

ISAT Mathematics Performance Definitions

Grade 8

EXCEEDS STANDARDS

Eighth-grade students at the exceeds standards level are able to demonstrate knowledge of numbers to solve a wide variety of practical problems involving whole numbers, percents, proportions and exponents. They have a solid conceptual understanding of the interrelationships among fractions, decimals and percents and their connections with proportions. These students are able to apply their knowledge of primes, factors, divisors, multiples common factors and common multiples in solving problems. They can apply these skills in combination with estimation and rounding to predict reasonable solutions to multi-step complex problems. These students are able to recognize and apply patterns in various ways.

Eighth-grade students at the exceeds standards level can consistently apply geometric formulas to determine perimeter, area, surface area and volume. These students are able to reliably measure and estimate measures to a specified level of accuracy. They can apply their knowledge of proportion and scale to a complex drawing or situation.

Algebraically, eighth-grade students at the exceeds standards level are able to translate a relationship into symbols and solve multi-step equations involving rational numbers. They can evaluate formulas and expressions involving the four fundamental operations with rational numbers. They are also capable of graphing inequalities on a number line or a coordinate plane. These students can interpret the slope of a line in various ways.

Geometrically, eighth-grade students at the exceeds standards level can apply properties of two- and three-dimensional figures, including similar and congruent figures and apply the Pythagorean Theorem in a variety of settings. They can recognize and apply translations, reflections and rotations using a variety of figures with or without coordinates. These students can demonstrate knowledge of relationships of parallel, perpendicular, similarity, congruency and symmetry between and within geometric figures and models.

Eighth-grade students at the exceeds standards level are capable of reading and interpreting complex statistical graphs, charts and tables. In addition, they are capable of calculating the probability and/or odds of a given event by constructing a sample space or computing using counting theory and identifying favorable outcomes for complex problems, and they are also able to make predictions from these results.

MEETS STANDARDS

Eighth-grade students at the meets standards level are able to demonstrate knowledge of numbers to solve practical problems that involve integers, decimals, fractions, percents and proportions with or without a calculator. They can conceptualize interrelationships among fractions, decimals and percents and their connections with proportions. They also understand variables and solve equations using one variable. These students are able to use their knowledge of primes, factors, divisors, multiples, common factors and common multiples in solving problems. These students can establish ratios and relate them to proportions in common problem settings with which they are familiar. Their grasp of percentages allows them to handle simple situations that involve each type of percent usage such as determining interest, sales tax or commissions. They function competently in routine settings and those that require minimal extensions from their previous experiences.

Eighth-grade students at the meets level can apply their geometric knowledge by making conversions between units of mass and capacity within a measurement system and calculate the surface area and volume of standard rectangular solids. Students can use proportions and interpret a simple scale drawing.

Algebraically, eighth-grade students at the meets level can solve simple equations of one- or two-step equations that have integral or simple rational solutions. They can also evaluate algebraic expressions using order of operations and implied multiplication procedures. Students can evaluate formulas and expressions that involve natural number exponents. They can graph a given line with integral coefficients on a coordinate plane. These students predict solutions to equations and numerical problems using estimation, rounding or mental mathematics to determine their response.

Geometrically, eighth-grade students at the meets level can apply relationships that involve lines, angles and two-dimensional shapes in a variety of settings. They can classify triangles by angles and sides and draw conclusions from the relationships of parallel and perpendicular lines within common figures. Students can apply the Pythagorean Theorem in common settings most of the time.

Eighth-grade students at the meets level can generalize from data tables, lists and graphs to predict future values and estimate values between given values. They can calculate mean, median, mode and range and make simple decisions about the effect of a change in data on those measures. They exhibit a basic understanding of relative frequency probability involving common objects or games. They can determine the probability of a simple event and apply simple counting theory to a situation.

BELOW STANDARDS

Eighth-grade students at the below standards level are able to apply numerical knowledge to identify and use the correct fundamental operation for simple one- and two-step problems that involve whole numbers. They can deal with practical mathematical situations that arise from the students own experience. These students understand place value but frequently make mistakes using order of operations, and they have some understanding of basic operations with simple fractions that have common or easily converted denominators. They can express simple common ratios but lack the ability to construct related proportions. These students are able to determine the reasonableness of given estimates and some solutions to numerical problems. They can use a calculator for simple numerical operations.

Eighth-grade students at the below standards level can make conversions between units of length within either the customary or metric system if they are given the formula. They know and are able to apply geometric formulas for perimeters and areas of simple geometric figures and can extend the use of these formulas to rectangular three-dimensional settings some of the time. They frequently cannot distinguish between surface area and volume situations. Students have a beginning conceptual knowledge of how to construct a simple scale drawing for a given situation. They can use scale to answer questions that require only simple ratios.

Algebraically, eighth-grade students at the below standards level are inconsistent when translating into symbols and solving one-step equations that involve the four basic operations. They can evaluate formulas and expressions that apply these four operations to whole numbers. These students are inconsistent in plotting ordered pairs of integers on a coordinate plane. They do recognize basic patterns.

Geometrically, eighth-grade students at the below standards level can identify, compare and contrast the basic concepts of congruence, parallel, perpendicular and symmetry within common two-dimensional figures, but they are not necessarily able to apply them to a problem situation that is more complex than a simple drawing. They tend not to know the Pythagorean Theorem.

Eighth-grade students at the below standards level are sometimes capable of organizing, interpreting and analyzing data from provided surveys, tables or graphs. They can perform simple experiments in probability and describe the results.

ACADEMIC WARNING

Numerically, eighth-grade students at the academic warning level are only able to identify and use the correct fundamental operation for one-step problems that involve whole numbers. They can begin to deal with practical mathematical situations that arise from their own experience. These students understand whole number place value and order of operations of whole numbers, but they have very little understanding of basic operations with simple fractions that have common denominators. They have difficulty expressing simple common ratios. These students are able to determine the reasonableness of some given estimates.

Eighth-grade students at the academic warning level can begin to make conversions between units of length in a customary system if they are provided with the formula. They are able to apply formulas for perimeters and areas of simple geometric figures if given the formula; however, they may make an error in the computation.

Algebraically, eighth-grade students at the indicates academic warning level can translate into symbols and begin to solve simple one-step equations that involve the four basic whole number operations. These students can plot ordered pairs of integers on a coordinate plane in Quadrant I but may switch the order (x, y) .

Geometrically, eighth-grade students at the indicates academic warning level can sort, identify, and compare the basic concepts of parallel and perpendicular within and/or between common two-dimensional objects.

Eighth-grade students at the academic warning level can begin to interpret simple graphs from given data. They understand the meaning of average and can compute simple means using a calculator. Predictions are inconsistently made from given data. They can perform simple experiments in probability.