



# **Grade 8 Mathematics Assessment**

## **Eligible Texas Essential Knowledge and Skills**

# STAAR Grade 8 Mathematics Assessment

## Mathematical Process Standards

**These student expectations will not be listed under a separate reporting category. Instead, they will be incorporated into test questions across reporting categories since the application of mathematical process standards is part of each knowledge statement.**

- (8.1) **Mathematical process standards.** The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to
- (A) apply mathematics to problems arising in everyday life, society, and the workplace;
  - (B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;
  - (C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;
  - (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
  - (E) create and use representations to organize, record, and communicate mathematical ideas;
  - (F) analyze mathematical relationships to connect and communicate mathematical ideas; and
  - (G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

## Reporting Category 1: Numerical Representations and Relationships

The student will demonstrate an understanding of how to represent and manipulate numbers and expressions.

- (8.2) **Number and operations.** The student applies mathematical process standards to represent and use real numbers in a variety of forms. The student is expected to
- (A) extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers; **Supporting Standard**
  - (B) approximate the value of an irrational number, including  $\pi$  and square roots of numbers less than 225, and locate that rational number approximation on a number line; **Supporting Standard**
  - (C) convert between standard decimal notation and scientific notation; and **Supporting Standard**
  - (D) order a set of real numbers arising from mathematical and real-world contexts. **Readiness Standard**

## Reporting Category 2: Computations and Algebraic Relationships

The student will demonstrate an understanding of how to perform operations and represent algebraic relationships.

- (8.4) **Proportionality.** The student applies mathematical process standards to explain proportional and non-proportional relationships involving slope. The student is expected to
- (A) use similar right triangles to develop an understanding that slope,  $m$ , given as the rate comparing the change in  $y$ -values to the change in  $x$ -values,  $(y_2 - y_1)/(x_2 - x_1)$ , is the same for any two points  $(x_1, y_1)$  and  $(x_2, y_2)$  on the same line; **Supporting Standard**
  - (B) graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship; and **Readiness Standard**
  - (C) use data from a table or graph to determine the rate of change or slope and  $y$ -intercept in mathematical and real-world problems. **Readiness Standard**
- (8.5) **Proportionality.** The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. The student is expected to
- (A) represent linear proportional situations with tables, graphs, and equations in the form of  $y = kx$ ; **Supporting Standard**
  - (B) represent linear non-proportional situations with tables, graphs, and equations in the form of  $y = mx + b$ , where  $b \neq 0$ ; **Supporting Standard**
  - (E) solve problems involving direct variation; **Supporting Standard**
  - (F) distinguish between proportional and non-proportional situations using tables, graphs, and equations in the form  $y = kx$  or  $y = mx + b$ , where  $b \neq 0$ ; **Supporting Standard**
  - (G) identify functions using sets of ordered pairs, tables, mappings, and graphs; **Readiness Standard**
  - (H) identify examples of proportional and non-proportional functions that arise from mathematical and real-world problems; and **Supporting Standard**

- (I) write an equation in the form  $y = mx + b$  to model a linear relationship between two quantities using verbal, numerical, tabular, and graphical representations. **Readiness Standard**
- (8.8) **Expressions, equations, and relationships.** The student applies mathematical process standards to use one-variable equations or inequalities in problem situations. The student is expected to
- (A) write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants; **Supporting Standard**
- (B) write a corresponding real-world problem when given a one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants; and **Supporting Standard**
- (C) model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants. **Readiness Standard**
- (8.9) **Expressions, equations, and relationships.** The student applies mathematical process standards to use multiple representations to develop foundational concepts of simultaneous linear equations. The student is expected to
- (A) identify and verify the values of  $x$  and  $y$  that simultaneously satisfy two linear equations in the form  $y = mx + b$  from the intersections of the graphed equations. **Supporting Standard**

## Reporting Category 3: Geometry and Measurement

The student will demonstrate an understanding of how to represent and apply geometry and measurement concepts.

- (8.3) **Proportionality.** The student applies mathematical process standards to use proportional relationships to describe dilations. The student is expected to
- (A) generalize that the ratio of corresponding sides of similar shapes are proportional, including a shape and its dilation;  
**Supporting Standard**
  - (B) compare and contrast the attributes of a shape and its dilation(s) on a coordinate plane; and **Supporting Standard**
  - (C) use an algebraic representation to explain the effect of a given positive rational scale factor applied to two-dimensional figures on a coordinate plane with the origin as the center of dilation.  
**Readiness Standard**
- (8.6) **Expressions, equations, and relationships.** The student applies mathematical process standards to develop mathematical relationships and make connections to geometric formulas. The student is expected to
- (A) describe the volume formula  $V = Bh$  of a cylinder in terms of its base area and its height; and **Supporting Standard**
  - (C) use models and diagrams to explain the Pythagorean theorem.  
**Supporting Standard**
- (8.7) **Expressions, equations, and relationships.** The student applies mathematical process standards to use geometry to solve problems. The student is expected to
- (A) solve problems involving the volume of cylinders, cones, and spheres; **Readiness Standard**
  - (B) use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prisms, triangular prisms, and cylinders; **Readiness Standard**
  - (C) use the Pythagorean theorem and its converse to solve problems; and **Readiness Standard**

- (D) determine the distance between two points on a coordinate plane using the Pythagorean theorem. **Supporting Standard**
- (8.8) **Expressions, equations, and relationships.** The student applies mathematical process standards to use one-variable equations or inequalities in problem situations. The student is expected to
- (D) use informal arguments to establish facts about the angle sum and exterior angle of triangles, the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. **Supporting Standard**
- (8.10) **Two-dimensional shapes.** The student applies mathematical process standards to develop transformational geometry concepts. The student is expected to
- (A) generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane; **Supporting Standard**
- (B) differentiate between transformations that preserve congruence and those that do not; **Supporting Standard**
- (C) explain the effect of translations, reflections over the  $x$ - or  $y$ -axis, and rotations limited to  $90^\circ$ ,  $180^\circ$ ,  $270^\circ$ , and  $360^\circ$  as applied to two-dimensional shapes on a coordinate plane using an algebraic representation; and **Readiness Standard**
- (D) model the effect on linear and area measurements of dilated two-dimensional shapes. **Supporting Standard**

## Reporting Category 4: Data Analysis and Personal Financial Literacy

**The student will demonstrate an understanding of how to represent and analyze data and how to describe and apply personal financial concepts.**

- (8.5) **Proportionality.** The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. The student is expected to
- (C) contrast bivariate sets of data that suggest a linear relationship with bivariate sets of data that do not suggest a linear relationship from a graphical representation; and **Supporting Standard**
  - (D) use a trend line that approximates the linear relationship between bivariate sets of data to make predictions. **Readiness Standard**
- (8.11) **Measurement and data.** The student applies mathematical process standards to use statistical procedures to describe data. The student is expected to
- (A) construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data; and **Supporting Standard**
  - (B) determine the mean absolute deviation and use this quantity as a measure of the average distance data are from the mean using a data set of no more than 10 data points. **Supporting Standard**
- (8.12) **Personal financial literacy.** The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to
- (A) solve real-world problems comparing how interest rate and loan length affect the cost of credit; **Supporting Standard**
  - (C) explain how small amounts of money invested regularly, including money saved for college and retirement, grow over time; **Supporting Standard**
  - (D) calculate and compare simple interest and compound interest earnings; and **Readiness Standard**



- (G) estimate the cost of a two-year and four-year college education, including family contribution, and devise a periodic savings plan for accumulating the money needed to contribute to the total cost of attendance for at least the first year of college.

***Supporting Standard***