DEPARTMENT of EDUCATION
Louisiana Believes

Practice Test Item Analysis
Grade 8

This Item Analysis is provided so that teachers, parents, and students may gain a better understanding of the Grade 8 LEAP math test structure and the Common Core State Standards (CCSS) as applied to assessment. The table below is organized by practice test sequence number, CCSS, rationale for alignment, and connection to the practice test. The CCSS is the standard to which the item is aligned. The rationale for alignment explains an item's alignment to the standard listed. The language of the standards, any clarifications and/or tables offered by the CCSS, and the progression documents published by the University of Arizona were used when aligning items to the CCSS. The final column highlights specific qualities in each practice test item which adhere the rationale for alignment. The practice test can be found here, and a detailed explanation of assessment structure can be found here.

Sequence Number	CCSS	Rationale for Alignment	Connection to the Practice Test
1	8.F.A.1	Language of the standard: "Understand that a function is a rule that assigns to each input exactly one output."	Recognize the relationship that is not a function because the last input has more than one output.
2	8.G.A.3	Language of the standard: "Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates."	Identify the coordinates of the image of the triangle after it is rotated 90º clockwise about the origin.
3	8.EE.A.2	Language of the standard: "Evaluate square roots of small perfect squares."	Evaluate $\sqrt{81}$.
4	8.G.A.4	Language of the standard: "Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations."	Identify the image of the original rectangle after it is rotated and dilated as a similar rectangle.
5	8.SP.A.1	Language of the standard: "Interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association."	Given one data category, identify which bivariate measurement data would most likely result in a negative association.
6	8.G.A.1b	Language of the standard: "Verify experimentally the properties of rotations, reflections, and translations: b. Angles are taken to angles of the same measure."	Recognize that the angle measure will remain the same after a rotation.
7	8.F.B.5	Language of the standard: "Sketch a graph that exhibits the qualitative features of a function that has been described verbally."	Given an ordered verbal description, identify the graph showing a steady pace due to no incline or decline, decrease in pace due to incline, and increase in pace due to decline.

8	8.EE.A.2	Language of the standard: "Evaluate square roots of small perfect squares."	Recognize 121 as a perfect square.
9	8.G.A.3	Language of the standard: "Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates."	Given a graph of the original rectangle and a set of conditions involving a rotation, identify a specific coordinate point for the image described.
10	8.F.B.5	Language of the standard: "Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally."	Given a picture and verbal description, identify the correct graph showing a sharp increase in speed to represent the decline; a relatively steady decrease in speed to represent the incline; a very sharp increase in speed to represent the decline; a slow decrease in speed to represent the slight incline; and an increase in speed to represent the slight decline.
11	8.EE.A.3	Language of the standard: "Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large quantities."	Express 30,000,000 in scientific notation.
12	8.EE.A.1	Language of the standard: "Know and apply the properties of integer exponents to generate equivalent numerical expressions." Similar to the example given in the standard.	Recognize $\left(9^{-2}\right)^{8}$ as equivalent to the expression $\frac{1}{9^{16}}$.
13	8.EE.A.3	Language of the standard: "Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very small quantities."	Express 5×10^{-4} in standard notation.
14	8.NS.A.2	Language of the standard: "Use rational approximations of irrational numbers to compare the size of irrational numbers, and estimate the value of expressions (e.g., π^2)." Similar to the example given in the standard.	Compare $\sqrt{2}$ and $\frac{\pi}{2}$ using the rational approximation of 1.5.
15	8.NS.A.2	Language of the standard: "Locate them approximately on a number line diagram."	Identify the approximate location of $\sqrt{6}$ on a number line.

16	8.G.A.2	Language of the standard: "Given two congruent figures, describe a sequence that exhibits the congruence between them."	Given a quadrilateral and its image, identify the correct sequence of transformations. The quadrilateral is first reflected over the x-axis, and then rotated 180º counterclockwise about the origin.
17	8.SP.A.1	Language of the standard: "Interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association."	Recognize that the given scatter plot shows no relationship between the bivariate data.
18	8.EE.A.1	Language of the standard: "Know and apply the properties of integer exponents to generate equivalent numerical expressions." Similar to the example given in the standard.	Recognize $5^4 \times 5^{-6}$ as equivalent to $\frac{1}{25}$.
19	8.EE.B.6	Language of the standard: "Use similar triangles to explain why the slope *m* is the same between any two distinct points on a non-vertical line in the coordinate plane."	Explain that the reason the slopes of the hypotenuses of the triangles are the same, is because the triangles are similar.
20	8.NS.A.2	Language of the standard: "Use rational approximations of irrational numbers to compare the size of irrational numbers."	Recognize that $\sqrt{18}$ is between the rational numbers 4 and 4.5.
21	8.G.A.3	Language of the standard: "Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates."	Given a graph of the original rectangle, determine the coordinates of the image after dilation, and then a rotation.
22	8.EE.B.5	Language of the standard: "Graph proportional relationships, interpreting the unit rate as the slope of the graph."	Interpret the interval with a steeper slope as having the unit rate representing greater rain fall.
23	8.EE.A.2	Language of the standard: "Evaluate square roots of small perfect squares."	Evaluate $\sqrt{64}$.
24	8.F.A.1	Language of the standard: "Understand that a function is a rule that assigns to each input exactly one output."	Recognize the set of ordered pairs that has exactly one output for each input.
25	8.EE.A.4	Language of the standard: "Perform operations with numbers expressed in scientific notation."	Subtract $7.4 \times 10^5 - 8.9 \times 10^3$.
26	8.NS.A.1	Language of the standard: "Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion."	Identify the irrational number as the one with a decimal expansion that does not repeat or terminate.

27	8.EE.B.6	Language of the standard: "Derive the equation $y = mx$ for a line through the origin."	Derive the equation for the line that would connect the points shown.
28	8.EE.A.2	Language of the standard: "Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number."	Recognize the expression $\sqrt[3]{36}$ as the solution to the equation $x^3 = 36$.
29	8.G.B.6	Language of the standard: "Explain a proof of the Pythagorean Theorem and its converse."	Recognize the correct diagram to prove a triangle as a right triangle (converse of the Pythagorean Theorem).
30	8.G.A.2	Language of the standard: "Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations."	Given the graph of a rectangle and two coordinates for the image, determine the remaining two coordinates that would describe a congruent image.
31	8.F.A.2	Language of the standard: "Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions)."	Using the graph of a function with $b = -3$ and $m = -\frac{1}{2}$, identify an equation with $b = -3$ and $m = \frac{1}{2}$.
32	8.G.C.9	Language of the standard: "Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems."	Calculate the exact volume of the cone shown.
33	8.SP.A.3	Language of the standard: "Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept." Similar to the example given in the standard.	Using the equation for a scatter plot, interpret the slope (-1.6) as using 1.6 ounces of detergent for each load of laundry. The equation of a linear model used is within a context for bivariate measurement data.
34	8.F.A.2	Language of the standard: "Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions)." Similar to the example given in the standard.	Compare the slope of Function A given in equation form to the slope of Function B given in table form.

35	8.SP.A.4	Language of the standard: "Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables."	Identify a two-way table which shows the data where the relative frequency of ordering a gold sweatshirt is half the relative frequency of ordering a purple sweatshirt.
36	8.G.B.7	Language of the standard: "Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions."	Given measurements for length and width, find the exact measure of the diagonal line drawn across the page.
37	8.F.B.5	Language of the standard: "Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear)."	Describe the function shown in the graph as nonlinear and always increasing.
38	8.G.A.5	Language of the standard: "Use informal arguments to establish facts about the angles created when parallel lines are cut by a transversal."	Recognize that angles 1 and 7 are supplementary and identify the equation which represents this relationship.
39	8.F.A.3	Language of the standard: "Interpret the equation $y = mx + b$ as defining a linear function."	Identify the equation $y = xy + 2$ as not a linear function because it cannot be written in the form $y = mx + b$.
40	8.SP.A.1	Language of the standard: "Interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association."	Identify the pattern in the scatter plot shown as having a negative association because the number of baseballs decreases as practice time increases.
41	8.EE.C.7	Language of the standard: "Solve linear equations in one variable. a. Give examples of linear equations in one variable with infinitely many solutions."	Identify the equation having infinitely many solutions.
42	8.F.A.5	Language of the standard: "Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear)."	Recognize the interval with the steepest slope as representing the fastest jogging speed. Identify this interval.

43	8.F.A.2	Language of the standard: "Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions)." Similar to the example given in the standard.	Recognize the rate in the equation (14) is twice the rate in the table (7).
44	8.EE.C.7	Language of the standard: "Solve linear equations in one variable. b. Solve linear equations with rational number coefficients, including equations whose solutions require collecting like terms."	Solve the equation given by combining like terms, subtracting 16 from both sides, and dividing both sides by $1\frac{5}{6}$ or multiplying by the reciprocal $\frac{6}{11}$.
45	8.EE.C.8a	Language of the standard: "Analyze and solve pairs of simultaneous linear equations. a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously."	Identify the solution to the system of equations shown in the graph as the point of intersection $(-5,-4)$.
46	8.EE.A.4	Language of the standard: "Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Interpret scientific notation that has been generated by technology."	Divide $(1.6\times10^{11}\div0.75)$. If students use a calculator (allowed in this session), they will have to interpret scientific notation that has been generated by technology.
47	8.G.A.3	Language of the standard: "Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates."	Recognize that angle degrees of an image are congruent to the original when dilated.
48	8.F.A.3	Language of the standard: "Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear."	Identify the correct function written without exponents as non-linear because it cannot be written in the form $y = mx + b$.
49	8.F.A.1	Language of the standard: "The graph of a function is the set of ordered pairs consisting of an input and the corresponding output."	Identify the set of ordered pairs graphed that can satisfy the function described.

50	8.EE.C.7	Language of the standard: "Solve linear equations in one variable. b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms."	Solve the equation $\frac{1}{3}(x+2)=\frac{2}{3}x+4$ for *x*, by using the distributive property, combining like terms, and applying inverse operations.
51	8.F.A.2	Language of the standard: "Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions)."	Compare the slope of the function in the graph (-1.5) and the slope of the function in the table (-1.25) by finding the difference of the two slopes.
52	8.SP.A.3	Language of the standard: "Use the equation of a linear model to solve problems in the context of bivariate measurement data."	Use the linear model of the scatter plot shown make valid predictions about certain cases, such as how many pages could be read in 12 hours.
53	8.SP.A.4	Language of the standard: "Interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables."	Using a two-way table, determine the relative frequency of people choosing pie, but not ice cream.
54	8.G.C.9	Language of the standard: "Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems."	Calculate the approximate volume of 36 cans with the given dimensions.
55	8.EE.B.5	Language of the standard: "Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways." Similar to the example given in the standard.	Interpret how the unit rate shown in the table ($6.15) affects the output over time versus how the unit rate shown in the graph ($7.15) affects the output over time. $1 more per month will be $30 more after 30 months.
56	8.F.A.3	Language of the standard: "Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line."	Identify the table having data that can be modeled in the equation $y = mx + b$ and graphs a straight line.

57	8.F.A.2	Language of the standard: "Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions)."	Recognize that the function in the table and the function represented by the linear equation each describe a horizontal line, with slope of zero. The functions have different y-intercepts, so the lines can never be the same line and never intersect.
58	8.EE.C.8c	Language of the standard: "Analyze and solve pairs of simultaneous linear equations. c. Solve real-world and mathematical problems leading to two linear equations in two variables."	Given two linear equations in two variables and written context, find the value for *x* that will be the solution for the system.
59	8.G.C.8	Language of the standard: "Apply the Pythagorean Theorem to find the distance between two points in a coordinate system."	Recognize the scale for each axis is 2, and use the horizontal (5 units) and vertical (11 units) distances between the points and the Pythagorean Theorem to calculate the length of the hypotenuse (shortest distance between the two points).
60	8.G.A.3	Language of the standard: "Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates."	Identify the graph showing the image of the parallelogram after being translated up 5 units.
61	8.F.B.4	Language of the standard: "Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (*x*, *y*) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values."	Calculate the initial value, *y*-intercept, in terms of the situation it models. Determine the rate of change from the description, and construct a function to model the relationship between *y* money saved after *x* days. Explain how the rate of change affects the output. Recognize that the constant rate of change will create a line if graphed.

62	8.SP.A.2	Language of the standard: "Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line."	Create a line of best fit for the scatter plot shown. Describe how the outlier (3, 6) affects the line of best fit.
	8.SP.A.3	Language of the standard: "Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept." Similar to the example given in the standard.	Interpret the meaning of the *y*-intercept of the line of best fit. Recognize the constraints of the model; game time is finite.
63	8.EE.C.7	Language of the standard: "Solve linear equations in one variable. a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms."	Solve the equation $\frac{2}{3}(3x+2) = zx$ for x, when $z = 1$. Find a value for z that would yield no solution for x. Explain why "infinitely many solutions" can never be possible for this equation.
64	8.G.B.7	Language of the standard: "Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions."	Determine the diagonal distance of the base of the box, 15 inches, using the Pythagorean Theorem. Use this distance and the height of the box as legs to determine the length of the hypotenuse (length of baton), 17 inches. Find Olivia's error. Derive a general equation that can be used to determine the length of a diagonal in a rectangular prism.