OKLAHOMA SCHOOL TESTING PROGRAM
OKLAHOMA CORE CURRICULUM TESTS

TEST AND ITEM SPECIFICATIONS

Mathematics

Grade 5

Oklahoma State Department of Education
Oklahoma City, Oklahoma

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OKLAHOMA CORE CURRICULUM TESTS

TEST AND ITEM SPECIFICATIONS

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Purpose

The purpose of the Grade 5 Mathematics Test is to measure Oklahoma fifth-grade students' level of proficiency in mathematics. On the test, students are required to respond to a variety of items linked to the fifth-grade mathematics content standards identified in the Oklahoma Academic Standards (OAS). Each Mathematics Test form tests each identified content standard and objective listed below. The following standards and objectives are intended to summarize the knowledge as identified in the Oklahoma Academic Standards.

OAS Content Standards and Objectives
Algebraic Reasoning: Patterns and Relationships • Algebra Patterns (1.1) • Equations (1.2) • Number Properties (1.3)
Number Sense and Operation • Number Sense (2.1) • Number Operations (2.2)
Geometry • Circles and Polygons (3.1) • Angles (3.2)
Measurement • Measurement (4.1) • Money (4.2)
Data Analysis • Data Analysis (5.1) • Central Tendency (5.3) • Probability (5.2)

Note: All references to Oklahoma Academic Standards (OAS) indicate the content standards and objectives previously known as Priority Academic Student Skills (PASS).

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Test Structure, Format, and Scoring

The Oklahoma Core Curriculum Tests consist of multiple-choice items. Each multiple-choice item is scored as correct or incorrect. The student's raw score is converted to a scaled score using the number correct method. Of the total items, 10 items are field-test items and do not contribute to the student's scaled score.

Content Assessment	Total Items	Total Operational Items	Total Field Test Items
Mathematics	60	50	10
Reading	60	50	10
Science	55	45	10
Social Studies	60	50	10

Test Alignment with Oklahoma Academic Standards

Criteria for Aligning the Test with the OAS Standards and Objectives
1. Categorical Concurrence The test is constructed so that there are at least six items measuring each OAS standard. The number of items is based on estimating the number of items that could produce a reasonably reliable estimate of a student's mastery of the content measured.
2. Depth of Knowledge Consistency The test is constructed using items from a variety of Depth of Knowledge levels that are consistent with the processes students need in order to demonstrate proficiency for each OAS objective.
3. Range of Knowledge Correspondence The test is constructed so that at least 75% of the OAS objectives for an OAS standard have at least one corresponding assessment item.
4. Balance of Representation The test is constructed according to the Test Blueprint which reflects the degree of representation given on the test to each OAS standard and/or OAS objective in terms of the percent of total test items measuring each standard and the number of test items measuring each standard and/or objective. The test construction shall yield a balance of representation with an index of 0.7 or higher of assessed objectives related to a standard.
5. Source of Challenge Each test item is constructed in such a way that the major cognitive demand comes directly from the targeted OAS objective or OAS concept being assessed, not from specialized knowledge or cultural background that the test-taker may bring to the testing situation.

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Oklahoma School Testing Program

Grade 5 Mathematics – Test Blueprint
School Years 2014-2015, 2015-2016, 2016-2017

The blueprint describes the content and structure of an assessment and defines the ideal number of test items by standard and objective of the Priority Academic Student Skills/ Oklahoma Academic Standards (PASS/OAS).

Standards and Objectives	Ideal Number of Items	Ideal Percentage of Items
1.0 Algebraic Reasoning: Patterns and Relationships	**13**	**26%**
1.1 Algebra Patterns	5	
1.2 Equations	4	
1.3 Number Properties	4	
2.0 Number Sense and Operation	**16**	**32%**
2.1 Number Sense	8	
2.2 Number Operations	8	
3.0 Geometry	**7**	**14%**
3.1 Circles and Polygons	4	
3.2 Angles	3	
4.0 Measurement	**7**	**14%**
4.1 Measurement	5	
4.2 Money	2	
5.0 Data Analysis	**7**	**14%**
5.1 Data Analysis	3	
5.2 Probability	2	
5.3 Central Tendency	2	
Total Test	**50**	**100%**

(Please note this blueprint does not include items that may be field-tested.)

- A minimum of 6 items is required to report a standard, and a minimum of 4 items is required to report results for an objective.

Depth of Knowledge Assessed by Test Items

The Oklahoma Core Curriculum Tests will, as closely as possible, reflect the following "Depth of Knowledge" distribution of items.

Grades 3-5	
Depth of Knowledge	**Percent of Items**
Level 1—Recall and Reproduction	20–25%
Level 2—Skills and Concepts	65–70%
Level 3—Strategic Thinking	5–15%

Grades 6-8	
Depth of Knowledge	**Percent of Items**
Level 1—Recall and Reproduction	10–15%
Level 2—Skills and Concepts	65–70%
Level 3—Strategic Thinking	15–25%

Level 1 (Recall and Reproduction) requires the student to recall facts, terms, definitions, or simple procedures, and to perform simple algorithms or apply formulas. One-step, well-defined, or straight algorithmic procedures should be included at this level.

Level 2 (Skills and Concepts) requires the student to make some decision as to how to approach the problem or activity. Level 2 activities include: making observations and collecting data; classifying, comparing, and organizing data; and organizing and displaying data in tables, charts, and graphs.

Level 3 (Strategic and Extended Thinking) requires complex reasoning, planning, developing, using evidence, and a higher level of thinking. These processes typically require an extended amount of time. The cognitive demands of the item should be high and the work should be complex. In order to be considered at this level, students are required to make several connections (relate ideas *within* the content area or *among* the content areas) and select one approach among many alternatives as to how the situation should be solved. Level 3 activities include: making conjectures; drawing conclusions from observations; citing evidence; developing a logical argument for concepts; explaining phenomena in terms of concepts; and using concepts to solve non-routine problems.

Note—The descriptions are adapted from Review Background Information and Instructions, Standards and Assessment Alignment Analysis, CCSSO TILSA Alignment Study, May 21–24, 2001, Version 2.0.

For an extended description of each Depth of Knowledge level, see the student assessment Web site at <http://www.ok.gov/sde/>.

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Universal Test Design Considerations

Universal design, as applied to assessments, is a concept that allows the widest possible range of students to participate in assessments and may even reduce the need for accommodations and alternative assessments by expanding access to the tests themselves. In the Oklahoma Core Curriculum Tests, modifications have been made to some items that simplify and clarify instructions, and provide maximum readability, comprehensibility, and legibility. This includes such things as reduction of language load in content areas other than Reading, increased font size, fewer items per page, and boxed items to assist visual focus. Reading tests will have vocabulary at grade level. In all other tests, the vocabulary level will be below the grade being tested except for content words. Grades 3 and 4 will be one grade level below, and grades 5, 6, 7, and 8 will be two grade levels below. These modifications are evident in the sample items included in this document.

Testing Schedules

Each subject test, except Writing, is divided into two separate sections at grades 3, 4, and 5. These two sections of the test may be administered on the same day with a break given between the sections or on consecutive days. At grades 6, 7, and 8, each subject area test is meant to be administered in a separate session. Students may be given additional time if needed, but additional time will be given as an extension of the same testing period, not at a different time.

Writing Test	
	Approximately:
Distributing books, filling in the Student Demographic Page, reading directions	20 minutes
Administering the Writing Test (not timed)	50 minutes
Total:	70 minutes

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Grade 5 Mathematics

Test Session

Section 1

	Approximately:
Distributing books, filling in the Student Demographic Page, reading directions	25 minutes
Administering the Mathematics Test; **no calculators are allowed** during this test	30–40 minutes
Total:	55–65 minutes

Section 2

	Approximately:
Distributing books, reading directions	5 minutes
Administering the Mathematics Test; **no calculators are allowed** during this test	30–40 minutes
Total:	35–45 minutes

Grade 5 Reading

Test Session

Section 1

	Approximately:
Distributing books, reading directions	15 minutes
Administering the Reading Test	50–60 minutes
Total:	65–75 minutes

Section 2

	Approximately:
Distributing books, reading directions	5 minutes
Administering the Reading Test	45–55 minutes
Total:	50–60 minutes

Grade 5 Social Studies

Test Session

Section 1

	Approximately:
Distributing books, reading directions	15 minutes
Administering the Social Studies Test	30–40 minutes
Total:	45–55 minutes

Section 2

	Approximately:
Distributing books, reading directions	5 minutes
Administering the Social Studies Test	30–40 minutes
Total:	35–45 minutes

Grade 5 Science

Test Session

Section 1

	Approximately:
Distributing books, reading directions	15 minutes
Administering the Science Test	30–40 minutes
Total:	45–55 minutes

Section 2

	Approximately:
Distributing books, reading directions	5 minutes
Administering the Science Test	45–55 minutes
Total:	50–60 minutes

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Multiple-Choice Item Guidelines

- All item stems clearly indicate what is expected in an item to help students focus on selecting a response.
- Each multiple-choice item has a stem (question, statement, or incomplete statement, and/or graphic component) and four answer (or completion) options, only one of which is correct.
- Multiple-choice item stems present a complete problem so that students know what to do before looking at the answer choices; students should not need to read all answer choices before knowing what is expected.
- Art incorporated within an item must be functional and assist students in determining the correct response.

In summary, test items assess whether students: understand relevant concepts and procedures; communicate their understandings effectively in content specific terms; approach problems; and develop viable solutions.

Stimulus Materials

Stimulus materials are the passages, graphs, models, figures, etc. that students must read and examine in order to respond to items. The following characteristics are necessary for stimulus materials:

1. When students are given information, data, or an experimental setup to evaluate, they should know the research question and the purpose of the research.
2. Tables, graphs, reading passages, and illustrations provide sufficient information for assessment of multiple standards.
3. Stimulus materials for a set of items may be a combination of multiple stimuli.
4. Information in stimulus materials is representative of concepts and principles described in Oklahoma Academic Standards.
5. For conceptual items, stimulus materials are necessary but not conceptually sufficient for student response.
6. There is a balance of graphic and textual stimulus materials within a test form. At least 50% of the items have appropriate pictorial and graphical representations. Graphs, tables, or figures are clearly associated with their intended items. Graphics appear either on the same page as the stimulus or on the facing page.
7. The stimuli avoid subject matter that might prompt emotional distress on the part of the students.
8. Permission to use stimuli from copyrighted material is obtained as necessary by the testing vendor.

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General Considerations

It is necessary to create test items that are reliable, fair, and targeted to the Oklahoma Academic Standards listed on the following pages. There are some general considerations and procedures for effective item development. These considerations include, but are not limited to, the following:

1. Each test form contains items assessing standards and objectives listed in the Test Blueprint for the specific grade and content area. In the Oklahoma Academic Standards document, asterisks have been used to identify standards and objectives that must be assessed by the local school district.

2. Test items that assess each standard are not limited to one particular type of response format. Each item begins with a stem that asks a question or poses a clear problem. Stems may include incomplete sentences in order to reduce unnecessary repetition of text.

3. Test items attempt to focus on content that is authentic and that grade-level students can relate to and understand.

4. Test items are worded precisely and clearly. The more focused an item, the more reliable and fair it will be, and the more likely all students will understand what is required of them.

5. All items are reviewed to eliminate language that is biased or is otherwise likely to disadvantage a particular group of students. That is, items do not display unfair representations of gender, race, ethnicity, disability, culture, or religion; nor do items contain elements that are offensive to any such groups.

6. All multiple-choice answer options, including the correct response and distractors, are similar in length and syntax. Students should not be able to rule out a wrong answer or identify a correct response solely because it looks or sounds different from the other answer choices. Distractors are created so that students reason their way to the correct answer rather than simply identify incorrect responses because of a distractor's obviously inappropriate nature. Distractors should always be plausible (but incorrect) in the context of the item stem. Correct responses are reasonably distributed among A's, B's, C's, and D's. The distractors adopt the language and sense of the material in the selection. Test items focus on reading skills and comprehension strategies, avoiding measurement of a student's feelings or values.

7. Items deal with issues and details that are of consequence in the stimulus and central to students' understanding and interpretation of the stimulus.

8. To the greatest extent possible, no item or response choice clues the answer to any other item. No item stem or answer option provides clues to any other item's answer, nor is the same fact of the passage assessed more than once, including the same vocabulary or technical term.

9. Test items are tied closely and particularly to the stimuli from which they derive, so that the impact of outside (prior) knowledge, while never wholly avoidable, is minimized.

10. The responses "Both of the above," "All of the above," "None of the above," and "Neither of the above" are not used.

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11. Most stems are positively worded—avoiding the use of the word not. If a negative is required, the format is "All of the following . . . except."
12. The material presented is balanced, culturally diverse, well-written, and of interest to students. The stimuli and items are presented fairly in order to gain a true picture of students' skills.
13. Across all forms, a balance of gender and active/passive roles by gender is maintained.
14. No resource materials or calculators may be used by students during the test.

Vocabulary

No single source is available to determine the reading level of various words. Therefore, the appropriateness and difficulty of a word is determined in various ways. Vocabulary words are checked in the following: *EDL Core Vocabularies in Reading, Mathematics, Science, and Social Studies*; *Basic Reading Vocabularies*; the *Living Word*; or other reliable readability sources. In addition to using the aforementioned printed resources to assist in creating vocabulary items, each vocabulary item must be approved by Oklahoma's Content Review Committee. The committee, comprised of Oklahoma educators from across the state, reviews proposed vocabulary items for grade level appropriateness. Reading tests will have vocabulary at grade level. In all other tests, the vocabulary level will be below the grade being tested except for content words. Grades 3 and 4 will be one grade level below, and grades 5, 6, 7, and 8 will be two grade levels below.

All items developed using these specifications are reviewed by Oklahoma educators and approved by the Oklahoma State Department of Education. The distribution of newly developed items is based on content and process alignment, difficulty, cognitive ability, percentage of art/graphics, and grade-level appropriateness as determined by an annual Item Development Plan approved by the Oklahoma State Department of Education.

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Overview of Item Specifications

For each OAS standard, item specifications are organized under the following headings:

- OAS Standard and OAS Objective
- Item Specifications
  a. Emphasis
  b. Stimulus Attributes
  c. Format
  d. Content Limits
  e. Primary Process Standards
  f. Distractor Domain
  g. Sample Test Items

The headings "OAS Standard" and "OAS Objective" state the standard and objective being measured as found in the fifth-grade mathematics section of the Oklahoma Academic Standards document.

The heading "Item Specifications" highlights important points about the items' emphasis, stimulus attributes, format, content limits, primary process standards, distractor domain, and sample test items. Although it is sometimes possible to score single items for more than one concept, all items in these tests are written to address a single content standard as the primary concept.

Note about the Item Specifications and Sample Test Items:

With the exception of content limits, the item specifications give suggestions of what might be included and do not give an exhaustive list of what can be included. The sample test items are not intended to be definitive in nature or construction—the stimuli and the test items that follow them may differ from one test form to another, as may their presentations.

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Oklahoma Academic Standards

MATHEMATICS CONTENT STANDARDS

Grade 5

Asterisks (*) have been used to identify standards and objectives that must be assessed by the local school district. All other skills may be assessed by the Oklahoma School Testing Program (OSTP).

Standard 1: Algebraic Reasoning: Patterns and Relationships—The student will use algebraic methods to describe patterns and solve problems in a variety of contexts.

1. Describe rules that produce patterns found in tables, graphs, and models, and use variables (e.g., boxes, letters, pawns, number cubes, or other symbols) to solve problems or to describe general rules in algebraic expression or equation form.

2. Use algebraic problem-solving techniques (e.g., use a balance to model an equation and show how subtracting a number from one side requires subtracting the same amount from the other side) to solve problems.

3. Recognize and apply the commutative, associative, and distributive properties to solve problems (e.g., $3 \times (2 + 4) = (3 \times 2) + (3 \times 4)$.

Standard 2: Number Sense and Operation—The student will use numbers and number relationships to acquire basic facts. The student will estimate and compute with whole numbers, fractions, and decimals.

1. Number Sense

   a. Apply the concept of place value of whole numbers through hundred millions (9 digits) and model, read, and write decimal numbers through the thousandths.

   b. Represent with models the connection between fractions and decimals, compare and order fractions and decimals, and be able to convert from one representation to the other to solve problems. (e.g., use 10×10 grids, base-10 blocks).

   c. Identify and compare integers using real-world situations. (e.g., owing money, temperature, or measuring elevations above and below sea level).

   *d. Identify and apply factors, multiples, prime, and composite numbers in a variety of problem-solving situations (e.g., build rectangular arrays for numbers 1–100 and classify as prime or composite, use common factors to add fractions).

2. Number Operations

   a. Estimate, add, or subtract decimal numbers with same and different place values to solve problems (e.g., 3.72 + 1.4, \$4.56 − \$2.12).

   b. Estimate, add, or subtract fractions (including mixed numbers) to solve problems using a variety of methods (e.g., use fraction strips, use area models, find a common denominator).

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c. Estimate and find the quotient (with and without remainders) with two-digit divisors and a two- or three-digit dividend to solve application problems.

Standard 3: Geometry—The student will apply geometric properties and relationships.

1. Compare and contrast the basic characteristics of circles and polygons (triangles, quadrilaterals, pentagons, hexagons, heptagons, octagons).
2. Classify angles (e.g., acute, right, obtuse, straight).

Standard 4: Measurement—The student will use appropriate units of measure to solve problems in a variety of contexts.

1. Measurement
   a. Compare, estimate, and determine the measurement of angles.
   b. Develop and use the formula for perimeter and area of a square and rectangle to solve application problems.
   c. Convert basic measurements of volume, mass, and distance within the same system for metric and customary units (e.g., inches to feet, hours to minutes, centimeters to meters).
2. Money: Solve a variety of problems involving money.

Standard 5: Data Analysis—The student will use data analysis, statistics, and probability to interpret data in a variety of contexts.

1. Data Analysis
   a. Compare and translate displays of data and justify the selection of the type of table or graph (e.g., charts, tables, bar graphs, pictographs, line graphs, circle graphs, Venn diagrams).
   *b. Formulate questions, design investigations, consider samples, and collect, organize, and analyze data using observation, measurement, surveys, or experiments (e.g., how far can 5th graders throw a softball based on where it first hits the ground?).
2. Probability
   a. Determine the probability of events occurring in familiar contexts or experiments and express probabilities as fractions from zero to one (e.g., find the fractional probability of an event given a biased spinner).
   b. Use the fundamental counting principle on sets with up to four items to determine the number of possible combinations (e.g., create a tree diagrams to see possible combinations).
3. Central Tendency: Determine the range (spread), mode (most often), and median (middle) of a set of data.

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Oklahoma Academic Standards

MATHEMATICS PROCESS STANDARDS

Process Standard 1: Problem Solving

1. Use problem-solving approaches (e.g., act out situations, represent problems with drawings and lists, use concrete, pictorial, graphical, oral, written, and/or algebraic models, understand a problem, devise a plan, carry out the plan, look back).
2. Formulate problems from everyday and mathematical situations (e.g., how many forks are needed?, how many students are absent?, how can we share/divide these cookies?, how many different ways can we find to compare these fractions?).
3. Develop, test, and apply strategies to solve a variety of routine and nonroutine problems (e.g., look for patterns, make a table, make a problem simpler, process of elimination, trial and error).
4. Verify and interpret results with respect to the original problem (e.g., students explain verbally why an answer makes sense, explain in a written format why an answer makes sense, verify the validity of each step taken to obtain a final result).
5. Distinguish between necessary and irrelevant information in solving problems (e.g., play games and discuss "best" clues, write riddles with sufficient information, identify unnecessary information in written story problems).

Process Standard 2: Communication

1. Express mathematical ideas coherently and clearly to peers, teachers, and others (e.g., with verbal ideas, models or manipulatives, pictures, or symbols).
2. Extend mathematical knowledge by considering the thinking and strategies of others (e.g., agree or disagree, rephrase another student's explanation, analyze another student's explanation).
3. Relate manipulatives, pictures, diagrams, and symbols to mathematical ideas.
4. Represent, discuss, write, and read mathematical ideas and concepts. Start by relating everyday language to mathematical language and symbols and progress toward the use of appropriate terminology (e.g., "add more" becomes "plus," "repeated addition" becomes "multiplication," "fair share" becomes "divide," "balance the equation" becomes "solve the equation").

Process Standard 3: Reasoning

1. Explain mathematical situations using patterns and relationships (e.g., identify patterns in situations, represent patterns in a variety of ways, extend patterns to connect with more general cases).

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2. Demonstrate thinking processes using a variety of age-appropriate materials and reasoning processes (e.g., manipulatives, models, known facts, properties and relationships, inductive [specific to general], deductive [general to specific], spatial, proportional, logical reasoning [“and,” “or,” “not”] and recursive reasoning).

3. Make predictions and draw conclusions about mathematical ideas and concepts. Predictions become conjectures and conclusions become more logical as students mature mathematically.

Process Standard 4: Connections

1. Relate various concrete and pictorial models of concepts and procedures to one another (e.g., use two colors of cubes to represent addition facts for the number 5, relate patterns on a hundreds chart to multiples, use base-10 blocks to represent decimals).

2. Link concepts to procedures and eventually to symbolic notation (e.g., represent actions like snap, clap, clap with symbols A B B, demonstrate 3 • 4 with a geometric array, divide a candy bar into 3 equal pieces that represent one piece as $\frac{1}{3}$).

3. Recognize relationships among different topics within mathematics (e.g., the length of an object can be represented by a number, multiplication facts can be modeled with geometric arrays, $\frac{1}{2}$ can be written as 0.5 and 50%).

4. Use mathematical strategies to solve problems that relate to other curriculum areas and the real world (e.g., use a timeline to sequence events, use symmetry in art work, explore fractions in quilt designs and to describe pizza slices).

Process Standard 5: Representation

1. Create and use a variety of representations appropriately and with flexibility to organize, record, and communicate mathematical ideas (e.g., dramatizations, manipulatives, drawings, diagrams, tables, graphs, symbolic representations).

2. Use representations to model and interpret physical, social, and mathematical situations (e.g., counters, pictures, tally marks, number sentences, geometric models; translate between diagrams, tables, charts, graphs).

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Oklahoma Academic Standards

Sample Test Items by Standard

Grade 5

OAS Standard:

Standard 1. Algebraic Reasoning: Patterns and Relationships—The student will use algebraic methods to describe patterns and solve problems in a variety of contexts.

OAS Objective:

1. Describe rules that produce patterns found in tables, graphs, and models, and use variables (e.g., boxes, letters, pawns, number cubes, or other symbols) to solve problems or to describe general rules in algebraic expression or equation form.

Item Specifications:

Emphasis:

Apply use of variables in solving problems and describing mathematical situations.

Stimulus Attributes:

Test items may include illustrations of the following: tables, graphs, diagrams, number lines, patterns, and counting manipulatives.

Format:

- Use variables as unknowns
- Use variables as changing quantities
- Use variables in generalizations of patterns
- Use variables to describe general rules

Content Limits:

- Limit patterns to an extension of, at most, six places
- Limit required operations to addition, subtraction, multiplication, and division
- Limit description of rules to one variable
- Limit to 2 operations in order of operations from left to right

Primary Process Standards:

Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections

Distractor Domain:

- Computational errors
- Predictable misrepresentation of the pattern

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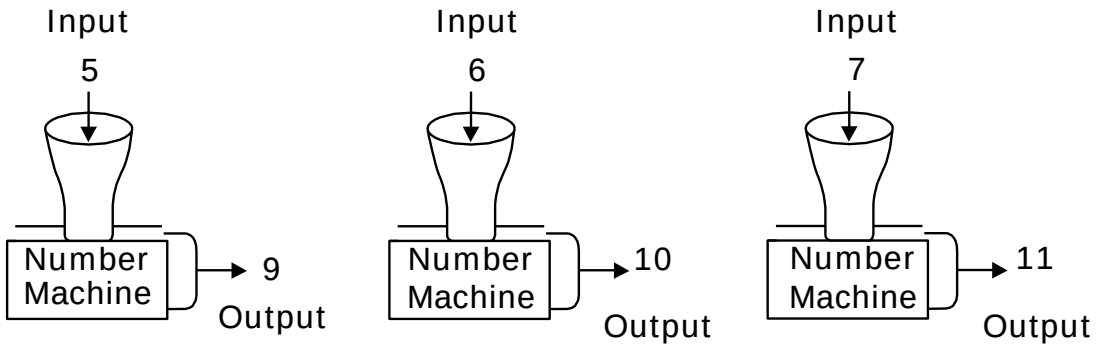
Oklahoma Academic Standards 1.1 Sample Test Items:

Primary Process Standard: 5M2.3
Depth of Knowledge: 1
Correct Answer: A

This number machine used the same rule each time to find the output numbers shown.



If *n* is the input number, which rule could the machine have used to find each output number?

A $n + 4$

B $n - 4$

C $n \bullet 4$

D $n \div 4$

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Primary Process Standard: 5M3.1
Depth of Knowledge: 2
Correct Answer: C

The librarian recorded the number of books sold at a book fair before and after school each day. The results are shown in this table.

Book Fair Sales

Day	Before School	After School
Monday	15	24
Tuesday	23	32
Wednesday	11	20
Thursday	18	27
Friday	12	21

Which conclusion <u>best</u> describes the number of books sold at the book fair after school compared to the books sold before school each day?

A The number of books sold after school each day was 8 more than the number of books sold before school each day.

B The number of books sold after school each day was 8 less than the number of books sold before school each day.

C The number of books sold after school each day was 9 more than the number of books sold before school each day.

D The number of books sold after school each day was 9 less than the number of books sold before school each day.

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Primary Process Standard: 5M4.2
Depth of Knowledge: 3
Correct Answer: A

If *n* is the input number, which expression could be used to find the value of the output shown in this table?

Input (*n*)	1	2	3	4	5
Output	3	5	7	9	11

A $2 \cdot n + 1$

B $3 \cdot n$

C $4 \cdot n - 1$

D $n + 2$

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OAS Standard:

Standard 1: Algebraic Reasoning: Patterns and Relationships—The student will use algebraic methods to describe patterns and solve problems in a variety of contexts.

OAS Objective:

2. Use algebraic problem-solving techniques (e.g., use a balance to model an equation and show how subtracting a number from one side requires subtracting the same amount from the other side) to solve problems.

Item Specifications:

Emphasis:

Apply a variety of problem-solving techniques to solve problems.

Stimulus Attributes:

Test items may include illustrations of the following: tables, graphs, base-10 blocks, cubes, sticks, number lines, and other counting manipulatives.

Format:

- Model real-world situations with objects
- Use representations such as graphs, tables, and equations to draw conclusions

Content Limits:

- Limit unknowns to 2-digit whole numbers
- Limit algebraic equations to one type of operation

Primary Process Standards:

Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:

- Inappropriate operations selected
- Computational errors

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Oklahoma Academic Standards 1.2 Sample Test Items:

Primary Process Standard: 5M3.2
Depth of Knowledge: 1
Correct Answer: D

What value of *w* makes this equation true?

$$w + 17 = 26$$

A $w = 43$

B $w = 19$

C $w = 9$

D $w = 2$

Primary Process Standard: 5M4.3
Depth of Knowledge: 1
Correct Answer: B

What value of *m* makes this equation true?

$$4 \cdot 9 = 2 \cdot m$$

A $m = 2$

B $m = 18$

C $m = 9$

D $m = 2$

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Primary Process Standard: 5M2.1
Depth of Knowledge: 2
Correct Answer: A

Randi solved this equation in one step to find the solution for *x*.

$$6 + x = 10$$

Which of these solves the equation?

A Subtract 6 from the left side of the equation and subtract 6 from the right side of the equation.

B Add 6 to the left side of the equation and subtract 6 from the right side of the equation.

C Subtract 6 from the left side of the equation and add 6 to the right side of the equation.

D Add 6 to the left side of the equation and add 6 to the right side of the equation.

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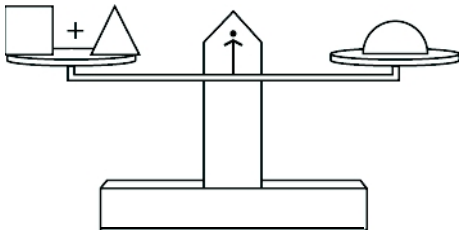
Primary Process Standard: 5M3.3
Depth of Knowledge: 3
Correct Answer: B

The scale shown is balanced.



Which sentence must be true?

A △ = ◠ + □

B △ = ◠ − □

C △ = ◠ × □

D △ = ◠ ÷ □

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OAS Standard:

Standard 1. Algebraic Reasoning: Patterns and Relationships—The student will use algebraic methods to describe patterns and solve problems in a variety of contexts.

OAS Objective:

3. Recognize and apply the commutative, associative, and distributive properties to solve problems (e.g., $3 \times (2 + 4) = (3 \times 2) + (3 \times 4)$).

Item Specifications:

Emphasis:

Apply the use of the properties of arithmetic to solve problems.

Stimulus Attributes:

Test items may include variables and illustrations of the following: base-10 blocks, cubes, and other counting manipulatives.

Format:

- Identify the basic properties of arithmetic and use them to compute with whole numbers
- Identify mathematical and nonmathematical situations that are facilitated by the use of the arithmetic properties

Content Limits:

- Limit numbers to three-digit whole numbers
- Limit situations to using two of the basic properties of arithmetic

Primary Process Standards:

Process Standard 2: Communication
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:

- Computational errors
- Failure to generalize or specify the appropriate property

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Oklahoma Academic Standards 1.3 Sample Test Items:

Primary Process Standard: 5M5.1
Depth of Knowledge: 1
Correct Answer: C

Which expression is equivalent to $4 \cdot b$?

A $4 + b$
B $b - 4$
C $b \cdot 4$
D $4 \div b$

Primary Process Standard: 5M2.4
Depth of Knowledge: 2
Correct Answer: A

Which expression shows a way to compute 12×34?

A $(10 \times 34) + (2 \times 34)$
B $(12 \times 30) + (10 \times 4)$
C $(10 \times 30) + (2 \times 4)$
D $(10 \times 2) + (30 \times 4)$

Primary Process Standard: 5M1.3
Depth of Knowledge: 2
Correct Answer: B

Which expression is equivalent to $x(4 + 6)$?

A $(x + 4) \cdot (x + 6)$
B $(x \cdot 4) + (x \cdot 6)$
C $(4 \cdot x) \cdot (x + 6)$
D $(4 \cdot 6) + (4 \cdot x)$

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Primary Process Standard: 5M4.2
Depth of Knowledge: 2
Correct Answer: B

At Mr. Clark's shop, his employees work 20 hours each week and earn $7 per hour. He uses this expression to find the total weekly payroll for *n* employees.

$$7 \cdot (20 \cdot n)$$

Which is an equivalent expression that can be used to find the total weekly payroll?

A $7 \cdot (20 \div n)$

B $(7 \cdot 20) \cdot n$

C $20 \cdot (n + 7)$

D $(n + 20) \cdot 7$

Primary Process Standard: 5M2.3
Depth of Knowledge: 3
Correct Answer: C

Which equation demonstrates the distributive property?

A $x \cdot 3 = 3 \cdot x$

B $4(n \cdot 6) = 4n \cdot 6$

C $3(x + 4) = 3x + 12$

D $n \cdot \frac{1}{n} = 1$

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Primary Process Standard: 5M3.3
Depth of Knowledge: 3
Correct Answer: B

Which equation demonstrates the commutative property of multiplication?

A $x \cdot \frac{1}{x} = 1$

B $6x \cdot 3 = 3 \cdot 6x$

C $3(4m \cdot 5) = 12m \cdot 15$

D $12 \cdot (n \cdot 2) = (12 \cdot n) \cdot 2$

Primary Process Standard: 5M3.4
Depth of Knowledge: 3
Correct Answer: D

$$4(x + 3)$$

Which of these is equivalent to the expression shown above?

A $4x + 3$

B $4x + 4$

C $4x + 7$

D $4x + 12$

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OAS Standard:

Standard 2: Number Sense and Operation—The student will use numbers and number relationships to acquire basic facts. The student will estimate and compute with whole numbers, fractions, and decimals.

OAS Objective:

1. Number Sense

   a. Apply the concept of place value of whole numbers through hundred millions (9 digits) and model, read, and write decimal numbers through the thousandths.

Item Specifications:

Emphasis:

Solve problems by analyzing the place value of whole numbers and the representations of rational numbers.

Stimulus Attributes:

Test items may include illustrations of the following: base-10 blocks, sticks, and other counting manipulatives.

Format:

- Use place value concepts in real-world situations
- Select and apply representations of decimals to solve problems
- Use representations of decimals to model and analyze real-world situations

Content Limits:

- Limit decimals to the thousandths place
- Limit whole numbers to 9 digits

Primary Process Standards:

Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:

- Misrepresentation of place value

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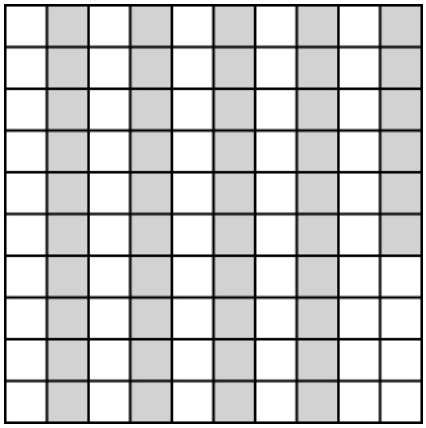
Oklahoma Academic Standards 2.1a Sample Test Items:

Primary Process Standard: 5M4.1
Depth of Knowledge: 1
Correct Answer: C

The grid shown represents 1 whole.



Which decimal number represents the shaded fractional part of this grid?

A 46.00

B 4.60

C 0.46

D 0.046

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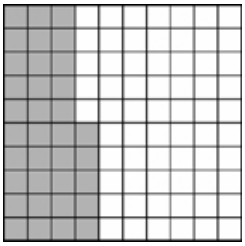
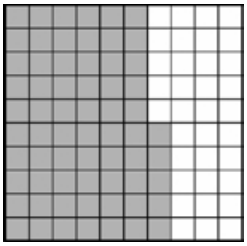
Primary Process Standard: 5M3.2
Depth of Knowledge: 2
Correct Answer: A

Which 10 × 10 grid is shaded to represent the decimal number that, when added to 0.65, results in a total of 1.00?

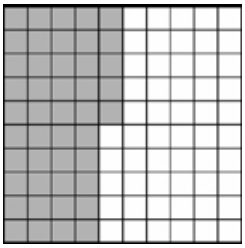
A



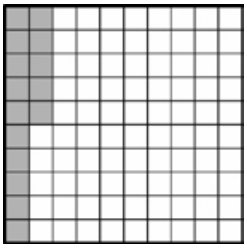
B



C

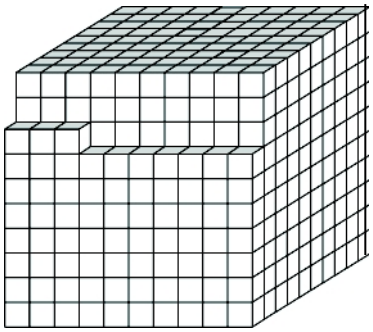


D



Primary Process Standard: 5M4.1
Depth of Knowledge: 2
Correct Answer: B

Which decimal number represents this thousandths cube?



A 0.0973

B 0.973

C 9.73

D 97.3

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OAS Standard:

Standard 2: Number Sense and Operation—The student will use numbers and number relationships to acquire basic facts. The student will estimate and compute with whole numbers, fractions, and decimals.

OAS Objective:

1. Number Sense

   b. Represent with models the connection between fractions and decimals, compare and order fractions and decimals, and be able to convert from one representation to the other to solve problems. (e.g., use 10 × 10 grids, base-10 blocks).

Item Specifications:

Emphasis:

Translate and demonstrate knowledge of the connections among rational numbers represented as fractions and decimals.

Stimulus Attributes:

Test items may include illustrations of the following: tables, graphs, number lines, base-10 blocks, 10 × 10 grids, cubes, sticks, and other counting manipulatives.

Format:

- Identify connections among representations of fractions and decimals
- Organize representations of fractions and decimals
- Translate among representations of fractions and decimals
- Recognize and generate equivalent forms of fractions and decimals

Content Limits:

- Limit decimals to the hundredths place
- Limit fractions to halves, fourths, and tenths in items that include both decimals and fractions

Primary Process Standards:

Process Standard 4: Connections

Distractor Domain:

- Computational errors
- Conversion errors
- Incorrect models
- Misrepresentation of place value

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Oklahoma Academic Standards 2.1b Sample Test Items:

Primary Process Standard: 5M4.3
Depth of Knowledge: 1
Correct Answer: B

Jim used $\frac{1}{4}$ pound (lb) of rice. Which is equivalent to the amount of rice Jim used?

A 0.15 lb
B 0.25 lb
C 0.50 lb
D 0.75 lb

Primary Process Standard: 5M4.3
Depth of Knowledge: 1
Correct Answer: C

A cookie recipe requires $\frac{1}{2}$ cup of sugar. Which is equivalent to $\frac{1}{2}$?

A $\frac{2}{3}$
B $\frac{3}{5}$
C $\frac{4}{8}$
D $\frac{6}{10}$

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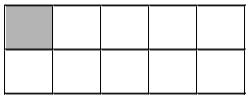
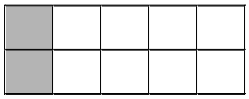
Primary Process Standard: 5M4.1
Depth of Knowledge: 1
Correct Answer: B

Each rectangle pictured represents one whole and is made up of small squares that are all the same size. Which rectangle has $\frac{1}{5}$ of its area shaded?

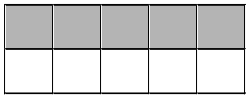
A



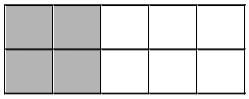
B



C



D



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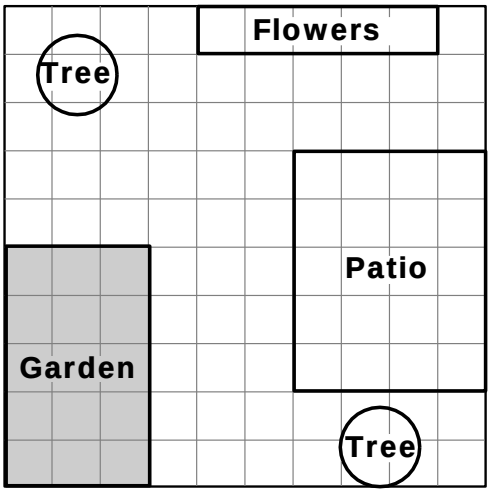
Primary Process Standard: 5M4.3
Depth of Knowledge: 1
Correct Answer: B

Thomas made a drawing of his yard on a grid. The shaded squares represent the area for the garden.

Thomas's Yard



Which decimal number is equivalent to the fractional part of Thomas's yard that will become the garden?

A 0.015

B 0.15

C 1.50

D 15.00

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Primary Process Standard: 5M4.3
Depth of Knowledge: 2
Correct Answer: C

Which set contains numbers that are listed in order from <u>least</u> to <u>greatest</u>?

A $\left\{0.5,\ 0.75,\ \frac{1}{4}\right\}$

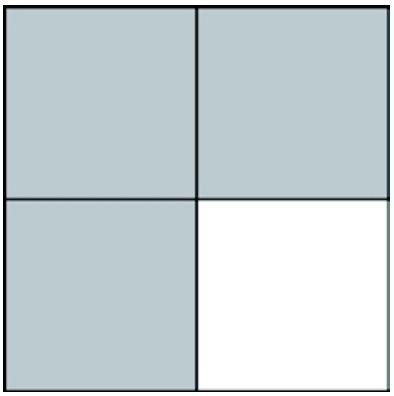
B $\left\{0.75,\ 0.5,\ \frac{1}{4}\right\}$

C $\left\{\frac{1}{4},\ 0.5,\ 0.75\right\}$

D $\left\{\frac{1}{4},\ 0.75,\ 0.5\right\}$

Primary Process Standard: 5M4.3
Depth of Knowledge: 2
Correct Answer: D

Which decimal number <u>best</u> represents the shaded part of this picture?



A 0.3

B 0.34

C 0.6

D 0.75

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OAS Standard:

Standard 2: Number Sense and Operation—The student will use numbers and number relationships to acquire basic facts. The student will estimate and compute with whole numbers, fractions, and decimals.

OAS Objective:

1. Number Sense

   c. Identify and compare integers using real-world situations. (e.g., owing money, temperature, or measuring elevations above and below sea level).

Item Specifications:

Emphasis:

Demonstrate a working knowledge of positive and negative integers to solve problems in mathematical and real world contexts.

Stimulus Attributes:

Test items may include illustrations of the following: coordinate graphs, number lines, balances, rulers, thermometers, calculator displays, tables, data sets, and line, bar, and circle graphs.

Format:

- Identify and compare representations of positive and negative integers in real-life contexts

Content Limits:

- Limit integers to 4 digits

Primary Process Standards:

Process Standard 1: Problem Solving
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:

- Common errors
- Incorrect comparisons
- Misidentification of integers

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Oklahoma Academic Standards 2.1c Sample Test Items:

Primary Process Standard: 5M4.1
Depth of Knowledge: 1
Correct Answer: B

The table shows the midday temperatures for each of five days during one week last winter.

Midday Temperatures

Day	Temperature (°F)
Monday	7
Tuesday	-2
Wednesday	-1
Thursday	4
Friday	0

Which lists the weekdays in order from the day with the lowest midday temperature to the day with the highest midday temperature?

A Friday, Wednesday, Tuesday, Thursday, Monday
B Tuesday, Wednesday, Friday, Thursday, Monday
C Friday, Tuesday, Wednesday, Thursday, Monday
D Tuesday, Friday, Wednesday, Thursday, Monday

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Primary Process Standard: 5M5.2
Depth of Knowledge: 1
Correct Answer: A

Which of these lists of integers is in order from <u>greatest</u> to <u>least</u>?

A 28, 25, 23, 0

B 27, 5, 2, 21

C 8, 5, 27, 24

D 3, 0, 21, 26

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OAS Standard:

Standard 2: Number Sense and Operation—The student will use numbers and number relationships to acquire basic facts. The student will estimate and compute with whole numbers, fractions, and decimals.

OAS Objective:

2. Number Operations

   a. Estimate, add, or subtract decimal numbers with same and different place values to solve problems (e.g., 3.72 + 1.4, \$4.56 − \$2.12).

Item Specifications:

Emphasis:

Apply estimation or computation skills to add or subtract decimal numbers.

Stimulus Attributes:

Test items may include illustrations of the following: tables, graphs, base-10 blocks, cubes, and other counting manipulatives.

Format:

- Use estimation to determine solutions to real-world situations involving decimals
- Add or subtract decimal numbers with the same or different place values

Content Limits:

- Limit decimal numbers to the 1000ths place

Primary Process Standards:

Process Standard 1: Problem Solving

Process Standard 4: Connections

Distractor Domain:

- Computational errors
- Failure to discriminate place value
- Error in placement of decimal point
- Rounding errors

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Oklahoma Academic Standards 2.2a Sample Test Items:

Primary Process Standard: 5M1.2
Depth of Knowledge: 1
Correct Answer: B

Karen estimated the amount of change she would get if she gave a clerk $20 for items that totaled $16.71. Which is closest to the amount of change Karen should receive?

A $2
B $3
C $4
D $5

Primary Process Standard: 5M1.4
Depth of Knowledge: 2
Correct Answer: D

José helps his mother bake pies. He earns between $1.00 and $2.00 for each pie they make. Which of these is a reasonable amount for José to earn for helping to make 24 pies?

A $2
B $4
C $20
D $40

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Primary Process Standard: 5M1.2
Depth of Knowledge: 2
Correct Answer: C

During a science activity, Elizabeth found the mass of two pecans to be 3.3 grams and 1.17 grams. What is the total mass of these two pecans?

A 1.50 grams
B 4.13 grams
C 4.47 grams
D 5.00 grams

Primary Process Standard: 5M1.3
Depth of Knowledge: 2
Correct Answer: A

In a relay race, Mia ran 1.43 kilometers. Then she passed the baton to Gerald, who ran an additional 2.7 kilometers. How many kilometers did they run in all?

A 4.13 kilometers
B 3.36 kilometers
C 3.50 kilometers
D 1.70 kilometers

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Primary Process Standard: 5M2.4
Depth of Knowledge: 2
Correct Answer: C

Maggie had a bag of peanuts that weighed 2.84 pounds. She took some of the peanuts out of the bag. The bag then weighed 1.24 pounds. What was the weight of the peanuts that Maggie took out of the bag?

A 4.08 pounds

B 3.60 pounds

C 1.60 pounds

D 1.06 pounds

Primary Process Standard: 5M2.4
Depth of Knowledge: 2
Correct Answer: B

Each box of cookies Jimmy sells raises $3.95 for his baseball team. His goal is to raise $160. Which expression has a value that is <u>closest</u> to the number of boxes Jimmy needs to sell to reach his goal?

A 160 ÷ 40

B 160 ÷ 4

C 160 × 40

D 160 × 4

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OAS Standard:

Standard 2: Number Sense and Operation—The student will use numbers and number relationships to acquire basic facts. The student will estimate and compute with whole numbers, fractions, and decimals.

OAS Objective:

2. Number Operations

   b. Estimate, add, or subtract fractions (including mixed numbers) to solve problems using a variety of methods (e.g., use fraction strips, use area models, find a common denominator).

Item Specifications:

Emphasis:

Demonstrate the ability to find or estimate sums and differences using fractions and mixed numbers (with like and unlike denominators).

Stimulus Attributes:

Test items may include the following: finding the LCD, fraction strips, counting manipulatives, two-dimensional figures, tables, graphs, charts, maps, scale drawings, data sets, and other diagrams.

Format:

- Use fractions and mixed numbers to solve problems involving sums and differences in mathematical and real-world contexts
- Use estimation of fractions and mixed numbers in real-world applications
- Items may include fractions with different denominators
- Items may include conversion from improper fractions to mixed numbers

Content Limits:

- Limit fractions to halves, thirds, fourths, fifths, sixths, eighths, tenths, and twelfths
- Limit mathematical and real-world contexts to age appropriate situations

Primary Process Standards:

Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:

- Incorrect procedures
- Computational errors
- Scaling errors in estimation
- Use of incorrect equivalencies

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Oklahoma Academic Standards 2.2b Sample Test Items:

Primary Process Standard: 5M4.4
Correct Answer: D

Abby wanted to make a good grade on her math test. She studied with Rudy for $2\frac{1}{4}$ hours and then studied alone for $1\frac{3}{4}$ hours. How many hours did Abby study for her math test in all?

A 3 hours

B $3\frac{4}{12}$

C $3\frac{4}{8}$

D 4 hours

Primary Process Standard: 5M1.1
Depth of Knowledge: 2
Correct Answer: A

Once a year, Patia's grandfather measures her height. Last year, Patia was $4\frac{1}{2}$ feet (ft) tall. One year later, she is $4\frac{3}{4}$ feet tall. How much did Patia grow in that one year?

A $\frac{1}{4}$ ft

B $\frac{4}{6}$ ft

C $\frac{4}{12}$ ft

D $\frac{7}{8}$ ft

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Primary Process Standard: 5M4.4
Depth of Knowledge: 2
Correct Answer: D

Billy has a flowerpot that is $18\frac{3}{8}$ inches in height. He put the flowerpot on a brick that is $4\frac{1}{4}$ inches in height. What is the total height of the brick and flowerpot?

A $22\frac{4}{12}$ inches

B $22\frac{3}{8}$ inches

C $22\frac{2}{4}$ inches

D $22\frac{5}{8}$ inches

Primary Process Standard: 5M1.3
Depth of Knowledge: 3
Correct Answer: B

Jenny and Miranda are working on a puzzle. Jenny has completed $\frac{5}{8}$ of the puzzle and Miranda has completed $\frac{1}{3}$ of it. What fraction represents how much <u>more</u> of the puzzle Jenny has completed than Miranda?

A $\frac{1}{6}$

B $\frac{7}{24}$

C $\frac{4}{5}$

D $\frac{25}{24}$

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Primary Process Standard: 5M2.4
Depth of Knowledge: 3
Correct Answer: A

Hannah jogged $1\frac{3}{4}$ miles (mi) on Saturday and 3 miles on Sunday. What is the difference between these two distances?

A $1\frac{1}{4}$ mi

B $2\frac{1}{4}$ mi

C $2\frac{3}{4}$ mi

D $4\frac{3}{4}$ mi

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Primary Process Standard: 5M1.1
Depth of Knowledge: 3
Correct Answer: A

The table shows the amount of popcorn four students shared at the movies.

Popcorn Shared

Student	Amount of Popcorn (ounces)
Denise	$1\frac{3}{4}$
Juan	$\frac{5}{10}$
Nikita	$1\frac{1}{2}$
Walter	$1\frac{8}{10}$

What was the total amount of popcorn shared?

A $5\frac{11}{20}$

B $5\frac{1}{20}$

C $3\frac{17}{20}$

D $3\frac{17}{26}$

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OAS Standard:

Standard 2: Number Sense and Operation—The student will use numbers and number relationships to acquire basic facts. The student will estimate and compute with whole numbers, fractions, and decimals.

OAS Objective:

2. Number Operations

   c. Estimate and find the quotient (with and without remainders) with two-digit divisors and a two- or three-digit dividend to solve application problems.

Item Specifications:

Emphasis:

Demonstrate the ability to find or estimate quotients in real-world contexts.

Stimulus Attributes:

Test items may include illustrations of the following: tables, graphs, base-10 blocks, cubes, and other counting manipulatives.

Format:

- Use estimation of quotients in real-world applications
- Divide whole numbers by two-digit divisors with and without remainders expressed as whole numbers or fractions

Content Limits:

- Limit divisors to two digits
- Limit dividends to two or three digits

Primary Process Standards:

Process Standard 1: Problem Solving
Process Standard 4: Connections

Distractor Domain:

- Computational errors
- Error in expression of remainder as fraction

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Oklahoma Academic Standards 2.2c Sample Test Item:

Primary Process Standard: 5M4.4
Depth of Knowledge: 2
Correct Answer: C

Miranda gave 176 pieces of candy to 16 friends. Each friend received the same number of pieces. How many pieces of candy did each friend receive?

A 9 pieces

B 10 pieces

C 11 pieces

D 12 pieces

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OAS Standard:
Standard 3: Geometry—The student will apply geometric properties and relationships.

OAS Objective:
1. Compare and contrast the basic characteristics of circle and polygons (triangles, quadrilaterals, pentagons, hexagons, heptagons, octagons).

Item Specifications:
Emphasis:
Communicate characteristics of geometric figures using appropriate geometric language.

Stimulus Attributes:
Test items may include illustrations of the following: tables, graphs, protractors, two-dimensional geometric shapes, geoboards, and other geometric manipulatives.

Format:
- Identify, compare, and analyze attributes of two-dimensional figures
- Classify figures by their attributes
- Identify and use the concepts of similarity, congruence, and symmetry

Content Limits:
- Limit figures to circles, triangles, quadrilaterals, pentagons, hexagons, heptagons, octagons

Primary Process Standards:
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:
- Failure to discriminate figures or figure characteristics

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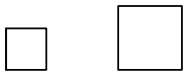
Oklahoma Academic Standards 3.1 Sample Test Items:

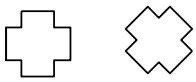
Primary Process Standard: 5M4.1
Depth of Knowledge: 1
Correct Answer: B

Which pair of shapes appears to be congruent?

A

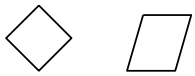


B



C

D



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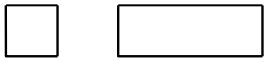
Primary Process Standard: 5M4.1
Depth of Knowledge: 1
Correct Answer: D

Which pair of shapes appears to be similar but <u>not</u> congruent?

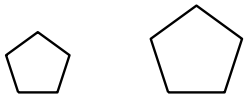
A

B

C



D



Primary Process Standard: 5M3.3
Depth of Knowledge: 3
Correct Answer: A

Which shapes will always be similar?

A two squares
B two triangles
C two pentagons
D two parallelograms

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OAS Standard:
Standard 3: Geometry—The student will apply geometric properties and relationships.

OAS Objective:
2. Classify angles (e.g., acute, right, obtuse, straight).

Item Specifications:
Emphasis:
Identify the characteristics of different types of angles

Stimulus Attributes:
Test items may include diagrams, tables, and graphs.

Format:
- Classify types of angles
- Classify angles in two-dimensional figures

Content Limits:
- Limit angle types to acute, right, obtuse, and straight

Primary Process Standards:
Process Standard 2: Communication
Process Standard 4: Connections

Distractor Domain:
- Incorrect classification of angles

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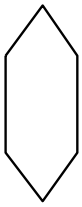
Oklahoma Academic Standards 3.2 Sample Test Items:

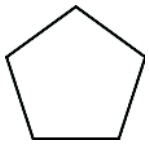
Primary Process Standard: 5M2.3
Depth of Knowledge: 2
Correct Answer: B

Which shape does not appear to contain 2 acute angles?

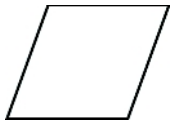
A



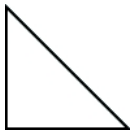
B



C



D



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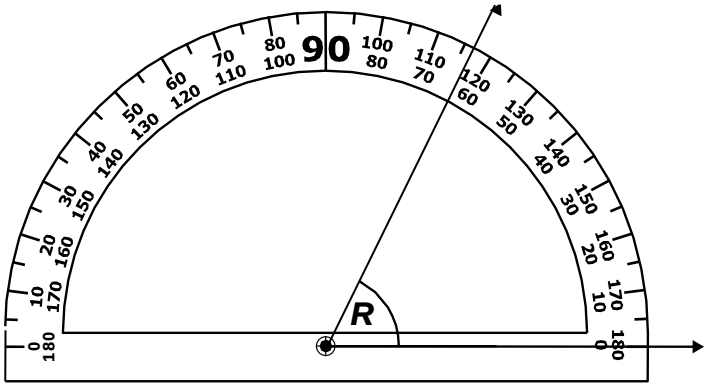
Primary Process Standard: 5M2.1
Depth of Knowledge: 2
Correct Answer: A

Harry used a protractor to find the measure of ∠ *R*.



Which term describes ∠ *R*?

A acute angle

B obtuse angle

C right angle

D straight angle

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Primary Process Standard: 5M2.1
Depth of Knowledge: 3
Correct Answer: B

Ariana combined an acute angle and a right angle to create a new angle. Which type of angle did Ariana create?

A acute

B obtuse

C straight

D right

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OAS Standard:

Standard 4: Measurement—The student will use appropriate units of measure to solve problems in a variety of contexts.

OAS Objective:

1. Measurement

   a. Compare, estimate, and determine the measurement of angles.

Item Specifications:

Emphasis:

Demonstrate the ability to find angle measures.

Stimulus Attributes:

Test items may include illustrations of the following: coordinate graphs, geometric figures, protractors, geoboards, other geometric manipulatives, measuring instruments, tables, graphs, charts, maps, scale drawings, circle graphs, and other diagrams.

Format:

- Identify and analyze angle measures in mathematical situations and in real-world contexts

Content Limits:

- Limit angle measures to whole numbers no greater than 180 degrees

Primary Process Standards:

Process Standard 1: Problem Solving
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:

- Common errors
- Computational errors
- Incorrect use of measurement instrument

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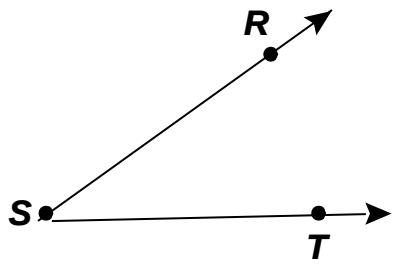
Oklahoma Academic Standards 4.1a Sample Test Items:

Primary Process Standard: 5M1.4
Depth of Knowledge: 1
Correct Answer: D

Which is closest to the measure of ∠ *RST*?



A 150°

B 120°

C 70°

D 35°

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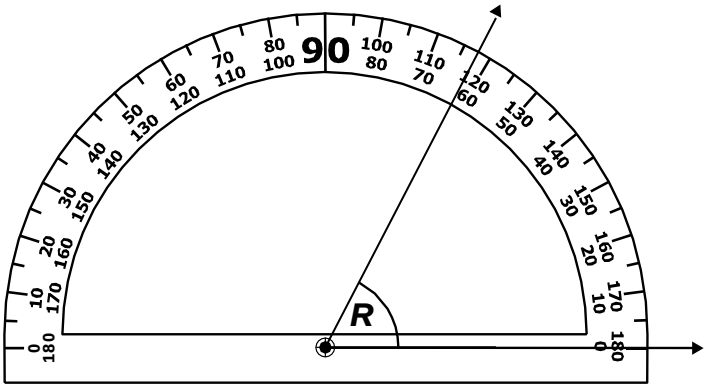
Primary Process Standard: 5M5.2
Depth of Knowledge: 2
Correct Answer: A

Which is <u>closest</u> to $m\angle R$?



A 63°

B 77°

C 117°

D 123°

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OAS Standard:

Standard 4: Measurement—The student will use appropriate units of measure to solve problems in a variety of contexts.

OAS Objective:

1. Measurement

   b. Develop and use the formula for perimeter and area of a square and rectangle to solve application problems.

Item Specifications:

Emphasis:

Apply use of formulas to calculate the perimeter and area of squares and rectangles.

Stimulus Attributes:

Test items may include illustrations of the following: diagrams of rectangles or squares, dot grids, geoboards, and other geometric manipulatives.

Format:

- Use the formula to find the perimeter of a rectangle
- Use the formula to find the area of a rectangle
- Determine the number of square tiles that would be needed to build a rectangle of a certain area or perimeter

Content Limits:

- Limit figures to squares and rectangles or figures that can be composed of squares and rectangles

Primary Process Standards:

Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections

Distractor Domain:

- Inappropriate formulas
- Computational errors

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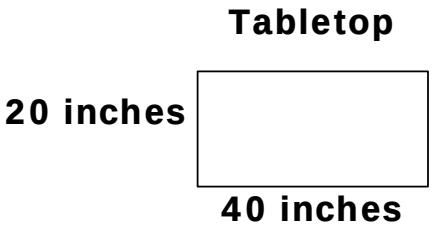
Oklahoma Academic Standards 4.1b Sample Test Items:

Primary Process Standard: 5M1.1
Depth of Knowledge: 1
Correct Answer: D

Kim is using 1-inch-square tiles to cover a rectangular tabletop.



What is the area, in square inches, of the tabletop?

A 60 square inches
B 120 square inches
C 400 square inches
D 800 square inches

Primary Process Standard: 5M3.2
Depth of Knowledge: 2
Correct Answer: C

Wade built a fence around a rectangular section of his backyard. The length of the section is 20 feet and the width is 5 feet. What is the perimeter of the fenced section?

A 10 feet
B 40 feet
C 50 feet
D 100 feet

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Primary Process Standard: 5M4.4
Depth of Knowledge: 2
Correct Answer: C

An architect drew a rectangle on part of a house plan. The length of the rectangle is 12 centimeters (cm) and the width is 8 cm. What is the area of the rectangle?

A 20 cm^2
B 40 cm^2
C 96 cm^2
D 106 cm^2

Primary Process Standard: 5M3.3
Depth of Knowledge: 3
Correct Answer: C

Lee drew this rectangular shape.

If the length of the rectangle is increased by 2 units, what must happen to the perimeter of the rectangle?

A The perimeter must increase by 2 units.
B The perimeter must decrease by 2 units.
C The perimeter must increase by 4 units.
D The perimeter must decrease by 4 units.

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OAS Standard:

Standard 4: Measurement—The student will use appropriate units of measure to solve problems in a variety of contexts.

OAS Objective:

1. Measurement

   c. Convert basic measurements of volume, mass, and distance within the same system for metric and customary units (e.g., inches to feet, hours to minutes, centimeters to meters).

Item Specifications:

Emphasis:

Translate among metric measurements and among customary measurements.

Stimulus Attributes:

Test items may include illustrations of the following: diagrams of two- and three-dimensional figures, maps, graphs, rulers, protractors, thermometers, beakers, or other measuring instruments.

Format:

- Compute simple metric unit conversions
- Compute simple customary unit conversions

Content Limits:

- Limit conversion to inches to feet and feet to inches
- Limit conversion to feet to yards and yards to feet
- Limit conversion to minutes to hours and hours to minutes
- Limit conversion to ounces to pounds and pounds to ounces
- Limit conversion to pounds to tons and tons to pounds
- Limit conversion to ounces to cups and cups to ounces
- Limit conversion to cups to pints and pints to cups
- Limit conversion to pints to quarts and quarts to pints
- Limit conversion to quarts to gallons and gallons to quarts
- Limit conversion to millimeters to centimeters and centimeters to millimeters
- Limit conversion to centimeters to meters and meters to centimeters
- Limit conversion to grams to kilograms and kilograms to grams
- Limit conversion to milliliters to liters and liters to milliliters

Primary Process Standards:

Process Standard 4: Connections

Distractor Domain:

- Inappropriate procedure or incorrect value in conversion
- Computational errors

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Oklahoma Academic Standards 4.1c Sample Test Items:

Primary Process Standard: 5M5.1
Depth of Knowledge: 1
Correct Answer: B

Kailee ran 5,000 centimeters from school to the bus stop. How many meters are equivalent to 5,000 centimeters?

A 5 meters

B 50 meters

C 5,000 meters

D 500,000 meters

Primary Process Standard: 5M5.1
Depth of Knowledge: 2
Correct Answer: B

John made $6\frac{1}{2}$ quarts of lemonade for the parent meeting.

How many pints of lemonade is $6\frac{1}{2}$ quarts?

A $12\frac{1}{2}$ pints

B 13 pints

C $19\frac{1}{2}$ pints

D 26 pints

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Primary Process Standard: 5M4.4
Depth of Knowledge: 3
Correct Answer: C

Jan plans to make some dip for her party.

- **The recipe calls for 1 cup of sour cream.**
- **She plans to triple the recipe.**
- **Sour cream is sold in 1-pint containers.**

What is the least number of 1-pint containers of sour cream Jan must have to make the dip?

A 4 containers

B 3 containers

C 2 containers

D 1 container

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OAS Standard:

Standard 4: Measurement—The student will use appropriate units of measure to solve problems in a variety of contexts.

OAS Objective:

2. Money: Solve a variety of problems involving money.

Item Specifications:

Emphasis:

Apply calculating skills to solve problems involving money.

Stimulus Attributes:

Test items may include illustrations of the following: pictures, tables, and charts.

Format:

- Solve real-world problems involving money

Content Limits:

- Limit dollar amounts to thousands place
- Limit operations to addition and subtraction

Primary Process Standards:

Process Standard 1: Problem Solving
Process Standard 3: Reasoning
Process Standard 5: Representation

Distractor Domain:

- Computational errors
- Select incorrect operation

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Oklahoma Academic Standards 4.2 Sample Test Items:

Primary Process Standard: 5M1.1
Depth of Knowledge: 1
Correct Answer: C

The receipt shows the cost of some items.

Red's Grocery

Bread…… …. $1.35
Milk…… ……. $2.45
Chips…… ….. $2.19
Eggs…… … $3.48
School supplies…..$7.89

Total: $17.36

What is the total cost for the bread and milk?

A $3.60

B $3.70

C $3.80

D $3.90

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Primary Process Standard: 5M1.5
Depth of Knowledge: 2
Correct Answer: A

Jack has $80 to spend on some of the items listed.

Shirts	**$16**
Pants	**$21**
Shoes	**$32**
Jackets	**$45**

(All prices include tax.)

How much money should he have left after paying for one jacket <u>and</u> one shirt?

A $19

B $35

C $61

D $64

Primary Process Standard: 5M4.2
Depth of Knowledge: 2
Correct Answer: D

Noel earned $23 washing cars. He paid his sister $9.50 for helping. What is the difference between the amount Noel earned and the amount he paid his sister?

A $9.27

B $9.73

C $12.50

D $13.50

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Primary Process Standard: 5M1.3
Depth of Knowledge: 3
Correct Answer: B

Kamilah took $7.75 to her school book fair. She bought 3 posters and 1 book. The prices, including tax, for items sold at the book fair are shown.

Book Fair

Item	Price
stickers	$0.25
pencil	$0.35
poster	$1.05
gel pen	$1.60
book	$3.00

What is the greatest number of pencils Kamilah can buy with the money she has left?

A 5 pencils

B 4 pencils

C 2 pencils

D 1 pencil

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OAS Standard:

Standard 5: Data Analysis—The student will use data analysis, statistics, and probability to interpret data in a variety of contexts.

OAS Objective:

1. Data Analysis

   a. Compare and translate displays of data and justify the selection of the type of table or graph (e.g., charts, tables, bar graphs, pictographs, line graphs, circle graphs, Venn diagrams).

Item Specifications:

Emphasis:

Demonstrate knowledge of data representation through translation and comparison.

Stimulus Attributes:

Test items may include illustrations of the following: tables, graphs, and charts.

Format:

- Translate between representations of data
- Compare how representations of data support inferences and predictions
- Select appropriate representations of data, such as tables, and bar, circle, or line graphs

Content Limits:

- Limit graphs to charts, tables, pictographs, Venn diagrams, and line, circle, or bar graphs
- Limit circle graphs to use of predetermined percents or to no percents on the circle graph (do not require determining percents)

Primary Process Standards:

Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:

- Misreported data
- Unsupportable conclusions
- Inappropriate representations

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Oklahoma Academic Standards 5.1a Sample Test Items:

Primary Process Standard: 5M5.2
Depth of Knowledge: 2
Correct Answer: A

Sam wants to make a graph that shows his height and the heights of his brothers and sisters. Which is the most appropriate type of graph for Sam to use?

A bar graph

B line graph

C pictograph

D circle graph

Primary Process Standard: 5M5.2
Depth of Knowledge: 2
Correct Answer: B

The table shows the favorite sports of 5th graders at Abram Middle School.

Favorite Sports

Sport	Percent of 5th Graders
baseball	23%
basketball	20%
football	40%
soccer	17%

Which type of graph is most appropriate to display the data in this table?

A bar graph

B circle graph

C line graph

D pictograph

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Primary Process Standard: 5M3.2
Depth of Knowledge: 2
Correct Answer: D

The pictograph shows the number of people that attended a play each night for five nights.

Play Attendance

Day	Number of People
Wednesday	🧍🧍
Thursday	🧍🧍
Friday	🧍🧍🧍🧍🧍
Saturday	🧍🧍🧍🧍
Sunday	🧍🧍🧍🧍🧍🧍

Key: 🧍 = 50 people

Which table <u>best</u> represents the information shown in the pictograph?

A

Play Attendance

Day	Number of People
Wednesday	100
Thursday	100
Friday	250
Saturday	200
Sunday	300

B

Play Attendance

Day	Number of People
Wednesday	2.0
Thursday	1.5
Friday	5.0
Saturday	4.0
Sunday	5.5

C

Play Attendance

Day	Number of People
Wednesday	2.0
Thursday	1.5
Friday	5.5
Saturday	4.0
Sunday	5.5

D

Play Attendance

Day	Number of People
Wednesday	100
Thursday	75
Friday	250
Saturday	200
Sunday	275

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Primary Process Standard: 5M5.1
Depth of Knowledge: 2
Correct Answer: C

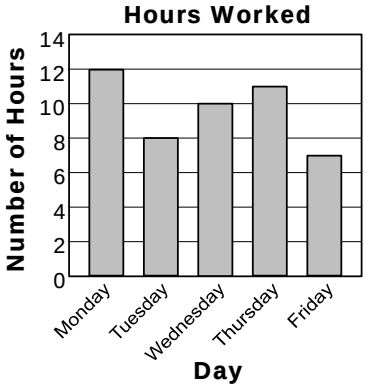
The table shows the number of hours Mr. Nguyen worked each day last week.

Hours Worked

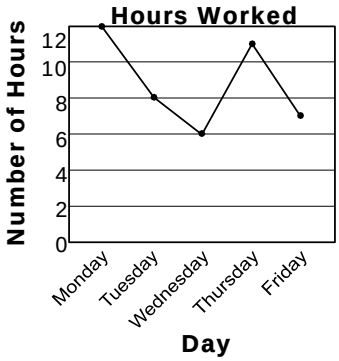
Day	Number of Hours
Monday	12
Tuesday	8
Wednesday	6
Thursday	11
Friday	7

Which graph <u>best</u> represents this data?

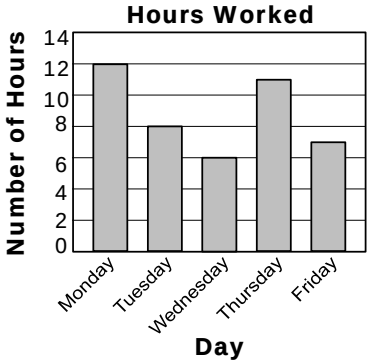
A



B



C



D

Hours Worked

Day	Number of Hours
Monday	○○○○○○
Tuesday	○○○○
Wednesday	○○○○○○
Thursday	○○○○○◑
Friday	○○○◑

Key: ○ = 2 hours

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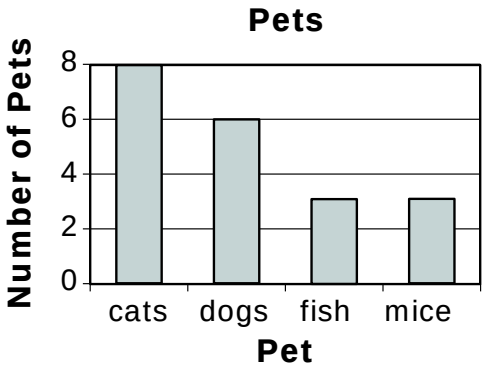
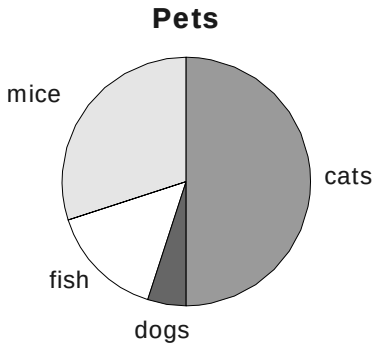
Primary Process Standard: 5M4.3
Depth of Knowledge: 2
Correct Answer: C

Stan wants to change this bar graph of the pets to a circle graph.

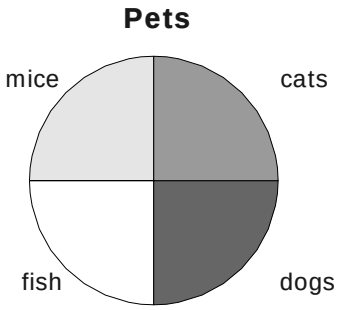


Which circle graph <u>best</u> represents the information in the bar graph?

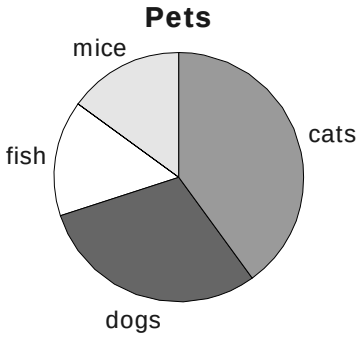
A



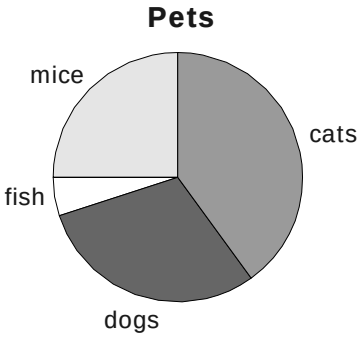
B



C



D



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Primary Process Standard: 5M5.2
Depth of Knowledge: 2
Correct Answer: C

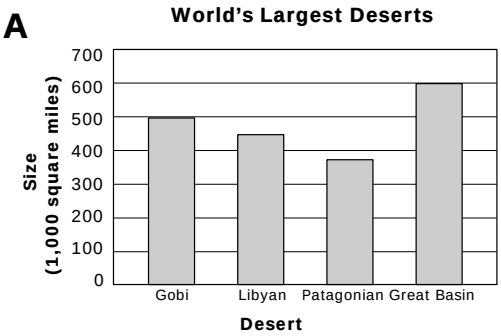
The areas of some of the world's largest deserts are shown in the table.

World's Largest Deserts

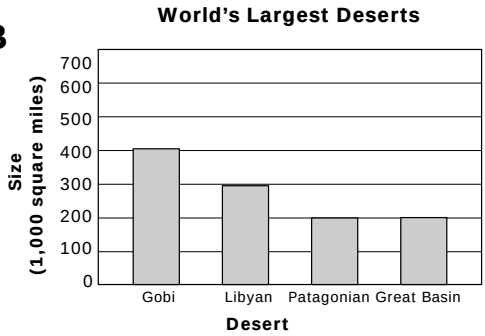
Desert	Size (square miles)
Gobi	500,000
Libyan	450,000
Patagonian	260,000
Great Basin	190,000

Which bar graph <u>best</u> represents the information in the table?

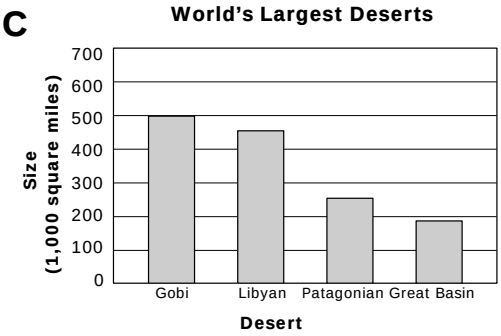
A



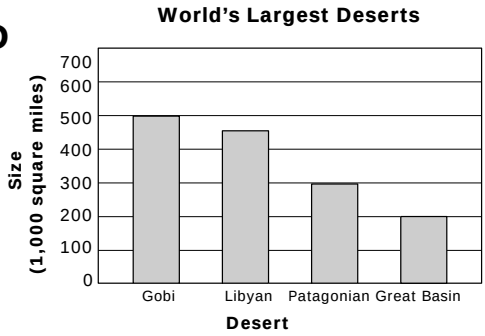
B



C



D



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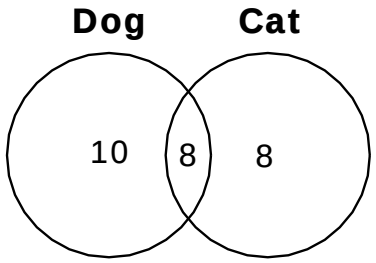
Primary Process Standard: 5M5.1
Depth of Knowledge: 3
Correct Answer: A

James surveyed 26 of his classmates who own at least one dog or cat. The table shows his results.

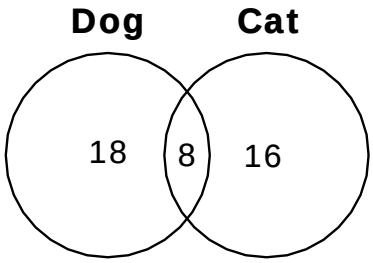
Pets	Number of Classmates
Dog	18
Cat	16

Which Venn diagram matches this information?

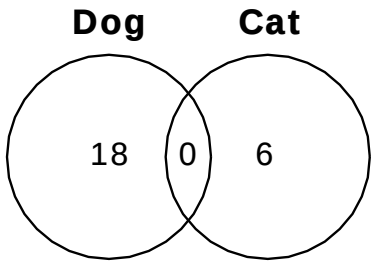
A



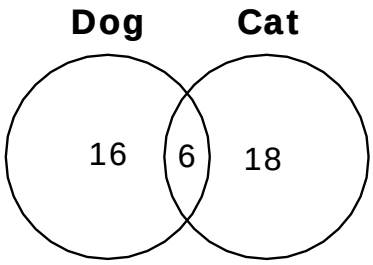
B



C



D



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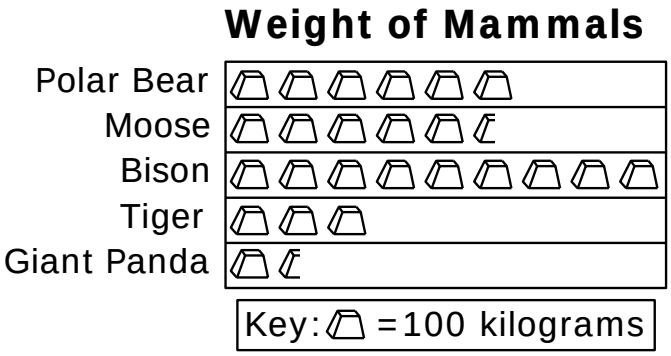
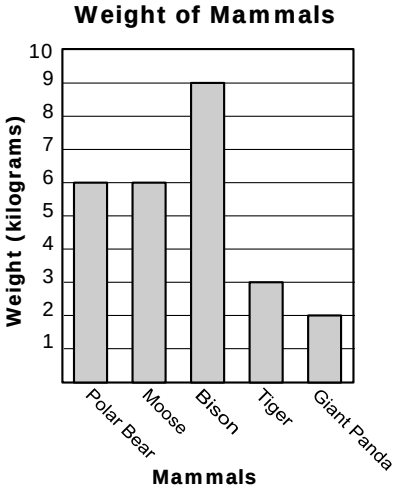
Primary Process Standard: 5M5.1
Depth of Knowledge: 3
Correct Answer: D

Katie wants to use a bar graph instead of this pictograph for her report on mammals.

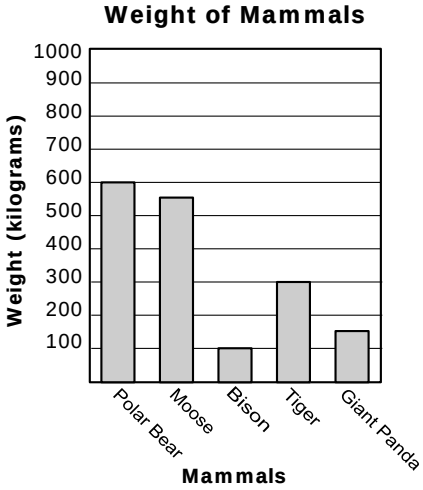


Which bar graph shows the same information as the pictograph?

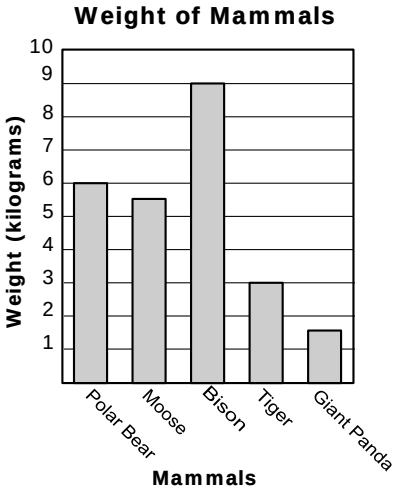
A



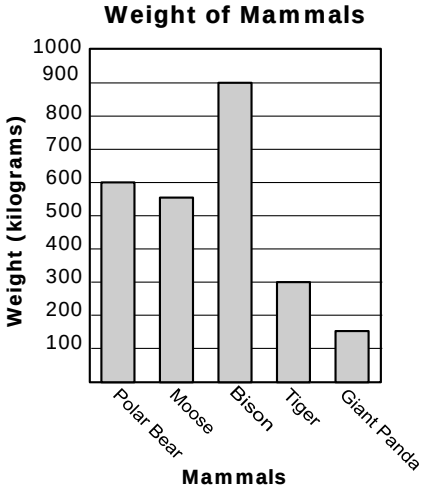
B



C



D



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OAS Standard:

Standard 5: Data Analysis—The student will use data analysis, statistics, and probability to interpret data in a variety of contexts.

OAS Objective:

2. Probability

   a. Determine the probability of events occurring in familiar contexts or experiments and express probabilities as fractions from zero to one (e.g., find the fractional probability of an event given a biased spinner).

Item Specifications:

Emphasis:

- Determine the probability of events in fractional form
- Emphasize pictorial representation of everyday objects

Stimulus Attributes:

Test items may include illustrations of the following: spinners, tables, graphs, and charts.

Format:

- Predict the probability of outcomes of simple experiments
- Fractions may be in simplest form

Content Limits:

- Limit to simple probability experiments (e.g., one spinner, one coin, etc.)

Primary Process Standards:

Process Standard 4: Connections

Distractor Domain:

- Computational errors
- Inappropriate procedures

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Oklahoma Academic Standards 5.2a Sample Test Items:

Primary Process Standard: 5M1.3
Depth of Knowledge: 1
Correct Answer: D

Jean will roll a fair, 6-sided number cube with the numbers 1 through 6 on the faces. What is the probability that the result will be a number greater than 6 on her first roll?

A 1

B $\frac{2}{3}$

C $\frac{1}{3}$

D 0

Primary Process Standard: 5M4.4
Depth of Knowledge: 1
Correct Answer: C

Jackie has a bag that contains 20 marbles that are all the same size and shape. In the bag are 5 black marbles, 7 green marbles, and 8 white marbles. If Jackie draws one marble from the bag without looking, what is the probability that her marble will be white

A $\frac{1}{8}$

B $\frac{8}{12}$

C $\frac{8}{20}$

D $\frac{12}{20}$

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Primary Process Standard: 5M3.1
Depth of Knowledge: 2
Correct Answer: C

A spinner is divided into 4 sections of different sizes and colors. The table shows the results of spinning the pointer 100 times.

Results of 100 Spins

Color of Section	Number of Times
green	20
red	30
blue	40
yellow	10

Based on these results, what is the probability that the pointer will stop on blue on the next spin?

A $\frac{1}{10}$

B $\frac{3}{10}$

C $\frac{2}{5}$

D $\frac{3}{5}$

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Primary Process Standard: 5M5.4
Depth of Knowledge: 3
Correct Answer: B

A box contains only blue and orange rubber balls. All balls are of the same size. The probability of drawing a blue ball on the first draw is $\frac{10}{27}$. What is the <u>least</u> number of orange balls in the box?

A 10

B 17

C 27

D 37

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OAS Standard:
Standard 5: Data Analysis—The student will use data analysis, statistics, and probability to interpret data in a variety of contexts.

OAS Objective:

2. Probability

   b. Use the fundamental counting principle on sets with up to four items to determine the number of possible combinations (e.g. create a tree diagram to see possible combinations).

Item Specifications:

Emphasis:
Apply the knowledge of simple probability to describe the outcome of different arrangements and combinations of sets of up to four items.

Stimulus Attributes:
Test items may include the following, but are not limited to: spinners, tables, lists, graphs, pictures, and charts. Emphasize pictorial representations of everyday objects.

Format:
- Describe the different possible outcomes of sets containing up to four different items
- Answers may include lists of items or numerical representations of possible combinations

Content Limits:
- Limit fundamental counting principle to sets of up to four different items

Primary Process Standards:
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:
- Combination error
- Misinterpretation of stimulus

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Oklahoma Academic Standards 5.2b Sample Test Items:

Primary Process Standard: 5M4.1
Depth of Knowledge: 1
Correct Answer: A

John wants to help his teacher decorate a bulletin board with the papers and borders shown.

Paper	Border
red green blue	stars hearts

Which list shows all the possible bulletin boards they could make with one color of paper and one type of border?

A red, stars
red, hearts
green, stars
green, hearts
blue, stars
blue, hearts

B red, stars
blue, stars
green, stars
hearts, stars
blue, green

C red, stars
red, hearts
blue, stars
blue, hearts
red, blue
stars, hearts

D red, stars
green, stars
green, hearts
blue, hearts

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Primary Process Standard: 5M5.1
Depth of Knowledge: 2
Correct Answer: D

Mr. Parker's math class had a pizza party. His students could choose from 3 kinds of pizza and 2 kinds of drinks.

Pizza Party Choices

Kinds of Pizza			Kinds of Drinks	
cheese	pepperoni	sausage	juice	milk

Which list shows all the different combinations of 1 kind of pizza and 1 kind of drink that each student can choose?

A cheese, juice

B cheese, juice
pepperoni, milk
sausage, juice

C cheese, juice
pepperoni, juice
sausage, milk
cheese, milk

D cheese, juice
pepperoni, juice
sausage, juice
cheese, milk
pepperoni, milk
sausage, milk

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Primary Process Standard: 5M3.2
Depth of Knowledge: 2
Correct Answer: A

Martin is going to make a cake using the choices shown in the table.

Cake Flavor	Icing Type	Sprinkle Color
chocolate vanilla strawberry	maple white yellow	red blue

How many different cakes can Martin make using one cake flavor, one icing type, and one sprinkle color?

A 18 different cakes

B 12 different cakes

C 8 different cakes

D 3 different cakes

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Primary Process Standard: 5M1.1
Depth of Knowledge: 2
Correct Answer: D

A local sandwich shop offers the choices shown for their lunch special. Jamie wants to order 1 sandwich.

Sandwich Choices

Meat	Sandwich Spread	Bread
ham	mustard	wheat
turkey	mayonnaise	white
chicken	ketchup	
roast beef		

How many possible sandwiches can Jamie make using 1 type of meat, 1 sandwich spread, and 1 type of bread?

A 3

B 4

C 9

D 24

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Primary Process Standard: 5M3.3
Depth of Knowledge: 3
Correct Answer: D

Philip is playing a game called "Mystery Word" with a friend. He gave his friend the following hints.

- **"My word has only two letters."**
- **"The first letter is either *a* or *i*."**
- **"The second letter is either *n* or *t*."**

Which lists all the possible words that follow Philip's hints?

A an, in

B it, at

C an, ai, in, it

D it, in, an, at

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OAS Standard:

Standard 5: Data Analysis—The student will use data analysis, statistics, and probability to interpret data in a variety of contexts.

OAS Objective:

3. Central Tendency: Determine the range (spread), mode (most often), and median (middle) of a set of data.

Item Specifications:

Emphasis:

- Demonstrate knowledge of data representation through determining the range, mode, and median
- Emphasize creativity using real-life situations and everyday objects

Stimulus Attributes:

Test items may include the following, but are not limited to: lists, tables, graphs, charts, and any of the following terms: range, spread, mode, most often, median, middle.

Format:

- Translate information in data through spread, frequency, and middle
- Compare how representations of data support inferences and predictions

Content Limits:

- Limit to descriptor of range, mode, and median
- Limit median items to an odd number of pieces of data

Primary Process Standards:

Process Standard 1: Problem Solving
Process Standard 2: Communication
Process Standard 3: Reasoning
Process Standard 4: Connections
Process Standard 5: Representation

Distractor Domain:

- Misreported data
- Miscalculation
- Unsupportable conclusions
- Incorrect choice of measure

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Oklahoma Academic Standards 5.3 Sample Test Items:

Primary Process Standard: 5M2.4
Depth of Knowledge: 2
Correct Answer: B

The range of the ages of the four children in Dario's family is 13. Which list could be the ages of the children in Dario's family?

A 3, 7, 9, 17

B 3, 9, 11, 16

C 5, 10, 16, 17

D 7, 8, 10, 18

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Primary Process Standard: 5M4.3
Depth of Knowledge: 2
Correct Answer: C

The pictograph shows the number of students from each school that visited the art museum yesterday.

Art Museum Attendance

School	Number of Students
G	★★★★★★★★
H	★★★★★★★★★
J	★★★★★★
K	★★★★★
L	★★★★★★

Key: ★ represents 10 students

What is the range of data in this graph?

A 150 students

B 140 students

C 40 students

D 20 students

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Primary Process Standard: 5M3.3
Depth of Knowledge: 3
Correct Answer: A

Edward recorded 6 of the 7 numbers he needed in a data set. He knows the median for this set of data is 15.

23, 12, 11, 20, 16, 15, ___?___

Which number could be the missing number in this set of data?

A 12

B 16

C 19

D 26

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