



Grade 3 Advanced

A third-grade student performing at the Advanced Level solves complex problems and demonstrates in-depth understanding of the skills, concepts, and procedures in the five Pennsylvania Mathematics Reporting Categories.

In addition to the skills demonstrated by students performing at the Basic and Proficient Levels, students performing at this level demonstrate these abilities by using the four operations to represent and solve multistep word problems. Students represent fractions on a number line, generate equivalent fractions, and express whole numbers as fractions. Students explain arithmetic patterns, use symbols to represent unknown quantities, and solve for missing values in multiplication and division computations. They solve problems using arithmetic properties and the order of operations. Students explain that polygons can be categorized by common attributes. Students multiply side lengths of rectangles to solve area. Students calculate elapsed time, make change, and solve problems using units of measure and information presented in data displays. Students solve real-world problems involving perimeters.

Grade 3 Proficient

A third-grade student performing at the Proficient Level solves practical and real-world problems.

In addition to the skills demonstrated by students performing at the Basic Level, students performing at this level demonstrate these abilities by using place-value skills to add and subtract whole numbers and by multiplying whole numbers through 10×10 and single-digit whole numbers by two-digit multiples of 10. Students determine products and whole-number quotients to solve problems and assess the reasonableness of answers. They identify fractions on a number line, compare fractions with like denominators, and express whole numbers as fractions with a denominator of 1. They create or match a story to numbers and mathematical symbols and identify arithmetic patterns. Students explain shared attributes of polygons. They calculate elapsed time within the same hour and compare and round amounts of money. Students measure and estimate mass, length, and liquid volume of objects. Students organize, display, and translate information in data displays to solve one-step problems. Students calculate perimeters of polygons.



Grade 3 Basic

A third-grade student performing at the Basic Level solves simple or routine problems by applying skills and procedures in the five Pennsylvania Mathematics Reporting Categories.

Students performing at this level demonstrate these abilities by using place-value skills to round, order, and add and subtract whole numbers without regrouping. Students calculate products and whole-number quotients (basic facts). They identify fractions as equal parts of a whole or set. Students match mathematical equations to real-world situations. They calculate areas of polygons by counting square units and identify rhombi, rectangles, and squares. Students read an analog clock, measure lengths, and calculate amounts of money. They read and interpret information presented in data displays.

Grade 3 Below Basic

Students performing at this level demonstrate a partial and selective understanding of place-value when performing arithmetic. They show partial understanding of fractions as numbers. Students understand the relationship between multiplication and division in limited and restricting ways and demonstrate difficulty solving problems involving the four operations. They show understanding of a limited variety of patterns. Students may or may not apply basic geometric concepts. They have difficulty solving problems involving measurement (time, money, liquid volume, mass, length). Students read some types of data but do not consistently represent and interpret data. They show partial understanding of the concepts of area and perimeter.



Grade 4 Advanced

A fourth-grade student performing at the Advanced Level solves complex problems and demonstrates in-depth understanding of the skills, concepts, and procedures in the five Pennsylvania Mathematics Reporting Categories.

In addition to the skills demonstrated by students performing at the Basic and Proficient Levels, students performing at this level demonstrate these abilities by interpreting remainders while performing computations and estimations and by determining the relationship between the values of digits in whole numbers. They add and subtract mixed numbers and add fractions having denominators of 10 and 100 in the same problem. Students solve equations with a symbol representing an unknown quantity, determine prime or composite numbers, and interpret problems to find multiples or factors of a number. Students identify features that are not explicit in patterns. They solve problems to find unknown angles. Students solve problems by analyzing information from line plots.

Grade 4 Proficient

A fourth-grade student performing at the Proficient Level solves practical and real-world problems.

In addition to the skills demonstrated by students performing at the Basic Level, students performing at this level demonstrate these abilities by comparing whole numbers using the four operations to perform computations and by estimating the answers to addition, subtraction, and multiplication problems. They generate equivalent fractions to represent and compare fractions, mixed numbers, and decimals, and multiply whole numbers by fractions. Students use information from a line plot to add and subtract fractions. They find factors and factor pairs of whole numbers and define prime and composite numbers. Students use numbers and symbols to interpret equations and expressions. They create, complete, and extend patterns and determine or apply rules to find missing elements in function tables. Students draw and classify figures based on geometric properties, measure angles, and solve problems using area and perimeter formulas. Students draw and identify lines of symmetry. They tell time, complete single-step conversions from a larger unit to a smaller unit, and solve problems involving measurement units. They create line plots with fractional units and translate information between different data displays.



Grade 4 Basic

A fourth-grade student performing at the Basic Level solves simple or routine problems by applying skills and procedures in the five Pennsylvania Mathematics Reporting Categories.

Students performing at this level demonstrate these abilities by comparing and expressing whole numbers in different forms. They use the four operations to perform single-step computations and to round numbers. Students compare, add, and subtract fractions with common denominators and generate equivalent fractions. They identify multiples, expressions and equations, and rules for simple patterns. They measure right angles with a protractor and identify and draw parallel line segments, perpendicular line segments, and basic geometric figures. Students tell time as the number of minutes after the hour, identify relative measurements, and match line plots to given data.

Grade 4 Below Basic

Students performing at this level have a partial and selective place-value understanding for whole numbers. They inadequately use place-value understanding and properties of operations. Students show limited understanding of fraction equivalence and ordering. Students demonstrate difficulty with decimal notation with fractions. They use the four operations in selective and incomplete ways. Students are developing familiarity with factors and multiples. They show an understanding of limited types of patterns. Students apply geometric concepts to familiar objects, but have difficulty in using general principles. They have difficulty solving problems involving measurement and conversions. Students have limited success in representing and interpreting data.



Grade 5 Advanced

A fifth-grade student performing at the Advanced Level solves complex problems and demonstrates in-depth understanding of the skills, concepts, and procedures in the five Pennsylvania Mathematics Reporting Categories.

In addition to the skills demonstrated by students performing at the Basic and Proficient Levels, students performing at this level demonstrate these abilities by explaining patterns of decimal point placement when a decimal is multiplied or divided by a power of 10. They solve multistep word problems using multidigit whole numbers, decimals, fractions, and mixed numbers. They solve problems involving computation of fractions shown on line plots. Students calculate the volume of solid figures composed of two non-overlapping right rectangular prisms.

Grade 5 Proficient

A fifth-grade student performing at the Proficient Level solves practical and real-world problems.

In addition to the skills demonstrated by students performing at the Basic Level, students performing at this level demonstrate knowledge of place-value concepts of decimals, including writing, comparing, and rounding decimals. Students use whole-number exponents to denote powers of 10. They solve single-step word problems using multidigit whole numbers, decimals, fractions, and mixed numbers. Students use multiple grouping symbols to complete calculations, and evaluate expressions by applying the order of operations. Students generate, extend, analyze, and determine relationships between corresponding terms of two patterns. Students plot, describe, and interpret ordered pairs in quadrant I to solve real-world problems. They categorize two-dimensional figures in a hierarchy based on properties. Students convert different-size units within a given measurement system to solve multistep problems. Students represent and interpret data shown in various displays to solve real-world problems. They calculate the volume of right rectangular prisms with whole-number edge lengths.



Grade 5 Basic

A fifth-grade student performing at the Basic Level solves simple or routine problems by applying skills and procedures in the five Pennsylvania Mathematics Reporting Categories.

Students performing at this level demonstrate these abilities by reading decimals using base-ten numerals, word form, and expanded form. Students use multidigit whole numbers and decimals to perform single-step computations. They add, subtract, and multiply fractions with unlike denominators. Students interpret numerical expressions by using grouping symbols in the order of operations. Students extend numerical patterns and determine relationships between corresponding terms of two single-operation patterns. Students identify parts of a coordinate grid. They convert like measurement units within a given measurement system and interpret data shown in data displays.

Grade 5 Below Basic

Students performing at this level have a limited and selective understanding of the place-value system of whole numbers and decimals. They perform operations with limited whole numbers and decimals. Students show an understanding of fraction equivalence and operations using fractions with explicit visual models. Students write and interpret selected numerical expressions. They show an understanding of patterns whose variations are limited. Students graph selected points on a coordinate grid in one dimension at a time. They classify figures based on properties with limited generalization. Students have difficulty solving problems involving measurement and conversions. They represent and interpret selected types of data. Students show partial understanding of concepts of volume.



Grade 6 Advanced

A sixth-grade student performing at the Advanced Level solves complex problems and demonstrates in-depth understanding of the skills, concepts, and procedures in the five Pennsylvania Mathematics Reporting Categories.

In addition to the skills demonstrated by students performing at the Basic and Proficient Levels, students performing at this level demonstrate these abilities by solving complex multistep computations and word problems. They apply Greatest Common Factor and Least Common Multiple to solve real-world problems. They solve real-world and mathematical problems, including distances, using the coordinate plane. Students analyze the relationship between dependent and independent variables using graphs, tables, and equations. Students determine area of a polygon using coordinate geometry. They analyze numerical data sets in relation to context.

Grade 6 Proficient

A sixth-grade student performing at the Proficient Level solves practical and real-world problems.

In addition to the skills demonstrated by students performing at the Basic Level, students performing at this level demonstrate these abilities by solving multistep computations or word problems. They determine the Greatest Common Factor and Least Common Multiple of two whole numbers. Students generate equivalent expressions using the properties of operations. Students use positive and negative numbers to describe and locate quantities on a number line or coordinate plane. Students use absolute value to describe distances. They represent, solve, and write numerical, one-variable, and two-variable algebraic expressions, equations, and inequalities. They use formulas to find the areas of irregular or compound polygons. They determine volume and surface area. Students represent three-dimensional figures using nets. Students determine measures of center and variability, given a display.



Grade 6 Basic

A sixth-grade student performing at the Basic Level solves simple or routine problems by applying skills and procedures in the five Pennsylvania Mathematics Reporting Categories.

Students performing at this level demonstrate these abilities by solving single-step computations or word problems including fractions using the four basic operations. They use the distributive property to identify sums as products of whole numbers. Students locate and plot integers and other rational numbers on a number line or coordinate plane. Students determine the opposite of a number. Students find unit rates and use ratio language/notation. They identify and evaluate numerical and one-variable algebraic expressions, equations, and inequalities. They identify the relationship between dependent and independent variables in equations. Students use formulas to find areas of simple polygons. Students determine the volume of right rectangular prisms. Students display numerical data in plots on a number line and determine quantitative measures of center of data.

Grade 6 Below Basic

Students performing at this level solve single-step computations including fractions using at least one of the four basic operations. Students locate and plot integers on a number line with explicit intervals or coordinate plane. Students determine the opposite of an integer. They identify and evaluate selected numerical expressions, equations, or inequalities. Students use formulas to find areas of some polygons.



Grade 7 Advanced

A seventh-grade student performing at the Advanced Level solves complex problems and demonstrates in-depth understanding of the skills, concepts, and procedures in the five Pennsylvania Mathematics Reporting Categories.

In addition to the skills demonstrated by students performing at the Basic and Proficient Levels, students performing at this level demonstrate these abilities by using operations with rational numbers and analyzing proportional relationships. They use and apply properties of angles to solve complex real-world problems. Students determine circumference, area, surface area, and volume of compound geometric figures by solving practical and real-world problems. They draw inferences about a population from a random sample and compare two numerical data distributions using variability. Students analyze and interpret the likelihood of outcomes and find the probability of independent and compound events.

Grade 7 Proficient

A seventh-grade student performing at the Proficient Level solves practical and real-world problems.

In addition to the skills demonstrated by students performing at the Basic Level, students performing at this level demonstrate these abilities by applying and extending the use of numerical and algebraic expressions with rational numbers. They use proportional relationships to solve problems and identify the constant of proportionality. Students use variables to write and solve equations and inequalities. They graph the solution set of inequalities on a number line. Students use properties of angles to solve practical and real-world problems. Students use and apply the triangle inequality theorem. They determine circumference, area, surface area, and volume of compound geometric figures. Students draw inferences about a population from a random sample and compare two numerical data distributions using measures of central tendency. They determine and explain the likelihood of outcomes, find the probability of complementary events, and utilize relative frequency in determining probability.



Grade 7 Basic

A seventh-grade student performing at the Basic Level solves simple or routine problems by applying skills and procedures in the five Pennsylvania Mathematics Reporting Categories.

Students performing at this level demonstrate these abilities by using operations with rational numbers and generating equivalent numerical and algebraic expressions. They compute unit rates. They recognize a proportion. Students use variables to write and solve simple equations and inequalities. They describe properties of angles and geometric figures. Students identify or describe the properties of triangles. They determine circumference, area, surface area, and volume. Students identify random samples, draw inferences about a population, and compare two numerical data distributions using the mean. They predict the likelihood of outcomes and find probability of simple events. Students determine the reasonableness of answers.

Grade 7 Below Basic

Students performing at this level use operations with integers and generate selected equivalent numerical expressions. They identify familiar unit rates. Students solve one-step equations or inequalities. Students identify selected properties of angles and geometric figures. They identify or describe limited and selected properties of triangles. They determine area of rectangles and selected triangles. Students find probability of simple events.



Grade 8 Advanced

An eighth-grade student performing at the Advanced Level solves complex problems and demonstrates in-depth understanding of the skills, concepts, and procedures in the five Pennsylvania Mathematics Reporting Categories.

In addition to the skills demonstrated by students performing at the Basic and Proficient Levels, students performing at this level demonstrate these abilities by finding and using appropriate approximate values of irrational numbers without a calculator. They estimate how many times larger or smaller quantities in scientific notation are, as a multiple of 10. Students interpret and compare the proportional relationships of linear equations represented in different ways. They analyze slope using similar right triangles. Students solve and interpret solutions of equations in one or two variables. They analyze and interpret the properties of linear functions. They describe, sketch, or determine the features of a nonlinear function. Students use coordinates to describe the effects of transformations and sequences of transformations (including dilations) of figures. They use and apply the Pythagorean theorem to non-coplanar points in three dimensions. Students interpret the slope and y-intercept of bivariate data.

Grade 8 Proficient

An eighth-grade student performing at the Proficient Level solves practical and real-world problems.

In addition to the skills demonstrated by students performing at the Basic Level, students performing at this level demonstrate these abilities by applying concepts of rational and irrational numbers to convert, compare, and order numbers in various forms. They use radical notation to represent solutions to equations of the form $x^3 = a$. Students solve problems with decimals and scientific notation and utilize appropriate units of measure. They perform operations with numbers expressed in scientific notation. Students write, solve, and graph equations in two variables and derive an equation of a line in slope-intercept form from its graph. Students interpret unit rate as slope. They compare properties of a linear function displayed in multiple representations. When solving practical and real-world problems, students apply properties of transformations or sequences of transformations of congruent and similar figures. They solve practical and real-world problems using and applying the Pythagorean theorem or volume formulas. Students interpret bivariate data displayed in multiple ways.



Grade 8 Basic

An eighth-grade student performing at the Basic Level solves simple or routine problems by applying skills and procedures in the five Pennsylvania Mathematics Reporting Categories.

Students performing at this level demonstrate these abilities by identifying numbers as rational or irrational and locating approximate positions on a number line. They use and evaluate radical notation to represent solutions to equations of the form $x^2 = a$. Students use properties of integer exponents to find equivalent numerical expressions and represent numbers in scientific notation (with or without technology). Students write, solve, and graph equations in one variable with one solution. They use a graph or an equation in slope-intercept form to identify the slope and y-intercept. They identify functions using tables and graphs. Students identify properties of transformations or sequences of transformations of congruent figures. They use and apply the Pythagorean theorem and volume formulas to solve simple or routine problems. Students identify line of best fit and determine patterns of association in bivariate data.

Grade 8 Below Basic

Students performing at this level identify rational numbers and locate approximate positions on a number line. They evaluate radical notation for perfect squares. Students solve one- and selected two-step equations in one variable with one solution. Students identify a function using a graph or table. They use the Pythagorean theorem or volume formulas to solve simple or routine problems. Students identify line of best fit or determine patterns of association in bivariate data.