

**OKLAHOMA SCHOOL TESTING PROGRAM  
OKLAHOMA CORE CURRICULUM TESTS**

**TEST AND ITEM  
SPECIFICATIONS**

Mathematics  
Grade 6



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 6 Mathematics Test is to measure Oklahoma sixth-grade students' level of proficiency in mathematics. On the test, students are required to respond to a variety of items linked to the sixth-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.

<b>OAS Content Standards and Objectives</b>
<p><b>Algebraic Reasoning: Patterns and Relationships</b></p> <ul style="list-style-type: none"> <li>• Algebra Patterns (1.1)</li> <li>• Expressions and Equations (1.2)</li> <li>• Number Properties (1.3)</li> <li>• Solving Equations (1.4)</li> </ul>
<p><b>Number Sense and Operation</b></p> <ul style="list-style-type: none"> <li>• Number Sense (2.1)</li> <li>• Number Operations (2.2)</li> </ul>
<p><b>Geometry</b></p> <ul style="list-style-type: none"> <li>• Three-Dimensional Figures (3.1)</li> <li>• Congruent and Similar Figures (3.2)</li> <li>• Coordinate Geometry (3.3)</li> </ul>
<p><b>Measurement</b></p> <ul style="list-style-type: none"> <li>• Circles (4.1)</li> <li>• Conversions (4.2)</li> </ul>
<p><b>Data Analysis</b></p> <ul style="list-style-type: none"> <li>• Data Analysis (5.1)</li> <li>• Probability (5.2)</li> <li>• Central Tendency (5.3)</li> </ul>

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

### *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

### *Test Alignment with Oklahoma Academic Standards*

Criteria for Aligning the Test with the OAS Standards and Objectives
<p><b>1. Categorical Concurrence</b> 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.</p>
<p><b>2. Depth of Knowledge Consistency</b> 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.</p>
<p><b>3. Range of Knowledge Correspondence</b> The test is constructed so that at least 75% of the objectives for an OAS standard have at least one corresponding assessment item.</p>
<p><b>4. Balance of Representation</b> 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.</p>
<p><b>5. Source of Challenge</b> 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.</p>

**Oklahoma School Testing Program**  
**Grade 6 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).

<b>Standards and Objectives</b>	<b>Ideal Number of Items</b>	<b>Ideal Percentage of Items</b>
<b>1.0 Algebraic Reasoning: Patterns and Relationships</b>	<b>13</b>	<b>26%</b>
1.1 Algebra Patterns	4	
1.2 Expressions and Equations	4	
1.3 Number Properties	3	
1.4 Solving Equations	2	
<b>2.0 Number Sense and Operation</b>	<b>15</b>	<b>30%</b>
2.1 Number Sense	5	
2.2 Number Operations	10	
<b>3.0 Geometry</b>	<b>8</b>	<b>16%</b>
3.1 Three Dimensional Figures	2	
3.2 Congruent and Similar Figures	2	
3.3 Coordinate Geometry	4	
<b>4.0 Measurement</b>	<b>7</b>	<b>14%</b>
4.1 Circles	4	
4.2 Conversions	3	
<b>5.0 Data Analysis</b>	<b>7</b>	<b>14%</b>
5.1 Data Analysis	3	
5.2 Probability	2	
5.3 Central Tendency	2	
<b>Total Test</b>	<b>50</b>	<b>100%</b>

*(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://facstaff.wcer.wisc.edu/normw/TILSA/INFO%20and%20INSTR%20Align%20Anal%20513.pdf>.

### *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.

Grade 6 Mathematics		Grade 6 Reading	
Test Session	<u>Approximately:</u>	Test Session	<u>Approximately:</u>
Distributing books, filling in the Student Demographic Page, reading directions	20 minutes	Distributing books, reading directions	15 minutes
Administering the Mathematics Test; <b>no calculators are allowed</b> during this test	60–80 minutes	Administering the Reading Test	95–115 minutes
<b>Total:</b>	80–100 minutes	<b>Total:</b>	110–130 minutes

### ***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 the 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.

### ***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.

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.

### *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 sixth-grade mathematics section of the Oklahoma Academic Standards document.

The heading “Item Specifications” highlights important points about the item’s 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.**

## Oklahoma Academic Standards

### MATHEMATICS CONTENT STANDARDS

#### Grade 6

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, simplify and write algebraic expressions and equations, and solve simple equations in a variety of contexts.**

1. Generalize and extend patterns and functions using tables, graphs, and number properties (e.g., number sequences, prime and composite numbers, recursive patterns like the Fibonacci numbers).
2. Write algebraic expressions and simple equations that correspond to a given situation.
3. Use substitution to simplify and evaluate algebraic expressions (e.g., if  $x = 5$  evaluate  $3 - 5x$ ).
4. Write and solve one-step equations with one variable using number sense, the properties of operations, and the properties of equality (e.g.,  $\frac{1}{3}x = 9$ ).

**Standard 2: Number Sense and Operation—The student will use numbers and number relationships to solve a variety of problems. The student will estimate and compute with integers, fractions, and decimals.**

1. Number Sense: Convert, compare, and order decimals, fractions, and percents using a variety of methods.
2. Number Operations
  - a. Multiply and divide fractions and mixed numbers to solve problems using a variety of methods.
  - b. Multiply and divide decimals with one- or two-digit multipliers or divisors to solve problems.
  - c. Estimate and find solutions to single and multi-step problems using whole numbers, decimals, fractions, and percents (e.g.,  $\frac{7}{8} + \frac{8}{9}$  is about 2,  $3.9 + 5.3$  is about 9).
  - d. Use the basic operations on integers to solve problems.
  - e. Build and recognize models of multiples to develop the concept of exponents and simplify numerical expressions with exponents and parentheses using order of operations.

**Standard 3: Geometry—The student will use geometric properties and relationships to recognize, describe, and analyze shapes and representations in a variety of contexts.**

1. Compare and contrast the basic characteristics of three-dimensional figures (pyramids, prisms, cones, and cylinders).
2. Compare and contrast congruent and similar figures.
3. Identify the characteristics of the rectangular coordinate system and use them to locate points and describe shapes drawn in all four quadrants.

**Standard 4: Measurement—The student will use measurements within the metric and customary systems to solve problems in a variety of contexts.**

1. Use formulas to find the circumference and area of circles in terms of pi.
2. Convert, add, or subtract measurements within the same system to solve problems (e.g.,  $9' 8'' + 3' 6''$ ,  $150 \text{ minutes} = \underline{\hspace{1cm}}$  hours and minutes,  $6 \text{ square inches} = \underline{\hspace{1cm}}$  square feet).

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

1. Data Analysis: Organize, construct displays, and interpret data to solve problems (e.g., data from student experiments, tables, diagrams, charts, graphs).
2. Probability: Use the fundamental counting principle on sets with up to five items to determine the number of possible combinations.
3. Central Tendency: Find the measures of central tendency (mean, median, mode, and range) of a set of data (with and without outliers) and understand why a specific measure provides the most useful information in a given context.

**Oklahoma Academic Standards****MATHEMATICS PROCESS STANDARDS****Grade 6****Process Standard 1: Problem Solving**

1. Develop and test strategies to solve practical, everyday problems which may have single or multiple answers.
2. Use technology to generate and analyze data to solve problems.
3. Formulate problems from situations within and outside of mathematics and generalize solutions and strategies to new problem situations.
4. Evaluate results to determine their reasonableness.
5. Apply a variety of strategies (e.g., restate the problem, look for a pattern, diagrams, solve a simpler problem, work backwards, trial and error) to solve problems, with emphasis on multistep and nonroutine problems.
6. Use oral, written, concrete, pictorial, graphical, and/or algebraic methods to model mathematical situations.

**Process Standard 2: Communication**

1. Discuss, interpret, translate (from one to another) and evaluate mathematical ideas (e.g., oral, written, pictorial, concrete, graphical, algebraic).
2. Reflect on and justify reasoning in mathematical problem solving (e.g., convince, demonstrate, formulate).
3. Select and use appropriate terminology when discussing mathematical concepts and ideas.

**Process Standard 3: Reasoning**

1. Identify and extend patterns and use experiences and observations to make suppositions.
2. Use counterexamples to disprove suppositions (e.g., all squares are rectangles, but are all rectangles squares?).
3. Develop and evaluate mathematical arguments (e.g., agree or disagree with the reasoning of other classmates and explain why).
4. Select and use various types of reasoning (e.g., recursive [loops], inductive [specific to general], deductive [general to specific], spatial, and proportional).

**Process Standard 4: Connections**

1. Apply mathematical strategies to solve problems that arise from other disciplines and the real world.
2. Connect one area or idea of mathematics to another (e.g., relate equivalent number representations to each other, relate experiences with geometric shapes to understanding ratio and proportion).

**Process Standard 5: Representation**

1. Use a variety of representations to organize and record data (e.g., use concrete, pictorial, and symbolic representations).
2. Use representations to promote the communication of mathematical ideas (e.g., number lines, rectangular coordinate systems, scales to illustrate the balance of equations).
3. Develop a variety of mathematical representations that can be used flexibly and appropriately (e.g., base-10 blocks to represent fractions and decimals, appropriate graphs to represent data).
4. Use a variety of representations to model and solve physical, social, and mathematical problems (e.g., geometric objects, pictures, charts, tables, graphs).

## Oklahoma Academic Standards

### Sample Test Items by Standard

#### Grade 6

**OAS Standard:**

Standard 1: Algebraic Reasoning: Patterns and Relationships—The student will use algebraic methods to describe patterns, simplify and write algebraic expressions and equations, and solve simple equations in a variety of contexts.

**OAS Objective:**

1. Generalize and extend patterns and functions using tables, graphs, and number properties (e.g., number sequences, prime and composite numbers, recursive patterns like the Fibonacci numbers).

**Item Specifications:**Emphasis:

Demonstrate the ability to identify and analyze number patterns from a variety of sources; identify and develop algebraic rules for number patterns.

Stimulus Attributes:

Test items may include illustrations of the following: sequences, tables, graphs, charts, diagrams, counting manipulatives, and data sets.

Format:

- Identify and analyze patterns of numbers from sequences, tables, and other data sources
- Identify missing numbers in number patterns
- Use variables to generalize a number pattern algebraically
- Use variables to develop rules which describe a pattern of numbers algebraically

Content Limits:

- Limit required operations to addition, subtraction, multiplication, and division
- Limit description of rules to one variable
- Limit operations with fractions to addition and subtraction

Primary Process Standards:

Process Standard 1: Problem Solving

Process Standard 3: Reasoning

Process Standard 4: Connections

Distractor Domain:

- Common errors
- Incorrect procedures
- Computational errors
- Incorrect use of rules or properties

**Oklahoma Academic Standards 1.1 Sample Test Items:**

Primary Process Standard: 6M3.1

Depth of Knowledge: 2

Correct Answer: C

Dale used these steps to form a number pattern.

1. The first term is 3.
2. The second term is 5.
3. Each term after the second is the sum of the two terms just before it.

The list shows the first five terms in Dale's pattern.

3, 5, 8, 13, 21, . . .

What are the next 3 terms?

- A** 27, 34, 42  
**B** 29, 37, 45  
**C** 34, 55, 89  
**D** 34, 55, 99

Primary Process Standard: 6M3.4

Depth of Knowledge: 2

Correct Answer: B

**Mrs. Johnson asked her 6th-grade students to form a number pattern using these rules.**

- 1. Use the number 1 as the first term.**
- 2. To find any other term, double the previous term and add 2.**

**The first two numbers in the pattern are 1 and 4. What is the 4th number in the pattern?**

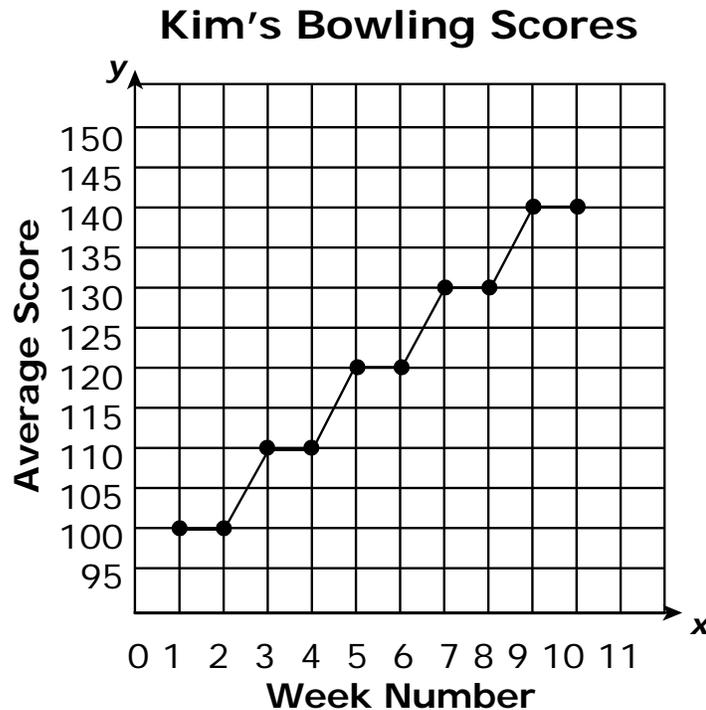
- A** 20
- B** 22
- C** 44
- D** 46

Primary Process Standard: 6M4.2

Depth of Knowledge: 2

Correct Answer: A

The graph shows that Kim's mean (average) bowling scores have formed a pattern for the last 10 weeks. Her mean stayed the same for two weeks, and then increased by the same amount the next week.



If the pattern continues for the next two weeks, what will Kim's mean score be in week 12?

- A** 150
- B** 155
- C** 160
- D** 165

Primary Process Standard: 6M1.5

Depth of Knowledge: 3

Correct Answer: B

Mia created this pattern using subtraction.

$$\frac{17}{6}, \frac{11}{4}, \frac{8}{3}, \frac{31}{12}, \frac{5}{2}, ?$$

What is the next number in this pattern?

A  $\frac{13}{5}$

B  $\frac{29}{12}$

C  $\frac{1}{3}$

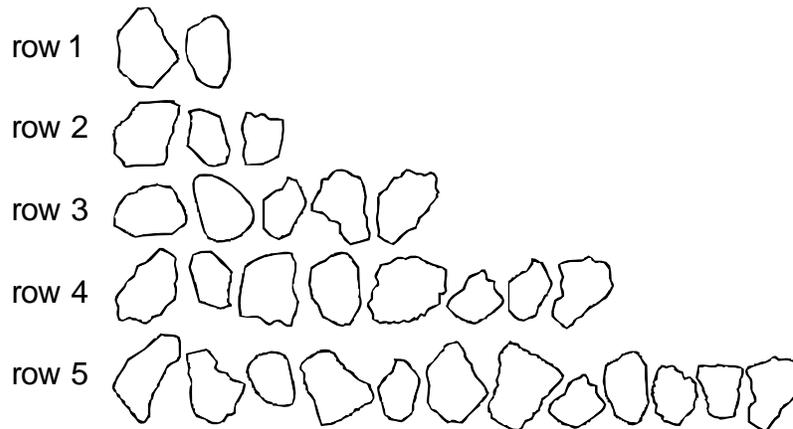
D  $\frac{1}{12}$

Primary Process Standard: 6M1.5

Depth of Knowledge: 3

Correct Answer: B

Grace used pebbles to make a design in the sand.



Based on this pattern, how many pebbles are in row 6?

- A 16 pebbles
- B 17 pebbles
- C 20 pebbles
- D 21 pebbles

**OAS Standard:**

Standard 1: Algebraic Reasoning: Patterns and Relationships—The student will use algebraic methods to describe patterns, simplify and write algebraic expressions and equations, and solve simple equations in a variety of contexts.

**OAS Objective:**

2. Write algebraic expressions and simple equations that correspond to a given situation.

**Item Specifications:**Emphasis:

Use variables to express given situations algebraically.

Stimulus Attributes:

Test items may include illustrations of the following: coordinate graphs, number lines, calculator displays, tables, graphs, charts, and data sets.

Format:

- Write algebraic expressions for mathematical and real-world contexts
- Model and translate among algebraic, and pictorial representations of simple linear equations

Content Limits:

- Limit to one variable in expressions and equations

Primary Process Standards:

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

Distractor Domain:

- Common errors
- Incorrect procedures

**Oklahoma Academic Standards 1.2 Sample Test Items:**

Primary Process Standard: 6M2.1

Depth of Knowledge: 1

Correct Answer: A

**A number,  $x$ , is doubled and then increased by 3. Which expression represents this situation?**

**A**  $2x + 3$

**B**  $2x - 3$

**C**  $3x + 2$

**D**  $3x - 2$

Primary Process Standard: 6M2.1

Depth of Knowledge: 2

Correct Answer: C

**Edward sold 72 boxes of popcorn, which was 4 times the number of boxes Robert sold. Which equation could be used to find the number of boxes Robert sold,  $r$ ?**

**A**  $r + 4 = 72$

**B**  $r - 4 = 72$

**C**  $r \cdot 4 = 72$

**D**  $r \div 4 = 72$

Primary Process Standard: 6M2.1

Depth of Knowledge: 2

Correct Answer: B

**Team A scored 82 points, which was 18 points fewer than the number of points Team B scored. Which equation represents the points scored by Team B,  $b$ ?**

**A**  $b + 18 = 82$

**B**  $b - 18 = 82$

**C**  $b \cdot 18 = 82$

**D**  $b \div 18 = 82$

**OAS Standard:**

Standard 1: Algebraic Reasoning: Patterns and Relationships—The student will use algebraic methods to describe patterns, simplify and write algebraic expressions and equations, and solve simple equations in a variety of contexts.

**OAS Objective:**

3. Use substitution to simplify and evaluate algebraic expressions (e.g., if  $x = 5$  evaluate  $3 - 5x$ ).

**Item Specifications:**Emphasis:

Demonstrate the ability to use the order of operations to find the value of an algebraic expression.

Stimulus Attributes:

Test items may include illustrations of the following: tables, graphs, charts, data sets, equivalency statements, and algebraic expressions.

Format:

- Use variables as unknowns
- Substitute numerical values for variables in algebraic expressions
- Use the rules for order of operations with rational numbers to find the value of algebraic expressions
- Items may include parentheses

Content Limits:

- Limit operations to addition, subtraction, multiplication, and division
- Limit the number of variables in an expression to one
- Limit values of the variable to two-digit whole numbers

Primary Process Standards:

Process Standard 1: Problem Solving

Process Standard 3: Reasoning

Distractor Domain:

- Common errors
- Incorrect procedures
- Computational errors
- Incorrect use of rules or properties
- Order of operations errors

**Oklahoma Academic Standards 1.3 Sample Test Items:**

Primary Process Standard: 6M1.6

Depth of Knowledge: 1

Correct Answer: C

**What is the value of this expression when  $p = 9$ ?**

$$6p + 5$$

- A** 49
- B** 54
- C** 59
- D** 68

Primary Process Standard: 6M1.5

Depth of Knowledge: 2

Correct Answer: A

**If  $x = 3$ , what is the value of this expression?**

$$3x + 2$$

- A** 11
- B** 15
- C** 17
- D** 35

Primary Process Standard: 6M1.6

Depth of Knowledge: 3

Correct Answer: B

If  $x = 6$ , what is the value of this expression?

$$10 + x \div 2 \cdot 8$$

- A 1
- B 34
- C 64
- D 104

Primary Process Standard: 6M1.5

Depth of Knowledge: 3

Correct Answer: B

What is the value of this expression when  $b = 5$ ?

$$50 - 2b + b$$

- A 35
- B 45
- C 245
- D 480

Primary Process Standard: 6M1.1

Depth of Knowledge: 3

Correct Answer: A

If  $y = 3$ , what is the value of this expression?

$$5(y + 1) - 8 \div 2$$

**A** 16

**B** 12

**C** 6

**D** 4

**OAS Standard:**

Standard 1: Algebraic Reasoning: Patterns and Relationships—The student will use algebraic methods to describe patterns, simplify and write algebraic expressions and equations, and solve simple equations in a variety of contexts.

**OAS Objective:**

4. Write and solve one-step equations with one variable using number sense, the properties of operations, and the properties of equality (e.g.,  $\frac{1}{3}x = 9$ ).

**Item Specifications:**Emphasis:

Demonstrate the ability to write and solve simple linear equations for mathematical and real-world contexts.

Stimulus Attributes:

Test items may include illustrations of the following: coordinate graphs, number lines, calculator displays, tables, graphs, charts, and data sets.

Format:

- Write and solve 1-step linear equations involving mathematical and real-world contexts
- Model and translate among algebraic and pictorial representations of simple linear equations

Content Limits:

- Limit linear equations to 1-step equations
- Limit coefficients of variables to positive whole numbers and fractions
- Limit fractional coefficients to halves, thirds, fourths, fifths, sixths, eighths, tenths, and twelfths

Primary Process Standards:

Process Standard 1: Problem Solving

Process Standard 5: Representation

Distractor Domain:

- Common errors
- Incorrect procedures
- Computational errors
- Incorrect use of rules or properties
- Order of operations errors

**Oklahoma Academic Standards 1.4 Sample Test Items:**

Primary Process Standard: 6M1.1

Depth of Knowledge: 1

Correct Answer: C

**What is the solution to this equation?**

$$5x = 35$$

- A**  $x = 40$
- B**  $x = 30$
- C**  $x = 7$
- D**  $x = 3$

Primary Process Standard: 6M5.4

Depth of Knowledge: 2

Correct Answer: A

**John had a jar that contained  $x$  dimes. He put another 58 dimes in the jar and now has a total of 84 dimes. Which equation could be used to find  $x$ , the number of dimes John had in the jar originally?**

- A**  $x + 58 = 84$ ;  $x = 26$
- B**  $x - 58 = 84$ ;  $x = 26$
- C**  $58 + x = 84$ ;  $x = 142$
- D**  $58 - x = 84$ ;  $x = 142$

Primary Process Standard: 6M2.1

Depth of Knowledge: 3

Correct Answer: B

**Vicki sold 48 picture frames at a craft fair and had 36 left. Which equation could be used to find  $n$ , the number of picture frames Vicki originally had?**

**A**  $n + 36 = 248$

**B**  $n - 36 = 48$

**C**  $n + 48 = 36$

**D**  $n - 48 = 236$

**OAS Standard:**

Standard 2: Number Sense and Operation—The student will use numbers and number relationships to solve a variety of problems. The student will estimate and compute with integers, fractions, and decimals.

**OAS Objective:**

1. Number Sense: Convert, compare, and order decimals, fractions, and percents using a variety of methods.

**Item Specifications:**Emphasis:

Demonstrate the ability to convert, compare, and order decimals, fractions, and percents.

Stimulus Attributes:

Test items may include illustrations of the following: number lines, 10 x 10 grids, 1000's blocks, fraction strips, circle graphs, and other diagrams.

Format:

- Convert between and among numerical representations of decimals, fractions, and percents
- Compare and order two or more decimals, fractions, or percents
- Items may include fractions with different denominators

Content Limits:

- Limit numbers to decimals, fractions, and percents
- Limit fractions to halves, thirds, fourths, fifths, sixths, eighths, tenths, and twelfths
- Limit decimals to 1000ths place
- Limit percents to those that are multiples of 5 up to and including 100 percent

Primary Process Standards:

Process Standard 2: Communication

Process Standard 4: Connections

Process Standard 5: Representation

Distractor Domain:

- Incorrect procedures
- Computational errors
- Misunderstanding of mathematical symbols

**Oklahoma Academic Standards 2.1 Sample Test Items:**

Primary Process Standard: 6M5.1

Depth of Knowledge: 2

Correct Answer: D

The large square is divided into smaller squares of equal size.

6		7					7	
			4	2				
	3				7			6
		7		5				
			1				7	
	7					4		4
			6	7				
	7							3
		4		7	6			2
5			7			3		

What fractional part of the large square is represented by the number of small squares that contain the number 7?

- A  $\frac{1}{9}$
- B  $\frac{9}{10}$
- C  $\frac{7}{100}$
- D  $\frac{1}{10}$

Primary Process Standard: 6M2.1

Depth of Knowledge: 2

Correct Answer: D

The table shows the number of pies eaten by the top four contestants in a middle school pie-eating contest.

Pie-Eating Contest

Contestant Name	Number of Pies Eaten
Ali	$5\frac{1}{2}$
Brett	$5\frac{1}{4}$
Lois	$5\frac{2}{3}$
Zeke	$5\frac{3}{8}$

Which lists the number of pies eaten in order from least to greatest?

**A**  $5\frac{1}{4}$ ,  $5\frac{1}{2}$ ,  $5\frac{3}{8}$ ,  $5\frac{2}{3}$

**B**  $5\frac{2}{3}$ ,  $5\frac{1}{2}$ ,  $5\frac{3}{8}$ ,  $5\frac{1}{4}$

**C**  $5\frac{2}{3}$ ,  $5\frac{1}{4}$ ,  $5\frac{3}{8}$ ,  $5\frac{1}{2}$

**D**  $5\frac{1}{4}$ ,  $5\frac{3}{8}$ ,  $5\frac{1}{2}$ ,  $5\frac{2}{3}$

Primary Process Standard: 6M4.2

Depth of Knowledge: 3

Correct Answer: B

Fractional parts of these figures have been shaded.

Figure 1



Figure 2

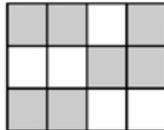


Figure 3

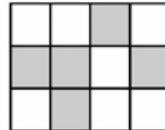


Figure 4



Which figure has shaded fractional parts that best represent the decimal 0.583?

- A figure 1
- B figure 2
- C figure 3
- D figure 4

**OAS Standard:**

Standard 2: Number Sense and Operation—The student will use numbers and number relationships to solve a variety of problems. The student will estimate and compute with integers, fractions, and decimals.

**OAS Objective:**

2. Number Operations
  - a. Multiply and divide fractions and mixed numbers to solve problems using a variety of methods.

**Item Specifications:**Emphasis:

Demonstrate the ability to find products and quotients using fractions and mixed numbers.

Stimulus Attributes:

Test items may include illustrations of the following: number lines, 10 x 10 grids, counting manipulatives, balances, two-dimensional geometric figures, tables, graphs, charts, maps, scale drawings, bar graphs, picture graphs, data sets, and other diagrams.

Format:

- Use fractions and mixed numbers to solve problems involving products and quotients in mathematical and real-world contexts
- Use graphs, grids, and other representations of fractions and mixed numbers to solve problems involving products and quotients in mathematical and real-world contexts
- Items may include fractions with different denominators

Content Limits:

- Limit operations to multiplication and/or division
- 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:

- Common errors
- Incorrect procedures
- Computational errors
- Use of incorrect equivalencies

**Oklahoma Academic Standards 2.2a Sample Test Items:**

Primary Process Standard: 6M1.3

Depth of Knowledge: 2

Correct Answer: D

Chuck cut an entire length of rope into 28 pieces, each  $1\frac{1}{2}$  feet (ft) long. What was the length of the rope before Chuck cut it?

- A 14 ft
- B 21 ft
- C 32 ft
- D 42 ft

Primary Process Standard: 6M4.1

Depth of Knowledge: 2

Correct Answer: C

The cooks at a restaurant used  $4\frac{2}{3}$  packages of cheese one day. At this rate, how many packages of cheese would the cooks use in  $5\frac{1}{2}$  days?

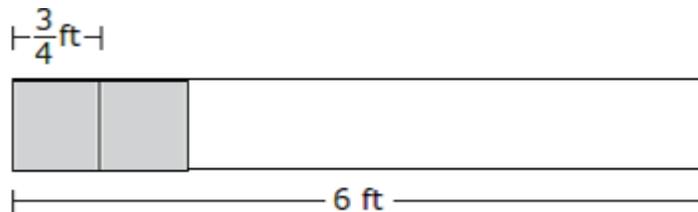
- A  $10\frac{1}{6}$  packages
- B  $20\frac{1}{3}$  packages
- C  $25\frac{2}{3}$  packages
- D  $30\frac{4}{5}$  packages

Primary Process Standard: 6M5.2

Depth of Knowledge: 2

Correct Answer: B

Mrs. Johnson plans to cut a 6 foot (ft) board into pieces that are  $\frac{3}{4}$  ft long, as shown in this diagram.



How many pieces can she get from this board?

- A 9 pieces
- B 8 pieces
- C 6 pieces
- D 4 pieces

Primary Process Standard: 6M1.5

Depth of Knowledge: 3

Correct Answer: C

One winter in Enrique's home state, it snowed 39 inches in  $6\frac{1}{2}$  days. What is that rate in inches of snow per day?

- A 4 inches per day
- B 5 inches per day
- C 6 inches per day
- D 7 inches per day

**OAS Standard:**

Standard 2: Number Sense and Operation—The student will use numbers and number relationships to solve a variety of problems. The student will estimate and compute with integers, fractions, and decimals.

**OAS Objective:**

2. Number Operations
  - b. Multiply and divide decimals with one- or two-digit multipliers or divisors to solve problems.

**Item Specifications:**Emphasis:

Perform the operations of multiplication and division on decimal numbers.

Stimulus Attributes:

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

Format:

- Multiply decimals with one- or two-digit multipliers
- Divide whole numbers by two-digit divisors with and without remainders expressed as whole numbers or fractions
- Divide decimals by two-digit divisors without remainder

Content Limits:

- Limit dividends to four digits
- Limit multiplicands to three digits

Primary Process Standards:

Process Standard 4: Connections

Distractor Domain:

- Computational errors
- Error in expression of remainder as fraction

**Oklahoma Academic Standards 2.2b Sample Test Items:**

Primary Process Standard: 6M4.4

Depth of Knowledge: 2

Correct Answer: A

**Cece walked 2.6 miles each day for 23 days. What is the total number of miles Cece walked?**

- A** 59.8 miles
- B** 12.1 miles
- C** 5.98 miles
- D** 4.9 miles

Primary Process Standard: 6M1.4

Depth of Knowledge: 2

Correct Answer: B

**Sean plans to cut a 120.4-centimeter length of string into 2-centimeter lengths. What is the greatest number of 2-centimeter lengths Sean can cut from this string?**

- A** 6
- B** 60
- C** 600
- D** 6,000

**OAS Standard:**

Standard 2: Number Sense and Operation—The student will use numbers and number relationships to solve a variety of problems. The student will estimate and compute with integers, fractions, and decimals.

**OAS Objective:**

## 2. Number Operations

- c. Estimate and find solutions to single and multi-step problems using whole numbers, decimals, fractions, and percents (e.g.,  $\frac{7}{8} + \frac{8}{9}$  is about 2,  $3.9 + 5.3$  is about 9).

**Item Specifications:**Emphasis:

Demonstrate the ability to estimate the solution to problems involving rational numbers.

Stimulus Attributes:

Test items may include illustrations of the following: number lines, 10 x 10 grids, counting manipulatives, balances, two-dimensional geometric figures, tables, graphs, charts, maps, scale drawings, bar graphs, picture graphs, data sets, and other diagrams.

Format:

- Use estimation strategies to solve mathematical and real-world problems involving whole numbers, decimal numbers, fractions, and percents
- Use estimation strategies to determine the soundness of solutions to mathematical and real-world problems involving whole numbers, decimal numbers, fractions, and percents
- Items may include fractions with different denominators

Content Limits:

- Limit multi-step problems to three operations
- Limit numbers to whole numbers, decimal numbers, fractions, and percents
- Limit decimals to the 1000ths place
- Limit fractions to halves, thirds, fourths, fifths, sixths, eighths, tenths, and twelfths
- Limit percents to up to and including 100 percent

Primary Process Standards:

Process Standard 1: Problem Solving

Process Standard 2: Communication

Process Standard 3: Reasoning

Process Standard 4: Connections

Distractor Domain:

- Common errors
- Incorrect procedures
- Computational errors
- Use of incorrect equivalencies
- Rounding errors

**Oklahoma Academic Standards 2.2c Sample Test Items:**

Primary Process Standard: 6M3.4

Depth of Knowledge: 2

Correct Answer: B

Sandra bought four bags of nails for a carpentry project. The weights of the bags, in pounds (lb), are shown.

$$2\frac{5}{6} \text{ lb}, 1\frac{1}{4} \text{ lb}, 2\frac{1}{8} \text{ lb}, 1\frac{3}{4} \text{ lb}$$

Which is closest to the total weight of the four bags of nails?

- A 10 lb
- B 8 lb
- C 6 lb
- D 4 lb

Primary Process Standard: 6M1.3

Depth of Knowledge: 2

Correct Answer: C

David discovered that  $\frac{1}{4}$  of the 432 members of his book club bought the December book selection. Which is closest to the number of members who bought the December book selection?

- A 7 members
- B 25 members
- C 100 members
- D 300 members

Primary Process Standard: 6M4.3

Depth of Knowledge: 2

Correct Answer: A

**A bookstore owner had a total of 823 novels on the shelves and sold 210 of them this week. Which is closest to the percent of the total number of novels sold this week?**

- A** 25%
- B** 50%
- C** 75%
- D** 100%

Primary Process Standard: 6M1.5

Depth of Knowledge: 2

Correct Answer: D

**Justin prepared 987 ads for mailing. To prepare each ad, it took him about 7 seconds (sec) to put each ad into an envelope and 8 seconds to seal, label, and stamp each envelope. Which is closest to the total amount of time it took Justin to prepare the ads?**

- A** 1,200 sec
- B** 7,000 sec
- C** 8,500 sec
- D** 15,000 sec

Primary Process Standard: 6M4.2

Depth of Knowledge: 2

Correct Answer: D

**Nikki and four friends had lunch at their favorite restaurant. The total bill was \$29.75, and they wanted to leave a 15% tip. Which amount of money is closest to the 15% tip?**

**A** \$3.00

**B** \$3.50

**C** \$4.00

**D** \$4.50

Primary Process Standard: 6M1.2

Depth of Knowledge: 2

Correct Answer: D

**There were 592 students at Carver Elementary School. On Friday,  $\frac{2}{3}$  of these students wore their school spirit shirts. Which is closest to the number of students who wore their school spirit shirts?**

**A** 100 students

**B** 200 students

**C** 300 students

**D** 400 students

Primary Process Standard: 6M4.4

Depth of Knowledge: 3

Correct Answer: A

**An auditorium can seat 976 people. At a recent event, 746 people sat in the auditorium. Which estimate is closest to the percent of the 976 seats that were empty during this event?**

- A** 25%
- B** 50%
- C** 75%
- D** 100%

**OAS Standard:**

Standard 2: Number Sense and Operation—The student will use numbers and number relationships to solve a variety of problems. The student will estimate and compute with integers, fractions, and decimals.

**OAS Objective:**

2. Number Operations
  - d. Use the basic operations on integers to solve problems.

**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 coordinate graphs, number lines, balances, deposits and withdrawals, rulers, thermometers, tables, graphs, charts, maps, data sets, and other diagrams.

Format:

- Select, apply, and justify the use of the basic operations on positive and negative integers to solve problems in mathematical, geometric, and real-world contexts

Content Limits:

- Limit operations to addition, subtraction, multiplication, and division.

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 procedures
- Computational errors
- Incorrect use of rules or properties

**Oklahoma Academic Standards 2.2d Sample Test Items:**

Primary Process Standard: 6M4.1

Depth of Knowledge: 2

Correct Answer: C

The table lists all of the deposits and withdrawals Harold made to his bank account during the month of March.

**Harold's Bank Account**

Date	Action	Amount
March 5	deposit	\$75
March 12	deposit	\$115
March 17	withdrawal	\$90
March 22	deposit	\$115
March 30	withdrawal	\$80

If there was \$450 in Harold's bank account on March 1, what was his bank account balance at the end of March?

- A** \$315
- B** \$475
- C** \$585
- D** \$745

Primary Process Standard: 6M1.6

Depth of Knowledge: 2

Correct Answer: A

**Chad works at a flower shop located on the 80th floor of a building. He went down 60 floors to deliver flowers, back up 15 floors to make a second delivery, and finally down 2 floors to make a third delivery.**

**Which floor was Chad on when he made the third delivery?**

- A** 33rd
- B** 35th
- C** 37th
- D** 47th

Primary Process Standard: 6M1.5

Depth of Knowledge: 3

Correct Answer: D

**Theresa had \$1,000 in her checking account and a payment of \$800 to pay on a loan. Theresa used money from her checking account to make a payment that decreased her loan to half of the balance.**

**What is her new checking account balance?**

- A** \$200
- B** \$400
- C** \$500
- D** \$600

**OAS Standard:**

Standard 2: Number Sense and Operation—The student will use numbers and number relationships to solve a variety of problems. The student will estimate and compute with integers, fractions, and decimals.

**OAS Objective:**

2. Number Operations
  - e. Build and recognize models of multiples to develop the concept of exponents and simplify numerical expressions with exponents and parentheses using order of operations.

**Item Specifications:**Emphasis:

Demonstrate an understanding of exponents; demonstrate the ability to simplify complex numerical expressions.

Stimulus Attributes:

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

Format:

- Create and identify models of multiples representing exponents
- Use the rules for order of operations with rational numbers to find the value of numerical expressions involving exponents and/or parentheses
- Items may include fractions with different denominators
- Items may include parentheses

Content Limits:

- Limit numbers to whole numbers, decimal numbers, and fractions
- Limit decimals to the 1000ths place
- Limit fractions to halves, thirds, fourths, fifths, sixths, eighths, tenths, and twelfths
- Limit exponents to whole numbers no greater than the fourth power

Primary Process Standards:

Process Standard 1: Problem Solving

Distractor Domain:

- Common errors
- Incorrect procedures
- Computational errors
- Order of operations errors

**Oklahoma Academic Standards 2.2e Sample Test Items:**

Primary Process Standard: 6M1.5

Depth of Knowledge: 2

Correct Answer: C

**What is the value of this expression?**

$$4 + 2(1 + 3^2) - 1$$

- A** 17
- B** 19
- C** 23
- D** 35

Primary Process Standard: 6M1.4

Depth of Knowledge: 2

Correct Answer: C

**According to the correct order of operations, which of these should be performed first to simplify this expression?**

$$3^2 + 24 \div 6 \times 2 (10 + 6^2)$$

- A**  $3^2 + 24$
- B**  $6 \times 2$
- C**  $6^2$
- D**  $10 + 6$

Primary Process Standard: 6M1.6

Depth of Knowledge: 2

Correct Answer: D

Which choice gives the correct order of operations to evaluate this expression?

$$10 + (8 - 3) \div 5 \times 2$$

**A** +, -,  $\div$ ,  $\times$

**B** -,  $\times$ ,  $\div$ , +

**C**  $\times$ , +, -,  $\div$

**D** -,  $\div$ ,  $\times$ , +

Primary Process Standard: 6M1.4

Depth of Knowledge: 3

Correct Answer: B

What is the value of this expression?

$$4^2 + (6 - 5)^2 \div (4 + 4) - 7$$

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

**B**  $9\frac{1}{8}$

**C** 17

**D** 25

Primary Process Standard: 6M1.5

Depth of Knowledge: 3

Correct Answer: B

**What is the value of this expression?**

$$36 + 18 \div \left( \frac{8 + 7}{5} \right)^2 - \frac{1}{2}$$

- A**  $38\frac{1}{2}$
- B**  $37\frac{1}{2}$
- C**  $8\frac{1}{2}$
- D**  $5\frac{1}{2}$

**OAS Standard:**

Standard 3: Geometry—The student will use geometric properties and relationships to recognize, describe, and analyze shapes and representations in a variety of contexts.

**OAS Objective:**

1. Compare and contrast the basic characteristics of three-dimensional figures (pyramids, prisms, cones, and cylinders).

**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, three-dimensional geometric shapes, geoboards, and other geometric manipulatives.

Format:

- Identify, compare, and analyze attributes of three-dimensional figures
- Classify three-dimensional figures by their attributes

Content Limits:

- Limit figures to rectangular and triangular prisms, rectangular and triangular pyramids, spheres, cones, and cylinders

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

**Oklahoma Academic Standards 3.1 Sample Test Items:**

Primary Process Standard: 6M3.2

Depth of Knowledge: 3

Correct Answer: D

**Which figure has exactly 6 edges?**

- A** triangular prism
- B** square pyramid
- C** triangular pyramid
- D** triangular pyramid

Primary Process Standard: 6M2.3

Depth of Knowledge: 1

Correct Answer: A

**Which of these is a prism?**

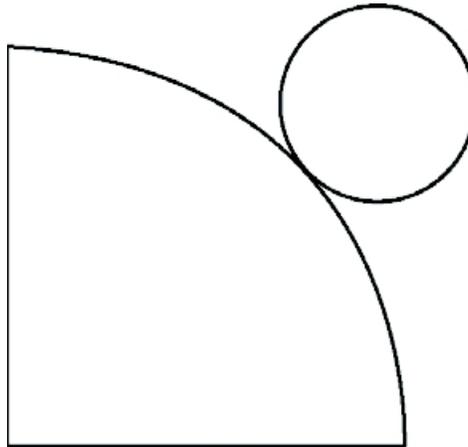
- A** cube
- B** cone
- C** cylinder
- D** pyramid

Primary Process Standard: 6M2.1

Depth of Knowledge: 2

Correct Answer: A

**A net for a solid is shown.**



**Which geometric solid can be formed by folding this net?**

- A** cone
- B** cylinder
- C** prism
- D** pyramid

**OAS Standard:**

Standard 3: Geometry—The student will use geometric properties and relationships to recognize, describe, and analyze shapes and representations in a variety of contexts.

**OAS Objective:**

2. Compare and contrast congruent and similar figures.

**Item Specifications:**Emphasis:

Demonstrate a working knowledge of the difference between congruency and similarity in geometric figures.

Stimulus Attributes:

Test items may include illustrations of the following: tables, charts, coordinate graphs, two- and three-dimensional geometric figures, protractors and other geometric manipulatives, measuring instruments, maps, and scale drawings.

Format:

Identify and use the concepts of similarity and congruence in mathematical, geometric, and real-world contexts.

Content Limits:

Limit to visual identification or definition of similarity or congruency

Primary Process Standards:

Process Standard 1: Problem Solving

Process Standard 4: Connections

Process Standard 5: Representation

Distractor Domain:

- Common errors
- Incorrect procedures
- Computational errors
- Incorrect use of rules or properties
- Confusion between congruency and similarity

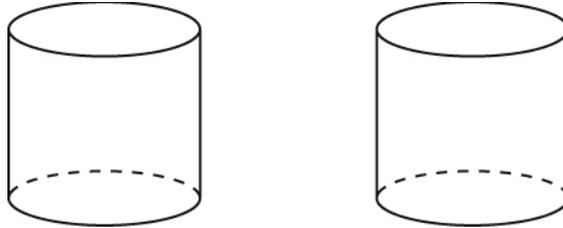
**Oklahoma Academic Standards 3.2 Sample Test Items:**

Primary Process Standard: 6M1.1

Depth of Knowledge: 1

Correct Answer: D

**Albert correctly stated that these two figures are congruent.**



**Which statement best describes what it means for these figures to be congruent?**

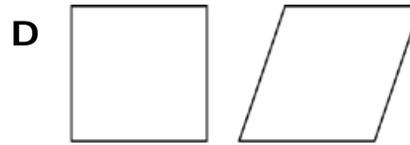
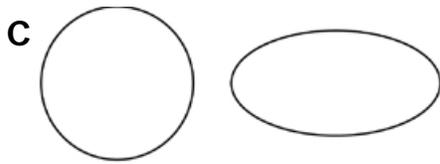
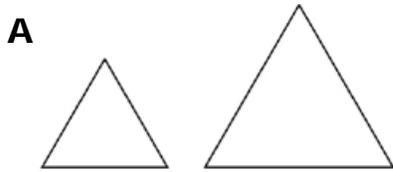
- A** Both figures have the same shape but are different sizes.
- B** Both figures have the same height but a different radius.
- C** Both figures have the same radius but a different height.
- D** Both figures have the same shape and same size.

Primary Process Standard: 6M1.2

Depth of Knowledge: 1

Correct Answer: A

Which shows a pair of shapes that appear to be similar but not congruent?



Primary Process Standard: 6M1.6

Depth of Knowledge: 2

Correct Answer: A

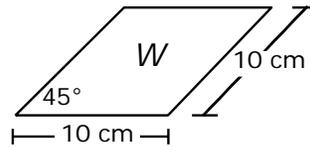
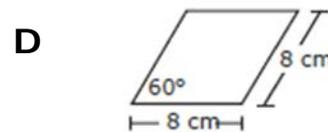
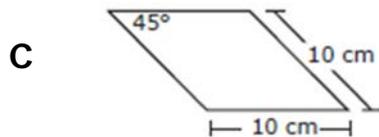
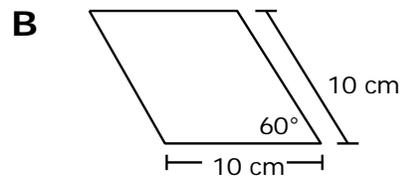
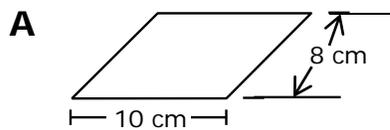
Which describes an example of congruent shapes?

- A** The lengths of the sides of 2 triangles are equal.
- B** The edges of one square are twice as long as the edges of a second square.
- C** The height of one ice-cream cone is 4 inches, and the height of another ice-cream cone is 6 inches.
- D** The length of a packing box is  $\frac{1}{3}$  the length of a second packing box.

Primary Process Standard: 6M1.6

Depth of Knowledge: 3

Correct Answer: C

**Figure W is shown.****Which figure is congruent to figure W?**

**OAS Standard:**

Standard 3: Geometry—The student will use geometric properties and relationships to recognize, describe, and analyze shapes and representations in a variety of contexts.

**OAS Objective:**

3. Identify the characteristics of the rectangular coordinate system and use them to locate points and describe shapes drawn in all four quadrants.

**Item Specifications:**Emphasis:

Demonstrate a working knowledge of the location of points on a coordinate plane.

Stimulus Attributes:

Test items may include illustrations of the following: coordinate graphs, two-dimensional geometric figures, protractors, geoboards, other geometric manipulatives, tables, graphs, charts, maps, data sets, and other diagrams.

Format:

- Identify the quadrant in which a given point is found on a coordinate plane
- Identify the coordinates of an identified point on a coordinate plane or map
- Identify the point located at identified coordinates on a coordinate plane or map

Content Limits:

- Limit geometric figures to two dimensions

Primary Process Standards:

Process Standard 1: Problem Solving

Process Standard 5: Representation

Distractor Domain:

- Common errors
- Incorrect procedures
- Computational errors
- Incorrect use of rules or properties
- Incorrect interpretation of data display

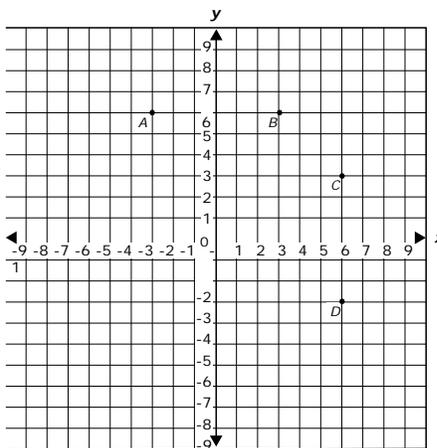
**Oklahoma Academic Standards 3.3 Sample Test Items:**

Primary Process Standard: 6M5.2

Depth of Knowledge: 1

Correct Answer: A

Which point represents the ordered pair  $(-3, 6)$  on this coordinate grid?

**A** point *A***B** point *B***C** point *C***D** point *D*

Primary Process Standard: 6M5.2

Depth of Knowledge: 1

Correct Answer: C

Point *K* is located at  $(-3, 8)$  on a coordinate plane. In which quadrant is point *K* located?

**A** quadrant IV**B** quadrant III**C** quadrant II**D** quadrant I

**OAS Standard:**

Standard 4: Measurement—The student will use measurements within the metric and customary systems to solve problems in a variety of contexts.

**OAS Objective:**

1. Use formulas to find the circumference and area of circles in terms of pi.

**Item Specifications:**Emphasis:

Demonstrate the ability to solve circumference and area of circle problems.

Stimulus Attributes:

Test items may include illustrations of the following: coordinate graphs, tables, charts, circles, data sets, formulas, and other diagrams.

Format:

- Explore the concepts of area and circumference in mathematical, geometric, and real-world contexts
- Apply the formulas used to find the circumference and area of circles in a variety of contexts

Content Limits:

- Limit answers to exact in terms of pi
- Limit radius to whole numbers.

Primary Process Standards:

Process Standard 1: Problem Solving

Process Standard 3: Reasoning

Process Standard 4: Connections

Process Standard 5: Representation

Distractor Domain:

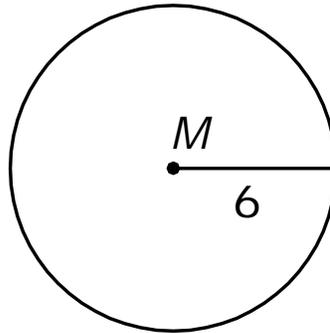
- Common errors
- Incorrect procedures
- Computational errors
- Use of incorrect formula
- Confusion between area and perimeter
- Incorrect use of rules, properties, or formulas

**Oklahoma Academic Standards 4.1 Sample Test Items:**

Primary Process Standard: 6M1.1

Depth of Knowledge: 1

Correct Answer: C

**What is the circumference of circle  $M$ ?**

$$C = 2\pi r$$

- A**  $6\pi$
- B**  $9\pi$
- C**  $12\pi$
- D**  $36\pi$

Primary Process Standard: 6M1.1

Depth of Knowledge: 2

Correct Answer: C

**Anabeth uses a piece of yarn to outline a circle that has a diameter of 8 inches. What is the least amount of yarn Anabeth could use to outline the circle?**

$$C = 2\pi r$$

- A**  $64\pi$  inches
- B**  $16\pi$  inches
- C**  $8\pi$  inches
- D**  $4\pi$  inches

Primary Process Standard: 6M1.1

Depth of Knowledge: 3

Correct Answer: C

**The area of a circle is  $36\pi$  square centimeters. What is the diameter of the circle?**

$$A = \pi r^2$$

- A** 6 centimeters
- B** 9 centimeters
- C** 12 centimeters
- D** 18 centimeters

**OAS Standard:**

Standard 4: Measurement—The student will use measurements within the metric and customary systems to solve problems in a variety of contexts.

**OAS Objective:**

2. Convert, add, or subtract measurements within the same system to solve problems (e.g.,  $9' 8'' + 3' 6''$ ,  $150 \text{ minutes} = \underline{\hspace{1cm}} \text{ hours and } \underline{\hspace{1cm}} \text{ minutes}$ ,  $6 \text{ square inches} = \underline{\hspace{1cm}} \text{ square feet}$ ).

**Item Specifications:**Emphasis:

Demonstrate the ability to convert and compute with measurements in the same measurement system.

Stimulus Attributes:

Test items may include illustrations of the following: number lines, balances, two- and three-dimensional geometric figures, other geometric manipulatives, tables, graphs, charts, data sets, and other diagrams.

Format:

- Compute with and express solutions using customary unit conversions to solve problems in mathematical, geometric, and real-world contexts
- Compute with and express solutions using metric conversions to solve problems in mathematical, geometric, and real-world contexts
- Express solutions to problems involving customary or metric units in combined units

Content Limits:

Limit to linear measure, weight, mass, time, perimeter, area, capacity, and volume.

Primary Process Standards:

Process Standard 1: Problem Solving

Process Standard 2: Communication

Process Standard 4: Connections

Process Standard 5: Representation

Distractor Domain:

- Common errors
- Incorrect procedures
- Computational errors
- Incorrect use of rules or properties
- Use of incorrect equivalencies
- Errors in converting units

**Oklahoma Academic Standards 4.2 Sample Test Items:**

Primary Process Standard: 6M4.1

Depth of Knowledge: 1

Correct Answer: C

**Julie likes to in-line skate at River Park, which has a sidewalk that is 6.2 kilometers in length. How many meters (m) long is the sidewalk?**

- A** 62 m
- B** 620 m
- C** 6,200 m
- D** 62,000 m

Primary Process Standard: 6M2.3

Depth of Knowledge: 1

Correct Answer: C

**Don bought a melon that weighed  $10\frac{1}{2}$  pounds (lb). What was the weight of the melon in pounds and ounces (oz)?**

- A** 10 lb 2 oz
- B** 10 lb 5 oz
- C** 10 lb 8 oz
- D** 10 lb 12 oz

Primary Process Standard: 6M4.2

Depth of Knowledge: 2

Correct Answer: A

**Ted calculated the area of the top surface of his workbench to be 4,320 square inches (sq in.). What is 4,320 square inches converted to square feet (sq ft)?**

$$144 \text{ sq in.} = 1 \text{ sq ft}$$

- A** 30 sq ft
- B** 360 sq ft
- C** 51,840 sq ft
- D** 622,080 sq ft

Primary Process Standard: 6M1.3

Depth of Knowledge: 2

Correct Answer: B

**Rosie weighed 7 pounds (lb) 11 ounces (oz) when she was born. Linda weighed 8 lb 10 oz when she was born. What was the total weight of these girls when they were born?**

- A** 15 lb 5 oz
- B** 16 lb 5 oz
- C** 16 lb 11 oz
- D** 17 lb 1 oz

Primary Process Standard: 6M4.1

Depth of Knowledge: 2

Correct Answer: B

**A storage room's floor in the shape of a square measures 13 feet on each side. How many yards (yd) are equivalent to the perimeter of this floor?**

**A**  $4\frac{1}{3}$  yd

**B**  $17\frac{1}{3}$  yd

**C** 39 yd

**D** 52 yd

**OAS Standard:**

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

**OAS Objective:**

1. Data Analysis: Organize, construct displays, and interpret data to solve problems (e.g., data from student experiments, tables, diagrams, charts, graphs).

**Item Specifications:**Emphasis:

Demonstrate the ability to organize and represent data in appropriate formats and to solve problems using data collected, organized, and represented in a variety of formats.

Stimulus Attributes:

Test items may include illustrations of the following: number lines, tables, frequency charts, line graphs, bar graphs, pictographs, Venn diagrams, stem-and-leaf plots, scatter plots, histograms, circle graphs, data sets, spreadsheets, and other diagrams.

Format:

- Solve mathematical and real-world problems based on data presented in a variety of formats
- Read and interpret data presented in a variety of formats
- Collect and organize data in appropriate formats
- Select appropriate representations of data such as tables, bar, circle, or line graphs
- Translate between representations of data
- Analyze how representations of data influence inferences and predictions
- Item may include model or names of graphs in options

Content Limits:

Limit graphs to number lines, tables, frequency charts, line graphs, single/double bar graphs, pictographs, Venn diagrams, stem-and-leaf plots, scatter plots, histograms, circle graphs, data sets, and spreadsheets.

Primary Process Standards:

Process Standard 1: Problem Solving

Process Standard 2: Communication

Process Standard 4: Connections

Process Standard 5: Representation

Distractor Domain:

- Common errors
- Incorrect procedures
- Incorrect or incomplete data display
- Incorrect interpretation of data display

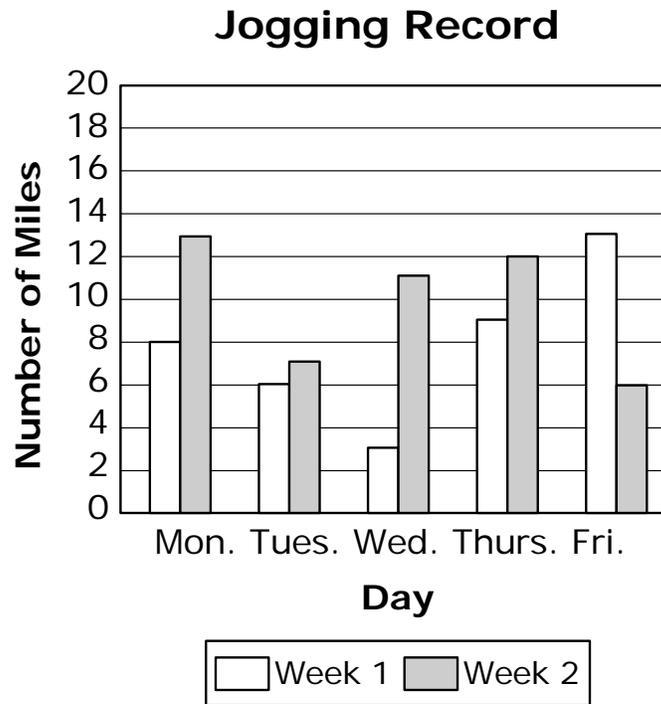
**Oklahoma Academic Standards 5.1 Sample Test Items:**

Primary Process Standard: 6M5.2

Depth of Knowledge: 1

Correct Answer: B

The graph shows the number of miles Johnny jogged each day for two weeks.



Which day had the greatest difference in the number of miles Johnny jogged between week 1 and week 2?

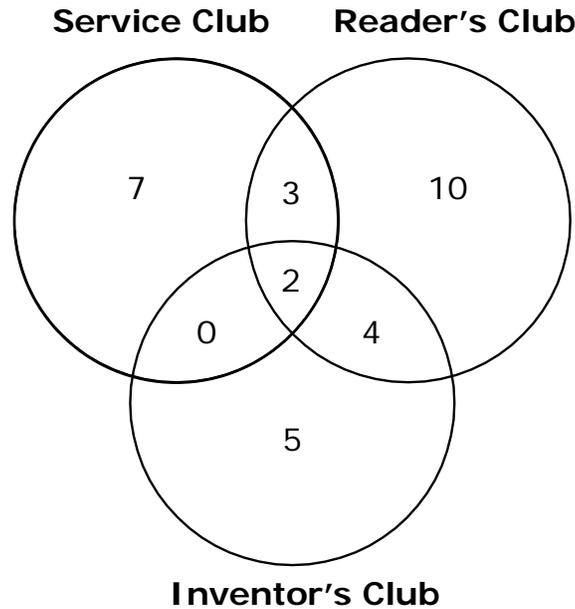
- A Monday
- B Wednesday
- C Thursday
- D Friday

Primary Process Standard: 6M5.1

Depth of Knowledge: 2

Correct Answer: C

The Venn diagram shows the numbers of sixth-grade students who participate in different after-school activities.



What is the total number of students who participate in the Service Club or the Inventor's Club?

- A** 12 students
- B** 19 students
- C** 21 students
- D** 23 students

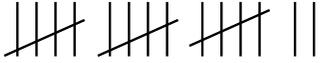
Primary Process Standard: 6M1.5

Depth of Knowledge: 2

Correct Answer: A

**Phil surveyed all the students in his class to find out their favorite flavors of ice cream. The results of the survey are shown in the table.**

**Favorite Flavor of Ice Cream**

Flavor	Number of Students
Vanilla	
Chocolate	
Strawberry	
Other	

**Which statement is true?**

- A** Flavors other than vanilla, chocolate, and strawberry are preferred by  $\frac{1}{6}$  of the students.
- B** Strawberry is the third most favorite flavor among the students.
- C** Vanilla is the favorite flavor of exactly  $\frac{1}{4}$  of all the students.
- D** Chocolate is the favorite flavor of 50% of the students.

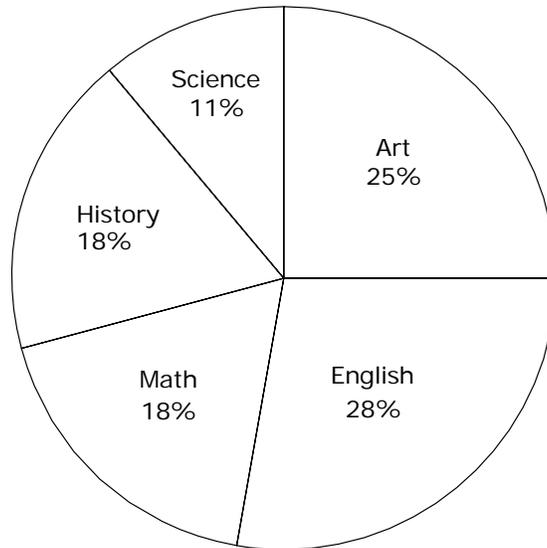
Primary Process Standard: 6M1.6

Depth of Knowledge: 2

Correct Answer: A

Zach surveyed 28 students in his class to find out which subjects are their favorites. He made this graph to show the results.

### Favorite Subjects



How many students chose art as their favorite subject?

- A 7 students
- B 14 students
- C 21 students
- D 25 students

Primary Process Standard: 6M5.1

Depth of Knowledge: 2

Correct Answer: B

**Dana attends a 90-minute dance class one day each week. Last week, she practiced these dances during class.**

- **30 minutes on ballet**
- **40 minutes on tap**
- **20 minutes on jazz**

**Which display of data is most appropriate to show how Dana spent her practice time in dance class last week?**

- A** line plot
- B** circle graph
- C** line graph
- D** tally chart

Primary Process Standard: 6M5.3

Depth of Knowledge: 2

Correct Answer: A

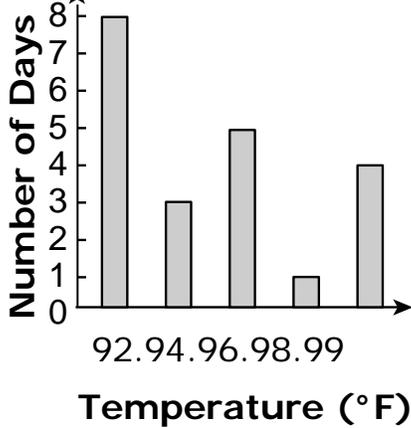
The table shows the data collected by Albert’s science class about high temperatures on school days last September.

**High Temperatures**

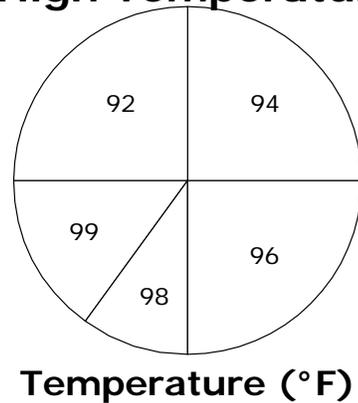
Temperature (°F)	Number of Days
92	8
94	3
96	5
98	1
99	4

Which graph best shows the data collected by Albert’s class?

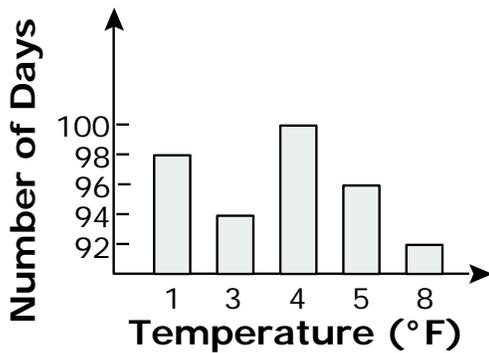
**A High Temperatures**



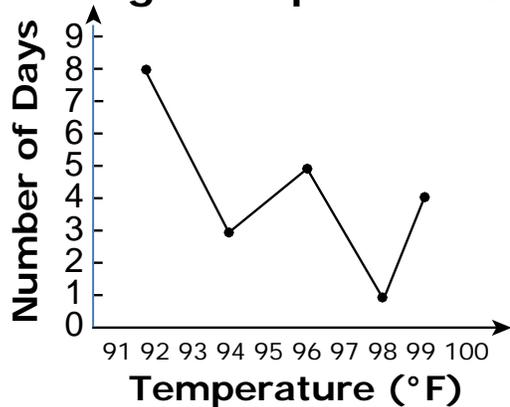
**B High Temperatures**



**C High Temperatures**



**D High Temperatures**

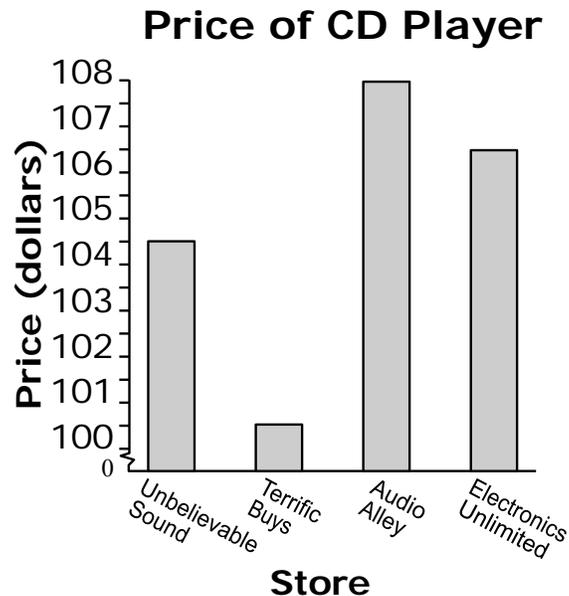


Primary Process Standard: 6M5.2

Depth of Knowledge: 2

Correct Answer: B

The bar graph shows the prices of the same CD player at four different stores. Jim is surprised to see how much less expensive the price is at Terrific Buys.



Which is the best reason why the graph might have misled Jim about the price of CD players?

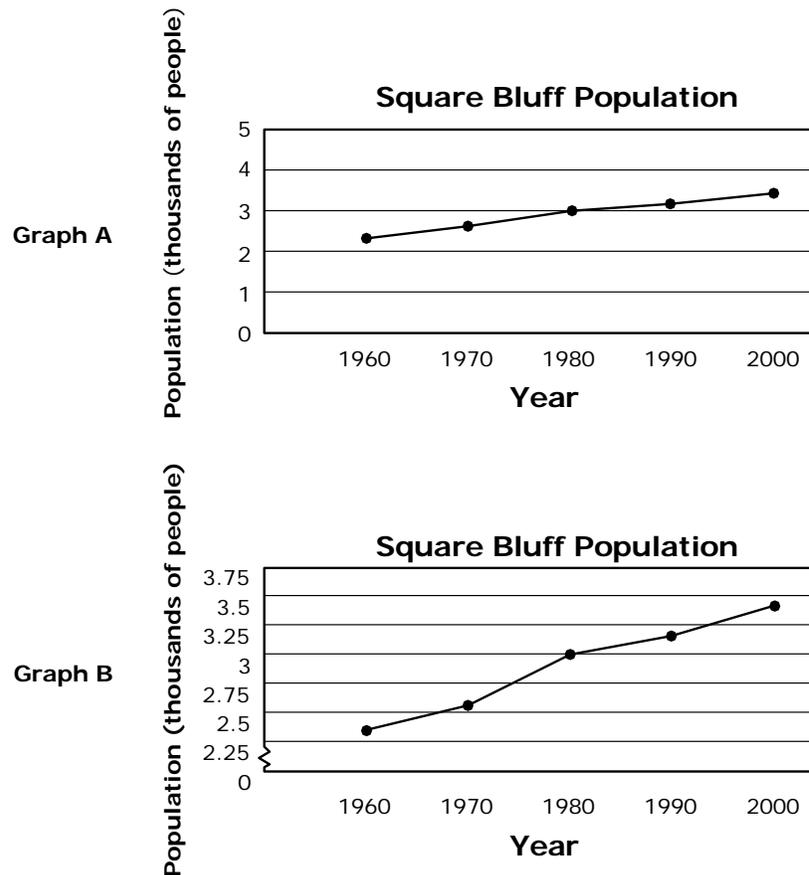
- A** The names of the four stores should be on the *y*-axis and the prices should be on the *x*-axis.
- B** The *y*-axis has a break in the scale between \$0 and \$100.
- C** The scale increments are different for each store.
- D** The bars on the graph are not in order from tallest to shortest.

Primary Process Standard: 6M5.4

Depth of Knowledge: 3

Correct Answer: C

The two graphs shown were made from the same data. They both show how the population of Square Bluff has changed over time.



What part of Graph A makes the changes in population over time appear smaller?

- A smaller scale increments on the y-axis
- B smaller scale increments on the x-axis
- C larger scale increments on the y-axis
- D larger scale increments on the x-axis

**OAS Standard:**

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

**OAS Objective:**

2. Probability: Use the fundamental counting principle on sets with up to five items to determine the number of possible combinations.

**Item Specifications:**Emphasis:

Apply the knowledge of simple probability to describe the outcome of different arrangements and combinations of up to five 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 up to five different items
- Answers may include lists of items or numerical representations of possible combinations

Content Limits:

- Limit combinations to no more than five different sets

Primary Process Standards:

Process Standard 2: Communication

Process Standard 3: Reasoning

Process Standard 4: Connections

Process Standard 5: Representation

Distractor Domain:

- Item permutation error
- Combination error
- Misinterpretation of stimulus

**Oklahoma Academic Standards 5.2 Sample Test Items:**

Primary Process Standard: 6M4.1

Depth of Knowledge: 1

Correct Answer: C

**This list shows the number of choices available at lunch one day.**

- **2 meats**
- **4 sides**
- **3 desserts**

**How many lunch combinations of 1 meat, 1 side, and 1 dessert are possible?**

- A** 3  
**B** 9  
**C** 24  
**D** 28

Primary Process Standard: 6M4.1

Depth of Knowledge: 2

Correct Answer: D

**The table shows choices for decorating a room.**

<b>Paint Color</b>	<b>Window Treatment</b>	<b>Bed Cover</b>	<b>Chair Style</b>
Blue	Curtains	Quilt	Stool
Green	Blinds	Comforter	Bean Bag
Yellow	Shades		Rocker
			Folding

**How many ways can the room be decorated with 1 paint color, 1 window treatment, 1 bed cover, and 1 chair style?**

- A** 4  
**B** 12  
**C** 24  
**D** 72

Primary Process Standard: 6M4.1

Depth of Knowledge: 3

Correct Answer: D

**A school club has 5 boys and 4 girls as members. How many different teams of 1 boy and 1 girl can be made from the club members?**

- A** 2 teams
- B** 9 teams
- C** 10 teams
- D** 20 teams

**OAS Standard:**

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

**OAS Objective:**

3. Central Tendency: Find the measures of central tendency (mean, median, mode, and range) of a set of data (with and without outliers) and understand why a specific measure provides the most useful information in a given context.

**Item Specifications:**Emphasis:

Demonstrate the ability to find the mean, median, mode, and range for a set of data.

Stimulus Attributes:

- Test items may include illustrations of the following: data sets, charts, tables, bar graphs, pictographs, frequency charts, line plots, scatter plots, and stem-and-leaf plots.
- Test items may include any of the following terms: range, spread, mean, or average.

Format:

- Given a set of data, the student will determine mean, median, mode, and range
- Items may include comparisons between mean, median, mode, and range
- Compare how representations of data support inferences and predictions

Content Limits:

- Limit data sets to 20 pieces of data
- Limit data sets to numerical data
- Emphasize creativity using real-life situations and everyday objects

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:

- Incorrect procedures
- Use of incorrect measure
- Misunderstanding of concepts
- Unsupportable conclusions
- Miscalculation

**Oklahoma Academic Standards 5.3 Sample Test Items:**

Primary Process Standard: 6M2.3

Depth of Knowledge: 1

Correct Answer: D

**What is the mode for this set of data?****2.4, 1.3, 3.9, 3.1, 4.2, 6.4, 1.4,  
4.6, 2.9, 1.5, 3.6, 6.3, 1.3, 5.1**

- A** 4.6
- B** 2.4
- C** 1.4
- D** 1.3

Primary Process Standard: 6M2.4

Depth of Knowledge: 1

Correct Answer: C

**The list shows 5 scores on a Science quiz.****75, 81, 77, 90, 93****Which of these is a correct method for finding the mean?**

- A** Find the score that appears the most often.
- B** Subtract the lowest score from the highest score.
- C** Add all the scores and divide the sum by the total number of scores.
- D** List the scores in order from least to greatest and then find the middle score.

Primary Process Standard: 6M5.1

Depth of Knowledge: 2

Correct Answer: A

The table shows the English test scores for 6 students.

English Test Scores

Student	Score
1	78
2	92
3	80
4	95
5	85
6	70

What is the median of these test scores?

- A 82.5
- B 83.3
- C 85.2
- D 87.5

Primary Process Standard: 6M4.2

Depth of Knowledge: 2

Correct Answer: C

Ilia's dog had 4 puppies. They weighed 8 ounces, 10 ounces, 12 ounces, and 14 ounces. What is the mean weight of the puppies?

- A 8 ounces
- B 9 ounces
- C 11 ounces
- D 13 ounces

Primary Process Standard: 6M5.4

Depth of Knowledge: 2

Correct Answer: B

The stem-and-leaf plot shows the ages of Mike's family members.

Stem	Leaf
0	3 4 8 9
1	5 7
2	2 4
3	9
4	9 9
5	5
6	1

Key: 2|4=24

What is the median age of Mike's family members?

- A 17
- B 22
- C 24
- D 39

Primary Process Standard: 6M3.3

Depth of Knowledge: 3

Correct Answer: C

Which statement best describes the median of this set of data?

**3, 5, 8, 9, 2, 2, 13**

- A** The median is a composite number and is also a factor of 12.
- B** The median is a composite number and is also a factor of 18.
- C** The median is a prime number and is also a factor of 15.
- D** The median is a prime number and is also a factor of 8.