2.7.5.J. Develop a tree diagram and list the elements.	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.5.A. Recognize, reproduce, extend, create and describe patterns, sequences and relationships verbally, numerically, symbolically and graphically, using a variety of materials.	Word Problem Shape-Up Set 1, 2, 3; Pre-Algebra Shape-Up

Math	2.8. Algebra and Functions	2.8.5.C. Form rules based on patterns (e.g., an equation that relates pairs in a sequence).	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.5.D. Use concrete objects and combinations of symbols and numbers to create expressions that model mathematical situations.	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.5.E. Explain the use of combinations of symbols and numbers in expressions, equations and inequalities.	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.5.G. Select and use appropriate strategies, including concrete materials, to solve number sentences and explain the method of solution.	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.5.I. Generate functions from tables of data and relate data to corresponding graphs and functions.	Word Problem Shape-Up Set 1, 2, 3

Grade 6-8

Subhead	Content	Standard	Merit Software
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.8.A. Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.8.B. Simplify numerical expressions involving exponents, scientific notation and using order of operations.	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.8.D. Apply ratio and proportion to mathematical problem situations involving distance, rate, time and similar triangles.	Word Problem Shape-Up Set 1, 2, 3; Pre-Algebra Shape-Up
Math	2.1. Numbers, Number Systems and Number Relationships	2.1.8.F. Use the number line model to demonstrate integers and their applications.	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2

Math	2.1. Numbers, Number Systems and Number Relationships	2.1.8.G. Use the inverse relationships between addition, subtraction, multiplication, division, exponentiation and root extraction to determine unknown quantities in equations.	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Math	2.2. Computation and Estimation	2.2.8.A. Complete calculations by applying the order of operations.	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Math	2.2. Computation and Estimation	2.2.8.B. Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Writing	2.2. Computation and Estimation	2.2.8.D. Estimate amount of tips and discounts using ratios, proportions and percents.	Word Problem Shape-Up Set 1, 2, 3
Math	2.2. Computation and Estimation	2.2.8.E. Determine the appropriateness of overestimating or underestimating in computation.	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Math	2.3. Measurement and Estimation	2.3.8.A. Develop formulas and procedures for determining measurements (e.g., area, volume, distance).	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Math	2.3. Measurement and Estimation	2.3.8.B. Solve rate problems (e.g., rate = distance, principal = interest).	Word Problem Shape-Up Set 1, 2, 3; Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Math	2.4. Mathematical Reasoning and Connections	2.4.8.B. Combine numeric relationships to arrive at a conclusion.	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Math	2.4. Mathematical Reasoning and Connections	2.4.8.D. Construct, use and explain algorithmic procedures for computing and estimating with whole numbers, fractions, decimals and integers.	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Math	2.6. Statistics and Data Analysis	2.6.8.A. Compare and contrast different plots of data using values of mean, median, mode, quartiles and range.	Word Problem Shape-Up Set 1, 2, 3; Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2

Math	2.7. Probability and Predictions	2.7.8.A. Determine the number of combinations and permutations for an event.	Basic Algebra Shape-Up Set 1 & 2
Math	2.7. Probability and Predictions	2.7.8.C. Analyze predictions (e.g., election polls).	Word Problem Shape-Up Set 1, 2, 3
Math	2.7. Probability and Predictions	2.7.8.D. Compare and contrast results from observations and mathematical models.	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.8.A. Apply simple algebraic patterns to basic number theory and to spatial relations	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Math	2.8. Algebra and Functions	2.8.8.C. Create and interpret expressions, equations or inequalities that model problem situations.	Word Problem Shape-Up Set 1, 2, 3
Math	2.8. Algebra and Functions	2.8.8.J. Show that an equality relationship between two quantities remains the same as long as the same change is made to both quantities; explain how a change in one quantity determines another quantity in a functional relationship.	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2

Grade 9-11

Subhead	Content	Standard	Merit Software
Math	2.2. Computation and Estimation	2.2.11 A. Develop and use computation concepts, operations and procedures with real numbers in problem-solving situations	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Math	2.3. Measurement and Estimation	2.3.11 A. Select and use appropriate units and tools to measure to the degree of accuracy required in particular measurement situations.	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2

Math	2.5. Mathematical Problem Solving and Communication	2.5.11 A. Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Math	2.5. Mathematical Problem Solving and Communication	2.5.11 B. Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas and results.	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Math	2.6. Statistics and Data Analysis	2.6.11 E. Determine the validity of the sampling method described in a given study.	Word Problem Shape-Up Set 1, 2, 3; Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2
Math	2.7. Probability and Predictions	2.7.11 A. Compare odds and probability.	Word Problem Shape-Up Set 1, 2, 3; Basic Algebra Shape-Up Set 1 & 2
Math	2.7. Probability and Predictions	2.7.11 E. Solve problems involving independent simple and compound events.	Word Problem Shape-Up Set 1, 2, 3; Basic Algebra Shape-Up Set 1 & 2
Math	2.8. Algebra and Functions	2.8.11 C. Use patterns, sequences and series to solve routine and non-routine problems.	Pre-Algebra Shape-Up; Basic Algebra Shape-Up Set 1 & 2