

Chapter 2: *i*LEAP Math, Grade 6

This section describes the overall design of the *i*LEAP Math test to be administered to students in grade 6. Details, specifications, sample test questions, and scoring rubrics are provided so that teachers may align classroom practices with the state assessment.

Test Structure

The Math test consists of four parts, or subtests, and is administered in a single day.

Part 1: NRT (Estimation)

Part 3: CRT (Multiple Choice)

Part 2: NRT (Multiple Choice)

Part 4: CRT (Constructed Response)

The Math test includes:

- Norm-referenced test (NRT) items from the survey battery (short form) of the Iowa Tests of Basic Skills® (ITBS). Most of the items measure Louisiana Grade-Level Expectations (GLEs). The survey battery is used to provide national norms.
- Criterion-referenced test (CRT) items. These items are aligned with Louisiana GLEs and were specifically developed to measure GLEs not assessed by NRT items.

Item Types

The test has sixty (60) multiple-choice items and two constructed-response items.

The multiple-choice items consist of an interrogatory stem and four answer options. These items assess a student's knowledge and conceptual understanding, and responses will be scored 1 if correct and 0 if incorrect.

The constructed-response items, which involve a number of separate steps and application of multiple skills, are designed to assess one or more of the GLEs/benchmarks/strands. These items are scored, according to an item-specific rubric, on a scale of 0 to 4 points.

The NRT Component

The ITBS survey battery is the NRT component of the *i*LEAP Math assessment. Sample questions that show what the questions are like and show how to mark answers are provided at the beginning of each subtest. This part of the assessment measures aspects of the six Mathematics strands.

Strand N: Number and Number Relations

Standard: In problem-solving investigations, students demonstrate an understanding of the real number system and communicate the relationships within that system using a variety of techniques and tools.

Strand A: Algebra

Standard: In problem-solving investigations, students demonstrate an understanding of concepts and processes that allows them to analyze, represent, and describe relationships among variable quantities and to apply algebraic methods to real-world situations.

Strand M: Measurement

Standard: In problem-solving investigations, students demonstrate an understanding of the concepts, processes, and real-life applications of measurement.

Strand G: Geometry

Standard: In problem-solving investigations, students demonstrate an understanding of geometric concepts and applications involving one-, two-, and three-dimensional geometry, and justify their findings.

Strand D: Data Analysis, Probability, and Discrete Math

Standard: In problem-solving investigations, students discover trends, formulate conjectures regarding cause-and-effect relationships, and demonstrate critical thinking skills in order to make informed decisions.

Strand P: Patterns, Relations, and Functions

Standard: In problem-solving investigations, students demonstrate an understanding of patterns, relations, and functions that represent and explain real-world situations.

The survey battery is designed to 1) obtain information that can support instructional decisions made by teachers in the classroom, 2) provide information to students and their parents for monitoring student growth from grade to grade, and 3) examine the yearly progress of grade groups as they pass through the school's curriculum. All questions are in multiple-choice format and have four answer options each. The survey battery is a **timed** test. Table 9 presents the testing times and the number of questions for each part, or subtest.

Table 9: Grade 6 Survey Battery Test Lengths and Times

Test	Time (min.)	No. of Questions
Part 1 Estimation	3	5
Part 2 Concepts and Problems	22	25
Total	25	30

The descriptions that follow briefly summarize the content and skills measured by each test of the survey battery.

Part 1 is a **timed** test on computational estimation and number sense. Problems are presented with and without an applied context, and each requires the use of one of several rounding or estimation methods. Calculators are **not** permitted on this part of the test.

Part 2 consists of questions that test students’ understanding of mathematical concepts—number properties and operations, measurement, probability, and statistics—as well as problem solving and data interpretation. Word problems included in this **timed** test require one or more steps to solve, each involving somewhat different skills. In some cases, students select an appropriate method or approach rather than compute an answer. For some questions, data are presented in tables and graphs and students use the data displays to obtain information, compare quantities, and determine trends and relationships. Calculators may be used on this part of the test.

The CRT Component

The CRT component of the Math assessment was developed specifically for Louisiana. Committees of Louisiana educators reviewed all items for content and alignment with Louisiana’s content standards, benchmarks, and GLEs. Separate committees reviewed the items for potential bias and sensitive material. The CRT component of the Math assessment includes both multiple-choice and constructed-response items. As does the NRT component, this part of the test measures aspects of the six mathematics strands. Students are given a Mathematics Reference Sheet to consult as a reference. Calculators may be used on parts 3 and 4 of the test.

Part 3 consists of questions comparable to part 2. Multiple-choice items measuring students’ mathematical skills and knowledge in realistic contexts were developed specifically to address Louisiana GLEs.

This part of the Math test is **untimed**, but students should be given about seventy-five (75) minutes to answer the questions.

Part 4 consists of two relatively complex constructed-response items that involve a number of separate steps and require application of multiple skills. The constructed-response items are designed to assess one or more of the strands, benchmarks, and/or GLEs that require students to *demonstrate the connection of the strand to the other strands and to real-life situations*. The response format for part 4 is open-ended and may include numerical answers, short written answers, and other types of constructed response (e.g., draw a graph or geometrical pattern). Students may be required to explain in writing how they arrived at their answers.

This part of the Math test is **untimed**, but students should be given about thirty (30) minutes to answer the questions.

Scoring Information for Constructed-response Items

The constructed-response items are scored, according to an item-specific rubric, from 0 to 4 points.

General Scoring Rubric for iLEAP Math Constructed-response Items

4	The student's response demonstrates in-depth understanding of the relevant content and/or procedures. The student completes all important components of the task and communicates ideas effectively. Where appropriate, the student offers insightful interpretations and/or extensions. Where appropriate, the student uses more sophisticated reasoning and/or efficient procedures.
3	The student completes most important aspects of the task accurately and communicates clearly. The response demonstrates an understanding of major concepts and/or processes, although less important ideas or details may be overlooked or misunderstood. The student's logic and reasoning may contain minor flaws.
2	The student completes some parts of the task successfully. The response demonstrates gaps in the conceptual understanding.
1	The student completes only a small portion of the tasks and/or shows minimal understanding of the concepts and/or processes.
0	The student's response is incorrect, irrelevant, too brief to evaluate, or blank.

Calculator Recommendations and Restrictions

It is recommended that a calculator be made available to **each** student for instructional and assessment purposes. As with all instructional materials, each individual district and school should determine which calculator best supports its mathematics curriculum and instructional program.

Calculators recommended for instruction and assessment:

- K–4 students: four-function calculator
- 5–8 students: scientific calculator
- 9–12 students: scientific calculator with graphing capabilities

Calculators not permitted on statewide assessment:

- handheld or laptop computers
- pocket organizers
- calculators with paper tape
- calculators that talk or make noise
- calculators with QWERTY (typewriter-style) keypads
- electronic writing pads or pen input devices

Math Test Specifications

Table 10 provides the test specifications for parts 1, 2, and 3 of the grade 6 *iLEAP* Math assessment. The values in the table are approximations due to slight variations in the content across test forms at grade 6.

Table 10: Grade 6 Math Test Specifications

Strands	% of Total Points
Number and Number Relations	30
Algebra	15
Measurement	13
Geometry	13
Data Analysis, Probability, and Discrete Math	15
Patterns, Relations, and Functions	14
Total	100

Sixty 1-point MC items plus two 4-point constructed-response items equals a 68-point test.

Key Concepts for the Grade 6 Assessment

The grade 6 year is important for students because it is a year of mathematics consolidation and foundation building. During the year, students continue to work with rational numbers in both fraction and decimal forms and begin to develop a solid basis for work with rates, ratios, and proportions. In Measurement, their focus is mastery of the perimeter and areas of triangles and quadrilaterals. Students estimate measures based upon an intuitive sense of relative sizes of common units. In Geometry, the students extend their knowledge of two-dimensional figures to three-dimensional counterparts, as well as apply concepts and properties related to basic geometry vocabulary and angle measures in real-life situations. Students make and test predictions regarding tessellations and use coordinate geometry in the first quadrant to locate points and investigate simple figures.

In the fields of data and chance, grade 6 students represent and evaluate data using frequency tables, scatter plots, stem-and-leaf plots, and Venn diagrams. They use mean, median, mode, and range to describe and analyze patterns in data sets. They also employ Venn diagrams to analyze arguments and solve simple problems involving inclusion and exclusion. Students use lists, tree diagrams, and tables to determine the possible combinations when choosing one item from each of two disjoint sets.

Grade 6 students match algebraic expressions with their verbal counterparts and evaluate such expressions using substitution. Students model and identify perfect squares, as well as find solutions to two-step equations having positive integer solutions. They also describe patterns found in tables and in sequences of arithmetic and multiplicative growth.

Standards, Benchmarks, and GLEs Assessed

Louisiana’s mathematics content standards encompass number and number relations; algebra; measurement; geometry; data analysis, probability, and discrete math; and patterns, relations, and functions. Each benchmark within a standard delineates what students should know and be able to do by the end of a grade cluster. GLEs further define the knowledge and skills students are expected to master by the end of each grade or high school course. The GLEs for each grade are developmentally appropriate and increase in complexity to build the knowledge and skills students need.

All of the grade 6 standards and most of the benchmarks and GLEs are eligible for assessment on the grade 6 *i*LEAP. Some benchmarks do not have associated GLEs and will not be assessed at grade 6. GLE number 12 is not assessed because it appears in the curriculum after the spring test administration. It is important, however, that the skills represented by this GLE are taught at this grade level.

Explanation of Codes:

GLEs are numbered consecutively at each grade level and grouped according to strand:

N—Number and Number Relations

A—Algebra

M—Measurement

G—Geometry

D—Data Analysis, Probability, and Discrete Math

P—Patterns, Relations, and Functions

Mathematics benchmarks are coded by strand, benchmark number, and grade cluster. The first part of the code refers to the strand (e.g., Number and Number Relations). The second part refers to the benchmark number. The third part refers to the grade cluster (E, M, H). Table 11 provides three examples of mathematics codes.

Table 11: Examples of Mathematics Codes

Code	Translation
N-1-E	Number and Number Relations, Benchmark 1, Elementary
G-5-M	Geometry, Benchmark 5, Middle School
A-3-H	Algebra, Benchmark 3, High School

The following chart presents **all** grade 6 Mathematics standards, benchmarks, and GLEs.

GRADE 6
MATHEMATICS STANDARDS, BENCHMARKS, AND GLEs

Number and Number Relations: In problem-solving investigations, students demonstrate an understanding of the real number system and communicate the relationships within that system using a variety of techniques and tools.

Benchmarks	Grade-Level Expectations
<p>N-1-M: demonstrating that a rational number can be expressed in many forms, and selecting an appropriate form for a given situation (e.g., fractions, decimals, and percents)</p>	<ol style="list-style-type: none"> 1. Factor whole numbers into primes (N-1-M) 2. Determine common factors and common multiples for pairs of whole numbers (N-1-M) 3. Find the greatest common factor (GCF) and least common multiple (LCM) for whole numbers in the context of problem-solving (N-1-M) 4. Recognize and compute equivalent representations of fractions and decimals (i.e., halves, thirds, fourths, fifths, eighths, tenths, hundredths) (N-1-M) (N-3-M) 5. Decide which representation (i.e., fraction or decimal) of a positive number is appropriate in a real-life situation (N-1-M) (N-5-M)
<p>N-2-M: demonstrating number sense and estimation skills to describe, order, and compare rational numbers (e.g., magnitude, integers, fractions, decimals, and percents)</p>	<ol style="list-style-type: none"> 6. Compare positive fractions, decimals, and positive and negative integers using symbols (i.e., $<$, $=$, $>$) and number lines (N-2-M)
<p>N-3-M: reading, writing, representing, and using rational numbers in a variety of forms (e.g., integers, mixed numbers, and improper fractions)</p>	<ol style="list-style-type: none"> 7. Read and write numerals and words for decimals through ten-thousandths (N-3-M) 8. Demonstrate the meaning of positive and negative numbers and their opposites in real-life situations (N-3-M) (N-5-M) <p>Also see GLE no. 4</p>
<p>N-4-M: demonstrating a conceptual understanding of the meaning of the basic arithmetic operations (add, subtract, multiply, and divide) and their relationships to each other</p>	
<p>N-5-M: applying an understanding of rational numbers and arithmetic operations to real-life situations</p>	<ol style="list-style-type: none"> 9. Add and subtract fractions and decimals in real-life situations (N-5-M) <p>Also see GLEs no. 5 and no. 8</p>
<p>N-6-M: constructing, using, and explaining procedures to compute and estimate with rational numbers employing mental math strategies</p>	<ol style="list-style-type: none"> 10. Use and explain estimation strategies to predict computational results with positive fractions and decimals (N-6-M) 11. Mentally multiply and divide by powers of 10 (e.g., $25/10 = 2.5$; $12.56 \times 100 = 1,256$) (N-6-M)

N-7-M: selecting and using appropriate computational methods and tools for given situations involving rational numbers (e.g., estimation, or exact computation using mental arithmetic, calculator, computer, or paper and pencil)	12. Divide 4-digit numbers by 2-digit numbers with the quotient written as a mixed number or a decimal (N-7-M)
N-8-M: demonstrating a conceptual understanding and applications of proportional reasoning (e.g., determining equivalent ratios, finding a missing term of a given proportion)	13. Use models and pictures to explain concepts or solve problems involving ratio, proportion, and percent with whole numbers (N-8-M)
Algebra: In problem-solving investigations, students demonstrate an understanding of concepts and processes that allows them to analyze, represent, and describe relationships among variable quantities and to apply algebraic methods to real-world situations.	
Benchmarks	Grade-Level Expectations
A-1-M: demonstrating a conceptual understanding of variables, expressions, equations, and inequalities (e.g., symbolically represent real-world problems as linear terms, equations, or inequalities)	14. Model and identify perfect squares up to 144 (A-1-M) 15. Match algebraic equations and expressions with verbal statements and vice versa (A-1-M) (A-3-M) (A-5-M) (P-2-M)
A-2-M: modeling and developing methods for solving equations and inequalities (e.g., using charts, graphs, manipulatives, and/or standard algebraic procedures)	16. Evaluate simple algebraic expressions using substitution (A-2-M) 17. Find solutions to 2-step equations with positive integer solutions (e.g., $3x - 5 = 13$, $2x + 3x = 20$) (A-2-M)
A-3-M: representing situations and number patterns with tables, graphs, and verbal and written statements, while exploring the relationships among these representations (e.g., multiple representations for the same situation)	See GLEs no. 15 and no. 29
A-4-M: analyzing tables and graphs to identify relationships exhibited by the data and making generalizations based upon these relationships	See GLE no. 38
A-5-M: demonstrating the connection of algebra to the other strands and to real-life situations	See GLEs no. 15 and no. 20

Measurement: In problem-solving investigations, students demonstrate an understanding of the concepts, processes, and real-life applications of measurement.	
Benchmarks	Grade-Level Expectations
M-1-M: applying the concepts of length, area, surface area, volume, capacity, weight, mass, money, time, temperature, and rate to real-world experiences	18. Measure length and read linear measurements to the nearest sixteenth-inch and mm (M-1-M) 19. Calculate perimeter and area of triangles, parallelograms, and trapezoids (M-1-M) 20. Calculate, interpret, and compare rates such as \$/lb., mpg, and mph (M-1-M) (A-5-M)
M-2-M: demonstrating an intuitive sense of measurement (e.g., estimating and determining reasonableness of measures)	21. Demonstrate an intuitive sense of relative sizes of common units for length and area of familiar objects in real-life problems (e.g., estimate the area of a desktop in square feet, the average adult is between 1.5 and 2 meters tall) (M-2-M) (G-1-M) 22. Estimate perimeter and area of any 2-dimensional figure (regular and irregular) using standard units (M-2-M) Also see GLE no. 31
M-3-M: selecting appropriate units and tools for tasks by considering the purpose for the measurement and the precision required for the task (e.g., length of a room in feet rather than inches)	23. Identify and select appropriate units to measure area (M-3-M)
M-4-M: using intuition and estimation skills to describe, order, and compare formal and informal measures (e.g., ordering cup, pint, quart, gallon; comparing a meter to a yard)	
M-5-M: converting from one unit of measurement to another within the same system (Comparisons between systems, customary and metric, should be based on intuitive reference points, not formal computation.)	
M-6-M: demonstrating the connection of measurement to the other strands and to real-life situations	
Geometry: In problem-solving investigations, students demonstrate an understanding of geometric concepts and applications involving one-, two-, and three-dimensional geometry, and justify their findings.	
Benchmarks	Grade-Level Expectations
G-1-M: using estimation skills to describe, order, and compare geometric measures	See GLEs no. 21 and no. 26

G-2-M: identifying, describing, comparing, constructing, and classifying geometric figures and concepts	<p>24. Use mathematical terms to describe the basic properties of 3-dimensional objects (edges, vertices, faces, base, etc.) (G-2-M)</p> <p>25. Relate polyhedra to their 2-dimensional shapes by drawing or sketching their faces (G-2-M) (G-4-M)</p> <p>26. Apply concepts, properties, and relationships of points, lines, line segments, rays, diagonals, circles, and right, acute, and obtuse angles and triangles in real-life situations, including estimating sizes of angles (G-2-M) (G-5-M) (G-1-M)</p>
G-3-M: making predictions regarding transformations of geometric figures (e.g., make predictions regarding translations, reflections, and rotations of common figures)	27. Make and test predictions regarding tessellations with geometric shapes (G-3-M)
G-4-M: constructing two- and three-dimensional models	See GLE no. 25
G-5-M: making and testing conjectures about geometric shapes and their properties	See GLE no. 26
G-6-M: demonstrating an understanding of the coordinate system (e.g., locate points, identify coordinates, and graph points in a coordinate plane to represent real-world situations)	28. Use a rectangular grid and ordered pairs to plot simple shapes and find horizontal and vertical lengths and area (G-6-M)
G-7-M: demonstrating the connection of geometry to the other strands and to real-life situations (e.g., applications of the Pythagorean Theorem)	
Data Analysis, Probability, and Discrete Math: In problem-solving investigations, students discover trends, formulate conjectures regarding cause-and-effect relationships, and demonstrate critical thinking skills in order to make informed decisions.	
Benchmarks	Grade-Level Expectations
D-1-M: systematically collecting, organizing, describing, and displaying data in charts, tables, plots, graphs, and/or spreadsheets	29. Collect, organize, label, display, and interpret data in frequency tables, stem-and-leaf plots, and scatter plots and discuss patterns in the data verbally and in writing (D-1-M) (D-2-M) (A-3-M)
D-2-M: analyzing, interpreting, evaluating, drawing inferences, and making estimations, predictions, decisions, and convincing arguments based on organized data (e.g., analyze data using concepts of mean, median, mode, range, random samples, sample size, bias, and data extremes)	<p>30. Describe and analyze trends and patterns observed in graphic displays (D-2-M)</p> <p>31. Demonstrate an understanding of precision, accuracy, and error in measurement (D-2-M) (M-2-M)</p> <p>32. Calculate and discuss mean, median, mode, and range of a set of discrete data to solve real-life problems (D-2-M)</p> <p>Also see GLE no. 29</p>

D-3-M: describing informal thinking procedures (e.g., solving elementary logic problems using Venn diagrams, tables, charts, and/or elementary logic operatives to solve logic problems in real-life situations; reach valid conclusions in elementary logic problems involving “and, or, not, if/then”)	33. Create and use Venn diagrams with two overlapping categories to solve counting logic problems (D-3-M)
D-4-M: analyzing various counting and enumeration procedures with and without replacement (e.g., find the total number of possible outcomes or possible choices in a given situation)	34. Use lists, tree diagrams, and tables to determine the possible combinations from two disjoint sets when choosing one item from each set (D-4-M)
D-5-M comparing experimental probability results with theoretical probability (e.g., representing probabilities of concrete situations as common fractions, investigating single-event and multiple-event probability, using sample spaces, geometric figures, tables, and/or graphs)	35. Illustrate and apply the concept of complementary events (D-5-M) 36. Apply the meaning of <i>equally likely</i> and <i>equally probable</i> to real-life situations (D-5-M) (D-6-M)
D-6-M demonstrating the connection of data analysis, probability, and discrete math to other strands and to real-life situations	See GLE no. 36
Patterns, Relations, and Functions: In problem-solving investigations, students demonstrate an understanding of patterns, relations, and functions that represent and explain real-world situations.	
Benchmarks	Grade-Level Expectations
P-1-M describing, extending, analyzing, and creating a wide variety of numerical, geometrical, and statistical patterns (e.g., skip counting of rational numbers and simple exponential number patterns)	37. Describe, complete, and apply a pattern of differences found in an input-output table (P-1-M) (P-2-M) (P-3-M)
P-2-M describing and representing relationships using tables, rules, simple equations, and graphs	See GLEs no. 15 and no. 37
P-3-M analyzing relationships to explain how a change in one quantity results in a change in another (e.g., change in the dimensions of a rectangular solid affects the volume)	38. Describe patterns in sequences of arithmetic and geometric growth and now-next relationships (i.e., growth patterns where the next term is dependent on the present term) with numbers and figures (P-3-M) (A-4-M) Also see GLE no. 37
P-4-M demonstrating the pervasive use of patterns, relations, and functions in other strands and in real-life situations	

Sample Test Items: Grade 6 Math

Sample Mathematics Constructed Response Items and Scoring Rubrics

Questions 1 and 2 show sample constructed-response items. Each item involves a number of separate steps and the application of multiple skills. The constructed-response items are designed to assess one or more of the GLEs/benchmarks/strands. The items are scored using an item-specific rubric on a scale of 0 to 4 points.

- 1 Marcus is looking at the Harry's Hungry Hut menu, which has two sections: entrées and side dishes.

Harry's Hungry Hut	
Entrées	
Hot Dog.....	\$2.50
Tuna.....	\$3.75
Hamburger.....	\$3.25
Chicken.....	\$3.50
Pork Chop.....	\$4.25
Side Dishes	
Fries.....	\$1.55
Salad.....	\$3.35
Onion Rings.....	\$2.00
Drink.....	\$1.65

- A** If Marcus orders one item from each section of the menu, what is the least amount he can spend? Show or explain how you found your answer.
- B** On Thursdays, Harry's Hungry Hut offers a special: one pork chop with a side salad for \$5.99. How much would Marcus save if he were to order the special instead of ordering one pork chop and one salad on another day of the week? Show or explain how you found your answer.
- C** How many combinations of one item from the entrée section and one item from the side section can Marcus choose? Show or explain how you found your answer.

Match to GLE: This item measures GLE 9: Add and subtract fractions and decimals in real-life situations (N-5-M) (N-7-M). This item also measures GLE 34: Use lists, tree diagrams, and tables to determine the possible combinations from two disjoint sets when choosing one item from each set. (D-4-M)

Scoring Rubric																					
4	The student earns 6 points.																				
3	The student earns 4 or 5 points.																				
2	The student earns 2 or 3 points.																				
1	The student earns 1 point. OR The student demonstrates minimal understanding of adding and subtracting decimals, or determining possible combinations from two disjoint sets when choosing one item from each set.																				
0	The student's response is incorrect or irrelevant to the skill or concept being measured or is blank.																				
Correct Answers:																					
<p>Part A. \$4.05 AND Marcus orders the least expensive item from the entrée section and the least expensive item from the side dish section ($2.50 + 1.55$)</p> <p>Part B. \$1.61 AND $4.25 + 3.35 = 7.60$; $7.60 - 5.99 = 1.61$</p> <p>Part C. 20 combinations AND</p> <table border="0"> <tr> <td>Hot Dog/Fries</td> <td>Tuna/Fries</td> <td>Hamburger/Fries</td> <td>Chicken/Fries</td> <td>Pork Chop/Fries</td> </tr> <tr> <td>Hot Dog/Salad</td> <td>Tuna/Salad</td> <td>Hamburger/Salad</td> <td>Chicken/Salad</td> <td>Pork Chop/Salad</td> </tr> <tr> <td>Hot Dog/On. Rings</td> <td>Tuna/On. Rings</td> <td>Hamburger/On. Rings</td> <td>Chicken/On. Rings</td> <td>Pork Chop/On. Rings</td> </tr> <tr> <td>Hot Dog/Drink</td> <td>Tuna/Drink</td> <td>Hamburger/Drink</td> <td>Chicken/Drink</td> <td>Pork Chop/Drink</td> </tr> </table>		Hot Dog/Fries	Tuna/Fries	Hamburger/Fries	Chicken/Fries	Pork Chop/Fries	Hot Dog/Salad	Tuna/Salad	Hamburger/Salad	Chicken/Salad	Pork Chop/Salad	Hot Dog/On. Rings	Tuna/On. Rings	Hamburger/On. Rings	Chicken/On. Rings	Pork Chop/On. Rings	Hot Dog/Drink	Tuna/Drink	Hamburger/Drink	Chicken/Drink	Pork Chop/Drink
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Hot Dog/Drink	Tuna/Drink	Hamburger/Drink	Chicken/Drink	Pork Chop/Drink																	
Points Assigned:																					
<p>Part A. 2 points 2 points for the correct answer and the correct explanation OR 1 point for the correct answer with an incorrect or no procedure OR 1 point for an incorrect answer based on minor arithmetic errors with the correct procedure</p> <p>Part B. 2 points 2 points for the correct answer and the correct procedure OR 1 point for the correct answer with an incorrect or no procedure OR 1 point for an incorrect answer based on minor arithmetic errors with the correct procedure</p> <p>Part C. 2 points 2 points for the correct answer and the correct procedure OR 1 point for the correct answer with no procedure OR 1 point for an incorrect answer based on minor arithmetic errors with the correct procedure</p>																					

- 2** The graph shows the number of sandwiches sold at Tom’s Deli.

Sandwiches Sold

Month	Number of Sandwiches Sold
March	50
April	62
May	56
June	83
July	88
August	80

- A** What is the range of the number of sandwiches sold at the deli?
- B** Find the mean number of sandwiches sold over the 6 months at Tom’s Deli. Round your answer to the nearest whole number. Show your work.
- C** When buying supplies for the month of May, Tom spent \$5.60 for lettuce, \$5.60 for pickles, \$10.50 for tomatoes, \$10.50 for bread, \$30.80 for sandwich meat, and \$7.00 for onions. How much did each sandwich cost Tom? Show your work.
- D** For September, Tom plans on buying enough supplies to make the mean number of sandwiches sold from March to August. If the cost of supplies for each sandwich is the same as in the month of May, how much will Tom spend on supplies for September? Show or explain how you found your answer.

Match to GLE: This item measures GLE 32: Calculate and discuss mean, median, mode, and range of a set of discrete data to solve real-life problems (D-2-M). This item also measures GLE 9: Add and subtract fractions and decimals in real-life situations (N-5-M).

Scoring Rubric	
4	The student earns 7 points.
3	The student earns 5 or 6 points.
2	The student earns 2, 3, or 4 points.
1	The student earns 1 point. OR The student shows minimal understanding of calculating the mean of a set of data.
0	The student's response is incorrect or irrelevant to the skill or concept being measured or is blank.
Correct Answers:	
Part A. The range is 38 OR $88 - 50 = 38$.	
Part B. The mean is 70 (rounded to the nearest whole number). AND $50 + 62 + 56 + 83 + 88 + 80 = 419$ $419/6 = 69.83, \approx 70$ (rounded to the nearest whole number)	
Part C. \$ 1.25 AND $5.6 + 5.6 + 10.5 + 10.5 + 30.80 + 7 = \70 $70/56 = \$1.25$	
Part D. \$87.50 AND $70 \times 1.25 = \$87.50$	
Points Assigned:	
Part A. 1 point 1 point for the correct answer	
Part B. 2 points 2 points for the correct answer and the correct procedure OR 1 point for an incorrect answer based on minor arithmetic errors with the correct procedure OR 1 point for the correct answer with an incorrect procedure or no procedure	
Part C. 2 points 2 points for the correct answer and the correct procedure OR 1 point for an incorrect answer based on minor arithmetic errors with the correct procedure OR 1 point for the correct answer with an incorrect procedure or no procedure	
Part D. 2 points 2 points for the correct answer (or an answer based on an incorrect answer from part B and/or part C) with the correct procedure OR 1 point for an incorrect answer based on minor arithmetic errors with the correct procedure OR 1 point for the correct answer (or an answer based on an incorrect answer from part B and/or part C) with an incorrect procedure or no procedure	

Sample CRT Multiple-Choice Items

Questions 3 through 24 are sample CRT multiple-choice items, arranged by GLE. The items test students' ability to solve math problems. Most items are provided in context and require students to use information from stories, graphs, or tables to solve a problem. Items may assess some of the skills of a GLE while other items may measure all of the skills of the GLE.

- 3** Amber has been asked to make a square-shaped collage for a social studies project. **If the length of each side of the collage is a whole number, what could be the area of the collage?**
- A** 24 square inches
 - B** 32 square inches
 - C** 56 square inches
 - D** 64 square inches

Correct response: D

Match to GLE: This item measures GLE 14: Model and identify perfect squares up to 144 (A-1-M).

- 4** Tamera's class was divided in half to play a game of softball. There were 12 students on each team. **Which algebraic equation could be used to calculate the number of students, s , in Tamera's class?**
- A** $\frac{12}{s} = 2$
 - B** $12 + s = 2$
 - C** $\frac{s}{2} = 12$
 - D** $s + 2 = 12$

Correct Response: C

Match to GLE: This item measures GLE 15: Match algebraic equations and expressions with verbal statements and vice versa (A-1-M) (A-3-M) (A-5-M) (P-2-M).

- 5** Alana plans to order concert tickets that cost \$45 each. She will also have to pay a \$10 service charge for the order. To find the total amount she must pay, Alana used the expression $45n + 10$, where n is the number of tickets ordered. **What is the total amount of money Alana must pay if she orders 5 tickets?**

- A** \$19
- B** \$55
- C** \$225
- D** \$235

Correct Response: D

Match to GLE: This item measures GLE 16: Evaluate simple algebraic expressions using substitution (A-2-M).

- 6** Thirty-seven students in the sixth grade class voted for Jerry for class president. Of those 37 students, 3 fewer than twice the number of boys in the class voted for Jerry. This can be represented by the equation $2b - 3 = 37$, where b represents the number of boys. **How many boys are in the sixth grade class?**

- A** 17
- B** 20
- C** 23
- D** 32

Correct Answer: B

Match to GLE: This item measures GLE 17: Find solutions to two-step equations with positive integer solutions (e.g., $3x - 5 = 13$, $2x + 3x = 20$) (A-2-M).

- 7 Ray wants to frame a rectangular poster for his room. The dimensions of the poster are 1.5 feet by 2 feet. **What is the perimeter of Ray’s poster?**
- A 3 feet
 - B 3.5 feet
 - C 5.5 feet
 - D 7 feet

Correct Response: D

Match to GLE: This item measures GLE 19: Calculate perimeter and area of triangles, parallelograms, and trapezoids (M-1-M).

- 8 Mr. Jones drove 345 miles on 15 gallons of gas. **What was Mr. Jones’ average number of miles per gallon?**
- A 11.5
 - B 13.8
 - C 23
 - D 69

Correct Response: C

Match to GLE: This item measures GLE 20: Calculate, interpret, and compare rates such as dollar/pound, mpg, and mph (M-1-M) (A-5-M).

- 9 Mr. Young is going to put trim around his bedroom window. **Which of these is most likely the dimensions of Mr. Young’s bedroom window?**
- A 3 feet \times 5 feet
 - B 3 yards \times 5 yards
 - C 3 inches \times 5 inches
 - D 3 meters \times 5 meters

Correct Response: A

Match to GLE: This item measures GLE 21: Demonstrate an intuitive sense of relative sizes of common units for length and area of familiar objects in real-life problems (e.g., estimate the area of a desktop in square feet, the average adult is between 1.5 and 2 meters tall) (M-2-M) (G-1-M).

- 10** Tyrone bought a new notebook for school. **Which of these is most likely the area of the front cover of the notebook?**
- A** 5 square inches
 - B** 10 square inches
 - C** 100 square inches
 - D** 500 square inches

Correct Response: C

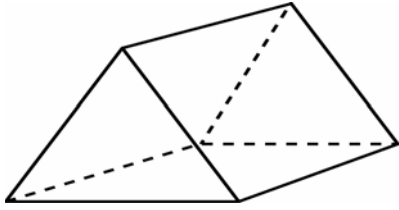
Match to GLE: This item measures GLE 22: Estimate perimeter and area of any two-dimensional figure (regular and irregular) using standard units (M-2-M).

- 11** Mr. Simon is going to replace a broken window at the grocery store. **Which unit should he use to measure the area of the window?**
- A** Square foot
 - B** Square mile
 - C** Square millimeter
 - D** Square centimeter

Correct Response: A

Match to GLE: This item measures GLE 23: Identify and select appropriate units to measure area (M-3-M).

- 12 Sara pitched a tent in her backyard.



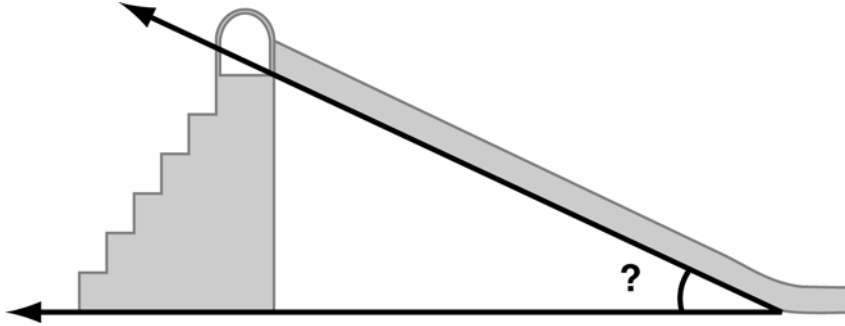
How many faces does Sara's tent have?

- A** 3 faces
- B** 5 faces
- C** 6 faces
- D** 9 faces

Correct Response: B

Match to GLE: This item measures GLE 24: Use mathematical terms to describe the basic properties of three-dimensional objects (edges, vertices, faces, base, etc.) (G-2-M).

- 13 The diagram below shows the side view of a slide.



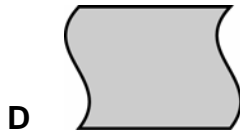
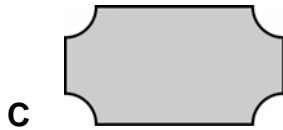
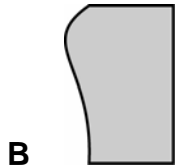
What is the best estimate of the measure of the angle formed between the slide and the ground?

- A 10°
- B 25°
- C 50°
- D 80°

Correct Response: B

Match to GLE: This item measures GLE 26: Apply concepts, properties, and relationships of points, lines, line segments, rays, diagonals, circles, and right, acute, and obtuse angles and triangles in real-life situations, including estimating sizes of angles (G-2-M) (G-5M0 (G-1-M).

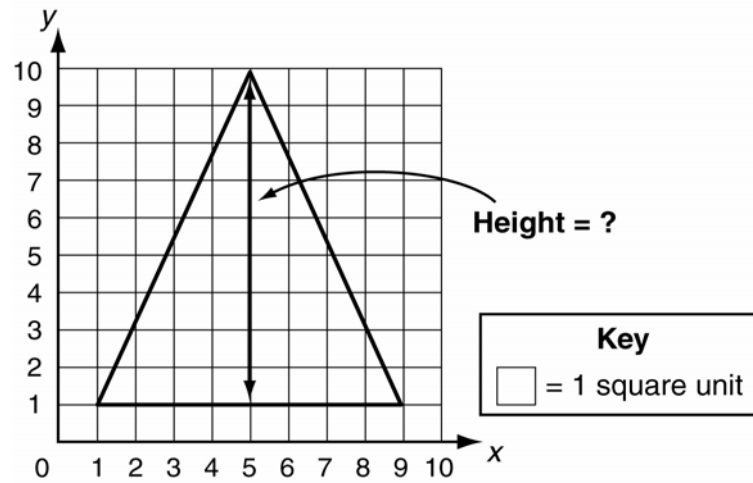
- 14 Adam is painting a design along his bathroom walls. He wants to use a shape that tessellates, with each shape being a different color. **Which shape could Adam use?**



Correct Response: D

Match to GLE: This item measures GLE 27: Make and test predictions regarding tessellations with geometric shapes (G-3-M).

- 15 Toya found a triangular flag. She traced the flag on graph paper, as shown below.



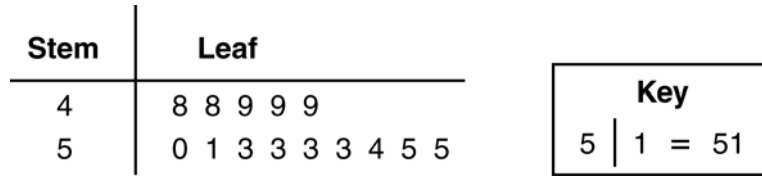
What was the height of the triangular flag?

- A 4 units
- B 8 units
- C 9 units
- D 10 units

Correct Response: C

Match to GLE: This item measures GLE 28: Use a rectangular grid and ordered pairs to plot simple shapes and find horizontal and vertical lengths and area (G-6-M).

- 16 The stem-and-leaf plot below shows the height in inches of the students in Mr. Hill's science class.



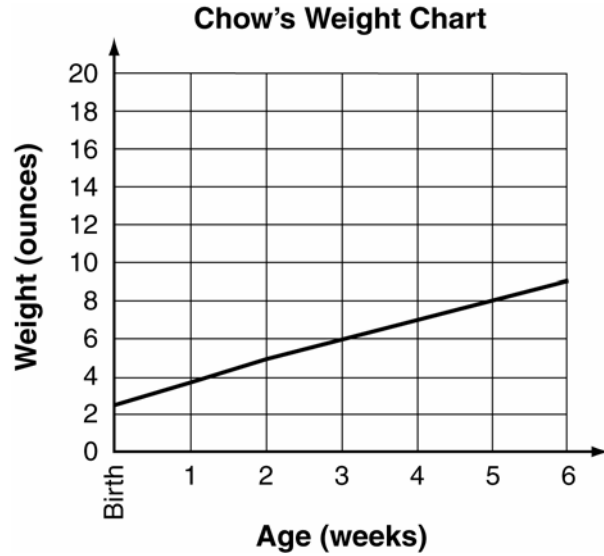
Mr. Hill will make a frequency table of all his students' heights. **How many tally marks should there be in the 45 through 50 range?**

- A 5 tally marks
- B 6 tally marks
- C 9 tally marks
- D 14 tally marks

Correct Response: B

Match to GLE: This item measures GLE 29: Collect, organize, label, display, and interpret data in frequency tables, stem-and-leaf plots, and scatter plots and discuss patterns in the data verbally and in writing (D-1-M) (D-2-M) (A-3-M).

- 17 The graph shows the weight of Ben’s dog, Chow, over 5 weeks.



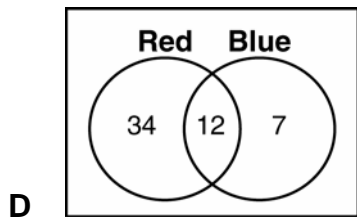
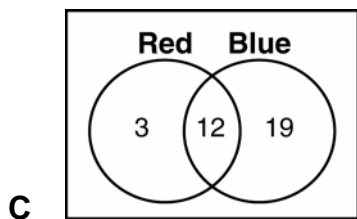
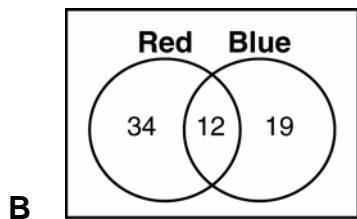
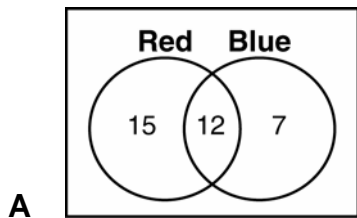
Based on the graph, which of these is the best prediction for Chow’s weight at 7 weeks?

- A 4 oz.
- B 9 oz.
- C 10 oz.
- D 20 oz.

Correct Response: C

Match to GLE: This item measures GLE 30: Describe and analyze trends and patterns observed in graphic displays (D-2-M).

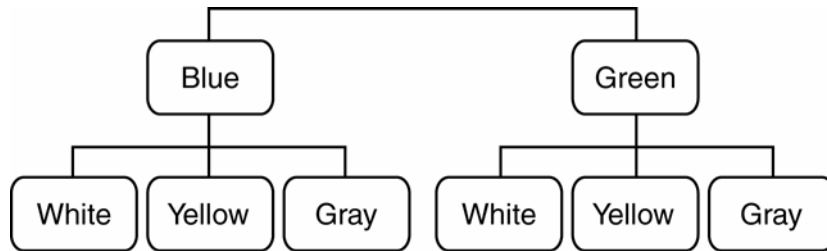
- 18 Abdul collects red, blue, and red and blue stamps. He has 15 stamps that are red only and 12 stamps that are red and blue. His collection has a total of 34 stamps. **Which Venn diagram correctly represents Abdul's stamp collection?**



Correct Response: A

Match to GLE: This item measures GLE 33: Create and use Venn diagrams with two overlapping categories to solve counting logic problems (D-3-M).

- 19 Winona is painting the outside of her dollhouse. She is considering painting the door blue or green and painting the walls white or yellow or gray. The diagram below shows all of the different combinations of colors she is considering.



How many different combinations of colors are possible?

- A 2
- B 4
- C 6
- D 8

Correct Response: C

Match to GLE: This item measures GLE 34: Use lists, tree diagrams, and tables to determine the possible combinations from two disjoint sets when choosing one item from each set (D-4-M).

- 20 The probability that a student in Fred's class has been to a play is $\frac{3}{7}$. **What is the probability that a student in Fred's class has not been to a play?**

- A $\frac{7}{3}$
- B $\frac{4}{7}$
- C $\frac{4}{10}$
- D $\frac{7}{10}$

Correct Response: B

Match to GLE: This item measures GLE 35: Illustrate and apply the concept of complementary events (D-5-M).

- 21** Fredrick has four flavors of candy in his candy jar: grape, lemon, orange, and strawberry. He picks one piece of candy from the jar without looking. **If the jar contains the same number of each flavor, which statement is true?**
- A** Fredrick has a 1 in 3 chance of choosing a lemon candy.
 - B** Fredrick is equally likely to pick a grape or a lemon candy.
 - C** It is more likely Fredrick will choose a grape candy than a lemon candy.
 - D** It is less likely Fredrick will choose an orange candy than a lemon candy.

Correct Response: B

Match to GLE: This item measures GLE 36: Apply the meaning of equally likely and equally probable to real-life situations (D-5-M) (D-6-M).

- 22** Gretchen planned to make color photocopies of a poster for the school play. At the copy center she saw the table below.

Number of Color Photocopies	Total Cost of Photocopies
2	\$0.30
4	\$0.60
6	\$0.90
8	\$1.20

If Gretchen makes 14 color photocopies, what will be the total cost?

- A** \$0.15
- B** \$1.80
- C** \$2.10
- D** \$2.40

Correct Response: C

Match to GLE: This item measures GLE 37: Describe, complete, and apply a pattern of differences found in an input-output table (P-1-M) (P-2-M) (P-3-M).

- 23** A junior high marching band is making a formation for the halftime show. There are 10 students in the first row, 11 students in the second row, 13 students in the third row, and 16 students in the fourth row. **Which statement correctly describes how to find the total number of students in the fifth row?**
- A** Add 3 to the number of students in the fourth row.
 - B** Add 4 to the number of students in the fourth row.
 - C** Add 5 to the number of students in the fourth row.
 - D** Add 6 to the number of students in the fourth row.

Correct Response: B

Match to GLE: This item measures GLE 38: Describe patterns in sequences of arithmetic and geometric growth and now-next relationships (growth patterns where the next term is dependent on the present term) with numbers and figures (P-3-M) (A-4-M).

- 24** Aaron is doing five sets of jumping jacks. He started with a set of 8 jumping jacks. In his second set, he did 16; in his third set, he did 32; and in his fourth set, he did 64. **If he follows the pattern, which statement describes how to find the number of jumping jacks Aaron will do in the fifth set?**
- A** Add 32 to the number in set 4.
 - B** Add 8 to the number in set 4.
 - C** Multiply the number in set 4 by 4.
 - D** Multiply the number in set 4 by 2.

Correct Response: D

Match to GLE: This item measures GLE 38: Describe patterns in sequences of arithmetic and geometric growth and now-next relationships (growth patterns where the next term is dependent on the present term) with numbers and figures (P-3-M) (A-4-M).

Sample NRT Multiple-Choice Items

Questions 25 through 30 are sample multiple-choice items representative of those used on the norm-referenced parts of the *iLEAP* test. The survey battery of the Iowa Tests of Basic Skills (ITBS) is designed to measure a wide range of student achievement. Some items address Louisiana GLEs at the specified grade level, while other items address Louisiana GLEs at other grade levels.

25 What is another way to represent $\frac{1}{2}$?

- A** 0.12
- B** 0.21
- C** 0.50
- D** 0.55

Correct response: C

Match to GLE: This item measures GLE 4: Recognize and compute equivalent representations of fractions and decimals (halves, thirds, fourths, fifths, eighths, tenths, hundredths) (N-1-M) (N-3-M).

26 Which set of numbers is arranged from largest to smallest?

- A** $0.75 > 0.50 > 0.38$
- B** $0.67 > 0.25 > 0.42$
- C** $0.50 > 0.67 > 0.83$
- D** $0.30 > 0.80 > 0.50$

Correct response: A

Match to GLE: This item measures GLE 6: Compare positive fractions, decimals, and positive and negative integers using symbols (i.e., $<$, $=$, $>$) and number lines (N-2-M).

- 27** How would you read 48.06?
- A** Forty-eight and six hundred
 - B** Forty-eight and six tenths
 - C** Forty-eight and one-sixth
 - D** Forty-eight and six hundredths

Correct response: D

Match to GLE: This item measures GLE 7: Read and write numerals and words for decimals through ten-thousandths (N-3-M).

- 28** Mrs. Black had $2\frac{1}{8}$ yards of material. She used $1\frac{1}{4}$ yards to make a jacket for Sally.

How much material did she have left?

- A** $1\frac{7}{8}$ yards
- B** $1\frac{1}{4}$ yards
- C** $\frac{7}{8}$ yard
- D** $\frac{1}{4}$ yard

Correct response: C

Match to GLE: This item measures GLE 9: Add and subtract fractions and decimals in real-life situations (N-5-M).

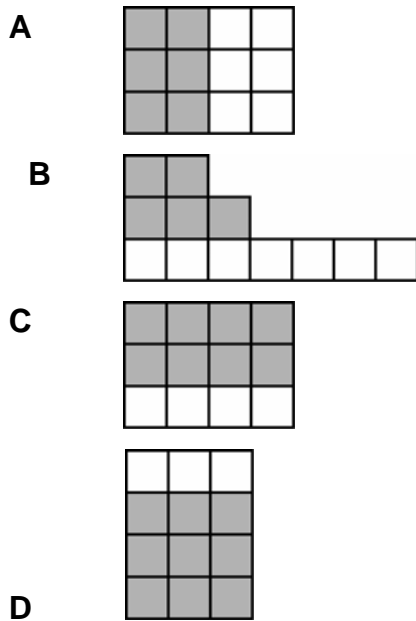
29 Which of these is the best way to estimate 3.16×5.81 ?

- A 4×6
- B 3×6
- C 4×5
- D 3×5

Correct response: B

Match to GLE: This item measures GLE 10: Use and explain estimation strategies to predict computational results with positive fractions and decimals (N-6-M).

30 Which model represents a ratio of 2:1?



Correct response: C

Match to GLE: This item measures GLE 13: Use models and pictures to explain concepts or solve problems involving ratio, proportion, and percent with whole numbers (N-8-M).