STAAR
State of Texas Assessments of Academic Readiness

Grade 8 Mathematics Assessment

Eligible Texas Essential Knowledge and Skills

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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 π 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°, 180°, 270°, and 360° 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