

Grade 10 Mathematics

The grade 10 mathematics assessment presents a variety of items representing the six strands of the Wisconsin Model Academic Standards for Mathematics: Mathematical Processes (*Reasoning, Communication, Connections, Representation, Problem Solving*), Number Operations and Relationship, Geometry, Measurement, Statistics and Probability, and Algebraic Relationships. Assessment items in each category may appear without context and within the context of real-world situations. All test items are either selected-response (multiple-choice) or constructed response format. Some items require the use of mathematical tools including a protractor, a ruler with 1/16 inch and millimeter intervals, and calculators (scientific or graphing calculator availability is required for most sessions of the test). Students performing at each level draw on a broad range of mathematical knowledge while applying skills and strategies to solve real-world and nonroutine mathematical problems. Each proficiency level presumes mastery at previous levels.

Advanced (595 and above)

At the beginning of tenth grade, students performing at the Advanced level convey mathematical ideas using the vocabulary of mathematics by providing detailed written communication about the reasonableness of their conclusions based upon calculations, models, arguments, the Pythagorean Theorem, logical reasoning and data analysis. Students use reasoning and logic to explain the validity of conclusions, determine extraneous information in problems, and verify and explain mathematical conjectures. They analyze and solve problems using percents by applying proportional reasoning. Students describe transformations of complex figures, and reflect geometric figures over any line of symmetry on a coordinate plane. They classify geometric figures using properties and theorems, evaluate the validity of geometric statements using logical reasoning and analyze geometric relationships on two-dimensional coordinate systems. Students apply properties of parallel lines and locate intercepts of linear and quadratic equations without a calculator. They convert between multiple units of measurement in mathematical and real-world contexts, calculate the value of an angle using angle relationships, and apply triangle congruence theorems. Students use measuring tools to solve multi-step problems and determine the areas of two and three-dimensional figures. Students apply the Pythagorean Theorem to solve problems and use midpoint and distance formulas in mathematical and real-world contexts. Students draw conclusions regarding the effects of outliers in a set of data, create scatter plots with appropriate scales and labels, and analyze the data. They compare and analyze box-and-whisker plots, identify appropriate ranges of values using standard deviation and calculate the probability or number of outcomes of an event with or without replacement using the fundamental counting principles. Students generalize patterns of various sequences, write linear equations when given the coordinates of two points, translate verbal problems into linear or quadratic equations, and solve problems using algebraic methods.

Proficient
(541-594)

At the beginning of tenth grade, students performing at the Proficient level convey mathematical ideas in a variety of ways and provide justifications and details to support their solutions and reasoning. Students solve a variety of problems using familiar percents. They locate and plot coordinates of geometric figures transformed in a coordinate plane and apply angle relationships in a circle to solve real-world problems. Students use the Pythagorean Theorem and distance and mid-point formulas. They convert between units of measurement, apply tools of measurement to solve problems, and calculate the area of two-dimensional shapes. Students determine missing information using Venn diagrams, create scatter plots with appropriate scales and labels, and interpret the graph of quadratic relationships between two real-world quantities. They solve multi-step linear and non-linear equations and inequalities. They determine and extend patterns involving real-world contexts.

Basic
(516 – 540)

At the beginning of tenth grade, students performing at the Basic level identify information necessary to solve real-world problems, represent mathematical ideas in real-world situations, provide justification, and test and communicate the reasonableness of solutions. Students add, subtract, multiply and divide integers and use appropriate properties when solving problems. They identify similar geometric figures using ratios, recognize supplementary angle relationships, and determine the missing length of a right triangle. Students select and use appropriate tools of measure, approximate linear and area measurements, and convert between US customary and metric systems. Students analyze the relationship between graphic representations of two sets of real-world linear and non-linear data; select appropriate sample sets for surveys; calculate probability for a single event; and predict values beyond the range of a linear graph. Students describe relationships among variable quantities; translate real-world data into algebraic equations with two variables; and determine slope of a line. They translate verbal expressions into algebraic expressions with one variable and demonstrate the use of algebraic properties to solve multi-step linear equalities and inequalities.

Minimal Performance
(515 and below)

At the beginning of tenth grade, students performing at the Minimal Performance level use simple explanations to support their conclusions. Students order real numbers, and add and subtract decimals without the use of a calculator. Students classify two and three-dimensional figures, identify corresponding parts of congruent figures, and determine the location of ordered pairs in a four-quadrant coordinate system. Students select appropriate units of measurement,

convert within US customary or metric systems, use appropriate tools and techniques to measure to the nearest unit, and estimate area when given a reference. Students interpret data from tables and linear graphs, including constant functions; determine mean, median, mode and range of an even or odd set of data; and predict the likelihood of a single event. Students apply associative, commutative or distributive properties to solve multi-step algebraic equations.