

Georgia Milestones

Assessment System



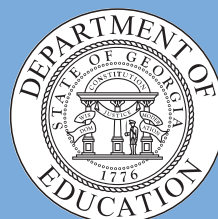
Study/Resource Guide for Students and Parents Grade 4



The Study/Resource Guides are intended to serve as a resource for parents and students. They contain practice questions and learning activities for each content area. The standards identified in the Study/Resource Guides address a sampling of the state-mandated content standards.

For the purposes of day-to-day classroom instruction, teachers should consult the wide array of resources that can be found at www.georgiastandards.org.

Study/Resource Guide



THE GEORGIA MILESTONES ASSESSMENT SYSTEM



Dear Student,

This **Georgia Milestones Grade 4 Study/Resource Guide for Students and Parents** is intended as a resource for parents and students. It contains sample questions and helpful activities to give you an idea of what test questions look like on Georgia Milestones and what the Grade 4 End-of-Grade (EOG) assessment covers.

These sample questions are fully explained and will tell you why each answer is either correct or incorrect.

Get ready—open this guide—and get started!

HOW TO USE THIS GUIDE

Let's get started!

* **Get it together!**

- This guide
- Pen or pencil
- Highlighter
- Paper

* **Gather materials**

- Classroom notebooks
- Textbooks

* **Study space**

- Find a comfortable place to sit.
- Use good lighting.
- Time to focus—no TV, games, or phones!

* **Study time**

- Set aside some time after school.
- Set a goal—how long are you going to study?
- Remember—you cannot do this all at one time.
- Study a little at a time every day.

* **Study buddy**

- Work with a friend, sister, brother, parent—anyone who can help!
- Ask questions—it is better to ask now and get answers.
- Make sure you know what you need to do—read the directions before you start.
- Ask your teacher if you need help.

* **Test-taking help**

- Read each question and all of the answer choices carefully.
- Be neat—use scratch paper.
- Check your work!



PREPARING FOR TAKING TESTS

Getting ready!



Here are some ideas to think about before you take a test.

- Get plenty of rest and eat right. Take care of your body and your mind will do the rest.
- If you are worried about a test, don't be. Talk with a teacher, parent, or friend about what is expected of you.
- Review the things you have learned all year long. Feel good about it.
- Remember that a test is just one look at what you know. Your class work, projects, and other tests will also show your teachers how much you have learned throughout the year.

Try your best!

OVERVIEW OF THE END-OF-GRADE ASSESSMENT

What is on the End-of-Grade Assessment?

- * English Language Arts (ELA)
- * Mathematics
- * Science
- * Social Studies

TYPES OF ITEMS

- * **Selected-response items**—also called multiple-choice items
 - English Language Arts (ELA), Mathematics, Science, and Social Studies
 - There is a question, problem, or statement that is followed by four answer choices.
 - There is only ONE right answer, so read EACH answer choice carefully.
 - Start by eliminating the answers that you know are wrong.
 - Then look for the answer that is the BEST choice.

- * **Constructed-response items**
 - English Language Arts (ELA) and Mathematics only
 - There is a question, problem, or statement but no answer choices.
 - You have to write your answer or work out a problem.
 - Read the question carefully and think about what you are asked to do.
 - In English Language Arts (ELA), go back to the passage to look for details and information.
 - You will be scored on accuracy and how well you support your answer with evidence.

- * **Extended constructed-response items**
 - English Language Arts (ELA) and Mathematics only
 - These are similar to the constructed-response items.
 - Sometimes they have more than one part, or they require a longer answer.
 - Check that you have answered all parts of the question.

- * **Extended writing prompt**
 - English Language Arts (ELA) only
 - There is a question, problem, or statement.
 - You may be asked to do more than one thing.
 - In English Language Arts (ELA), you will be asked to read two passages and then write an essay.
 - You will be scored on how well you answer the question and the quality of your writing.
 - Organize your ideas clearly.
 - Use correct grammar, punctuation, and spelling.
 - Support your answer with evidence from the text.

DEPTH OF KNOWLEDGE

Test questions are designed with a Depth of Knowledge (DOK) level in mind. As you go from Level 1 to Level 4, the items get more and more challenging. They take more thinking and reasoning to answer. You may have experienced these types of questions in your classroom as your teachers find ways to challenge you each day.

A Level 1 item may not require as much thinking as a Level 4 item—but that does not mean it’s easy.

A Level 4 item may have more than one part or ask you to write something.

Here is some information to help you understand just what a DOK level really is.

Level 1 (Recall of Information)

- * Identify, list, or define something.
- * Questions may start with *who*, *what*, *when*, and *where*.
- * Recall facts, terms, or identify information.

Level 2 (Basic Reasoning)

- * Think about things—it is more than just remembering something.
- * Describe or explain something.
- * Answer the questions “how” or “why.”

Level 3 (Complex Reasoning)

- * Go beyond explaining or describing “how and why.”
- * Explain or justify your answers.
- * Give reasons and evidence for your response.
- * Make connections and explain a concept or a “big idea.”

Level 4 (Extended Reasoning)

- * Complex thinking required!
- * Plan, investigate, or apply a deeper understanding.
- * These items will take more time to write.
- * Connect and relate ideas.
- * Show evidence by doing a task, creating a product, or writing a response.

Depth of Knowledge

Level 1—Recall of Information

Level 1 asks you to identify, list, or define. You may be asked to recall *who*, *what*, *when*, and *where*. You may also be asked to recall facts and terms or identify information in documents, quotations, maps, charts, tables, graphs, or illustrations. Items that ask you to “describe” and/or “explain” could be Level 1 or Level 2. A Level 1 item requires that you just recall, recite, or repeat information.

Skills Demonstrated	Question Cues
<ul style="list-style-type: none"> • Make observations • Recall information • Recognize formulas, properties, patterns, processes • Know vocabulary, definitions • Know basic concepts • Perform one-step processes • Translate from one representation to another • Identify relationships 	<ul style="list-style-type: none"> • Tell who, what, when, or where • Find • List • Define • Identify; label; name • Choose; select • Compute; estimate • Express as • Read from data displays • Order

Level 2—Basic Reasoning

Level 2 includes some thinking that goes beyond recalling or repeating a response. A Level 2 “describe” and/or “explain” item would require that you go beyond a description or explanation of information to describe and/or explain a result or “how” or “why.”

Skills Demonstrated	Question Cues
<ul style="list-style-type: none"> • Apply learned information to abstract and real-life situations • Use methods, concepts, and theories in abstract and real-life situations • Perform multi-step processes • Solve problems using required skills or knowledge (requires more than habitual response) • Make a decision about how to proceed • Identify and organize components of a whole • Extend patterns • Identify/describe cause and effect • Recognize unstated assumptions; make inferences • Interpret facts • Compare or contrast simple concepts/ideas 	<ul style="list-style-type: none"> • Apply • Calculate; solve • Complete • Describe • Explain how; demonstrate • Construct data displays • Construct; draw • Analyze • Extend • Connect • Classify • Arrange • Compare; contrast

Level 3—Complex Reasoning

Level 3 requires reasoning, using evidence, and thinking on a higher level than Level 1 and Level 2. You will go beyond explaining or describing “how and why” to justifying the “how and why” through reasons and evidence. Level 3 items often involve making connections across time and place to explain a concept or a “big idea.”

Skills Demonstrated	Question Cues
<ul style="list-style-type: none"> • Solve an open-ended problem with more than one correct answer • Create a pattern • Generalize from given facts • Relate knowledge from several sources • Draw conclusions • Make predictions • Translate knowledge into new contexts • Compare and discriminate between ideas • Assess value of methods, concepts, theories, processes, and formulas • Make choices based on a reasoned argument • Verify the value of evidence, information, numbers, and data 	<ul style="list-style-type: none"> • Plan; prepare • Predict • Create; design • Ask “what if?” questions • Generalize • Justify; explain why; support; convince • Assess • Rank; grade • Test; judge • Recommend • Select • Conclude

Level 4—Extended Reasoning

Level 4 requires the complex reasoning of Level 3 with the addition of planning, investigating, applying deeper understanding, and/or developing that will require a longer period of time. You may be asked to connect and relate ideas and concepts *within* the content area or *among* content areas in order to be at this highest level. The Level 4 items would be a show of evidence—through a task, a product, or an extended response—that the higher-level demands have been met.

Skills Demonstrated	Question Cues
<ul style="list-style-type: none"> • Analyze and synthesize information from multiple sources • Examine and explain alternative perspectives across a variety of sources • Describe and illustrate how common themes are found across texts from different cultures • Apply mathematical models to illuminate a problem or situation • Design a mathematical model to inform and solve a practical or abstract situation • Combine and synthesize ideas into new concepts 	<ul style="list-style-type: none"> • Design • Connect • Synthesize • Apply concepts • Critique • Analyze • Create • Prove

MATHEMATICS

DESCRIPTION OF TEST FORMAT AND ORGANIZATION

The Grade 4 Mathematics EOG assessment consists of a total of 73 items.

You will answer a variety of item types on the test. Some of the items are selected-response (multiple-choice), which means you choose the correct answer from four choices. Some items will ask you to write your response.

The test will be given in two sections.

- You may have up to 85 minutes per section to complete Sections 1 and 2.
- The test will take about 120 to 170 minutes.

CONTENT

The Grade 4 Mathematics EOG assessment will measure the Grade 4 standards that are described at www.georgiastandards.org.

The content of the assessment covers standards that are reported under these domains:

- Operations and Algebraic Thinking
- Number and Operations in Base 10
- Number and Operations—Fractions
- Measurement and Data
- Geometry

ITEM TYPES

The Mathematics portion of the Grade 4 EOG assessment consists of selected-response (multiple-choice) items, constructed-response items, and extended constructed-response items.

MATHEMATICS DEPTH OF KNOWLEDGE EXAMPLE ITEMS

Example items that represent applicable DOK levels are provided for you on the following pages. The items and explanations of what is expected of you to answer them will help you prepare for the test.

All example and sample items contained in this guide are the property of the Georgia Department of Education.

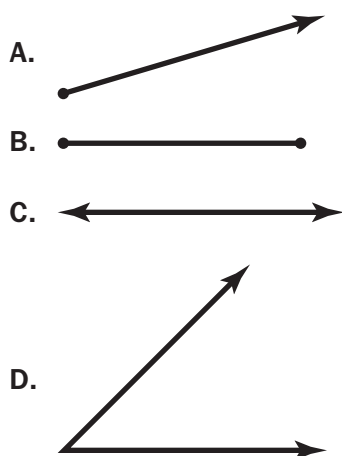
Example Item 1

DOK Level 1: This is a DOK level 1 item because it assesses recall of a vocabulary term and its definition.

Mathematics Grade 4 Content Domain: Geometry

Standard: MGSE4.G.1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

Which of these figures **BEST** models a ray?



Correct Answer: A

Explanation of Correct Answer: The correct answer is choice (A). A ray is a part of a line with a starting point, but no ending point. Choice (B) is incorrect because it is a line segment, a part of a line with starting and ending points. Choice (C) is incorrect because it is a line; it has neither a starting nor an ending point. Choice (D) is incorrect because it is an acute angle, formed by two rays.

Scoring Rubric

Points	Description
2	<p>The response achieves the following:</p> <ul style="list-style-type: none"> The response demonstrates a complete understanding of adding fractions with like denominators with a sum greater than 1. Give 2 points for the correct sum and correct explanation. <ul style="list-style-type: none"> Response is correct and complete. Response shows application of a reasonable and relevant strategy. Mathematical ideas are expressed coherently through a clear, complete, logical, and fully developed response using words, calculations, and/or symbols as appropriate.
1	<p>The response achieves the following:</p> <ul style="list-style-type: none"> The response demonstrates a partial understanding of adding fractions with like denominators with a sum greater than 1. Give 1 point for Part A OR Part B correct. <ul style="list-style-type: none"> Response is mostly correct but contains either a computation error or an unclear or incomplete explanation. Response shows application of a relevant strategy, though it may be only partially applied or remain unexplained. Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
0	<p>The response achieves the following:</p> <ul style="list-style-type: none"> The response demonstrates no understanding of adding fractions with like denominators with a sum greater than 1. <ul style="list-style-type: none"> Response is incorrect. Response shows no application of a strategy. Mathematical ideas cannot be interpreted or lack sufficient evidence to support even a limited understanding.

Exemplar Response

Points Awarded	Sample Response
2	<p>Part A: 2 yards. Part B: I added all the fractions.</p>
1	<p>Part A: 2 yards.</p>
0	<p><i>Response is irrelevant, inappropriate, or not provided.</i></p>

Example Item 3

DOK Level 3: This is a DOK level 3 item because it assesses finding all factor pairs of a whole number, identifying the factors as prime or composite, and explaining the difference between prime and composite numbers.

Mathematics Grade 4 Content Domain: Number and Operations in Base 10

Standard: MGSE4.OA.4. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

Part A: Find all of the factor pairs of 32.

Part B: Identify each factor as *prime*, *composite*, or *neither*.

Part C: Explain the difference between prime and composite numbers.

Scoring Rubric

Points	Description
4	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a complete understanding of identifying factor pairs of whole numbers and of identifying prime and composite numbers. • Give 4 points for 3 parts answered correctly. <ul style="list-style-type: none"> • Response is correct and complete. • Response shows application of a reasonable and relevant strategy. • Mathematical ideas are expressed coherently through a clear, complete, logical, and fully developed response using words, calculations, and/or symbols as appropriate.
3	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a good understanding of identifying factor pairs of whole numbers and of identifying prime and composite numbers. • Give 3 points for 2 parts correct OR 3 parts only partially correct. <ul style="list-style-type: none"> • Response is mostly correct, but contains either a computation error or an unclear or incomplete explanation. • Response shows application of a relevant strategy, though it may be only partially applied or remain unexplained. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
2	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a partial understanding of identifying factor pairs of whole numbers and of identifying prime and composite numbers. • Give 2 points for 1 part correct OR 2 parts partially correct. <ul style="list-style-type: none"> • Response is only partially correct. • Response shows application of a relevant strategy, though it may be only partially applied or remain unexplained. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
1	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a limited understanding of identifying factor pairs of whole numbers and of identifying prime and composite numbers. • Give 1 point for 1 part partially correct. <ul style="list-style-type: none"> • Response is only partially correct. • Response shows incomplete or inaccurate application of a relevant strategy. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
0	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates no understanding of identifying factor pairs of whole numbers and of identifying prime and composite numbers. <ul style="list-style-type: none"> • Response is incorrect. • Response shows no application of a strategy. • Mathematical ideas cannot be interpreted or lack sufficient evidence to support even a limited understanding.

Exemplar Response

Points Awarded	Sample Response
4	<p>Part A: The factor pairs of 32 are: 1 and 32; 2 and 16; 4 and 8</p> <p>Part B: prime: 2 composite: 4, 8, 16, 32 neither: 1</p> <p>Part C: A prime number is a number with exactly two factors—itsself and one. Two is a prime number because its only factors are 2 and 1. A composite number has more than two factors. For example, 8 is a composite number because its factors are 1, 2, 4, and 8. One is neither a prime nor a composite number.</p>
3	<p>Part A: The factor pairs of 32 are: 1 and 32; 2 and 16; 4 and 8</p> <p>Part B: prime: 2 composite: 4, 8, 16, 32 neither: 1</p>
2	<p>Part A: The factor pairs of 32 are: 1 and 32; 2 and 16; 4 and 8</p>
1	<p>Part A: The factor pairs of 32 are: 2 and 16; 4 and 8</p>
0	<p><i>Response is irrelevant, inappropriate, or not provided.</i></p>

MATHEMATICS CONTENT DESCRIPTION AND ADDITIONAL SAMPLE ITEMS

In this section, you will find information about what to study in order to prepare for the Grade 4 Mathematics EOG test. This includes key terms and important vocabulary words. This section also contains practice questions, with an explanation of the correct answers, and activities that you can do on your own or with your classmates or family to prepare for the test.

All example and sample items contained in this guide are the property of the Georgia Department of Education.

CONTENT DESCRIPTION

- Perform multi-digit multiplication and develop an understanding of dividing to find quotients involving multi-digit dividends
- Develop an understanding of fractions
- Multiplication of fractions by whole numbers
- Generate and analyze patterns
- Analyze and classify geometric figures based on their properties
- Represent and interpret data
- Understand concepts of angles and measure angles

Unit 1: Whole Numbers, Place Value, and Rounding in Computation

In this unit, you will work with the place value system. You will round, compare, and estimate numbers. You will use word problems with more than one step and write equations with unknown numbers.

KEY TERMS

Model **word problems** involving **more than one step** by writing an **equation** with a **letter** such as x to represent an **unknown number**. Use the four operations to solve the problem. (OA.3)

Solutions to multi-step word problems can be checked to make sure they are reasonable. **Rounding** the numbers in the equation before solving will provide an **estimate** of the correct answer. (OA.3)

Place value is the numerical value of a digit in a number based on its location. A digit in the tens place of a number is 10 times the value of the same digit in the ones place. A digit in the hundreds place is 10 times the value of the same digit in the tens place. (NBT.1)

Numbers can be written in different forms using the place value of each digit.

- **Base ten numerals:** The number is written as a group of digits, 183.
- **Number names:** The number is written in words, one hundred eighty-three.
- **Expanded form:** The number is written as an addition equation of the place value for each digit, $100 + 80 + 3$. (NBT.2)

Compare: Determine the value of two numbers written in different forms to see which has a greater value.

- **Greater than:** If a number is larger in value, use the symbol $>$.
- **Less than:** If a number is smaller in value, use the symbol $<$.
- **Equal to:** If the numbers have the same value, use the symbol $=$. (NBT.2)

Rounding: A number can be rounded to the nearest number of a certain place value. For example, 295 can be rounded to the nearest hundred to get 300. (NBT.3)

Add and **subtract** whole numbers using place value to regroup as needed. When adding, a place value that has a sum of 10 or greater will need to regroup into the higher place value. When subtracting, find the difference between the first and second number. If a digit in the first number is smaller than the digit in the same place in the second number, regroup from a higher place value into a lower place value. (NBT.4)

Important Tips

- ✍ Use the place value of each digit when writing numbers from number names. Remember to keep in mind place value when writing numbers. For example, one thousand twenty-four is written as 1,024 with a 1 in the thousands place, 2 in the tens place, and 4 in the ones place.
- ✍ When using rounded numbers in an equation, the answer will be an estimate.

Sample Items 1–3**Item 1**

The population of Pleasantville is 2,378.

What is the population of the city, rounded to the nearest hundred?

- A. 2,000
- B. 2,300
- C. 2,380
- D. 2,400

Item 2

Subtract.

$$2,406 - 157$$

- A. 2,249
- B. 2,259
- C. 2,349
- D. 2,351

Item 3

On Monday, workers at a toy factory made 529 teddy bears. On Tuesday, they made 207 teddy bears. On Wednesday, they made 174 teddy bears.

Part A: ABOUT how many teddy bears did the factory workers make in those three days?

The factory workers made ABOUT _____ teddy bears in three days.

Part B: Explain how you found the answer.

Part C: What is the exact number of teddy bears made in three days? The factory workers made **EXACTLY** _____ teddy bears in three days.

Part D: Explain how you know your estimate is a reasonable answer.

Unit 2: Multiplication and Division of Whole Numbers

In this unit, you will use multiplication, division, and word problems with more than one step. You will use the properties of operations. You will work with prime and composite numbers and patterns.

KEY TERMS

Multiplicative comparison: Comparing the value of one object to the value of another, using phrases such as “3 times as long.” (OA.1)

Solve word problems involving **multiplicative comparison** by creating a drawing or equation to represent the problem. A letter can be used in an equation for an unknown number. Use multiplication or division to solve for the unknown number. (OA.2)

Model **word problems** involving **more than one step** by writing an **equation** with a **letter** such as x to represent an **unknown number**. Use the four operations to solve the problem. (OA.3)

Division equations may include a **remainder**. Determine how the remainder should be used based on the information in the word problem. The remainder may be listed as part of the quotient or used to round the quotient up or down depending on the situation. (OA.3)

Use **place value** and **properties of operations** to multiply and divide whole numbers. Use models such as arrays, area models, and equations to illustrate the problem. (NBT.5, NBT.6)

Properties of Operations:

- **Commutative Property:** Numbers can be multiplied in any order and the **product** will stay the same.
- **Associative Property:** Three or more **factors** can be grouped together in any way and the **product** will stay the same.
- **Distributive Property:** The product of the sum of two numbers can be found by finding the product of each number, then taking the sum of those products. (NBT.5)

A number can be broken down into factors. The **factors** of a number are two whole numbers that when multiplied together equal the given number. Example: 4 and 2 are factors of 8; $4 \times 2 = 8$. (OA.4)




A **multiple** of a number is the product of that number and another factor. For example, 12 is a multiple of 3 because $3 \times 4 = 12$.

Prime: A number that can be broken down into factors of only 1 and itself. (OA.4)

Composite: A number that has more factors than 1 and itself. (OA.4)

Patterns: Repeated sequences of numbers or shapes that follow a set of **rules** such as “add 5.” (OA.5)

Important Tips

-  When listing multiples of a number, include the given number. The smallest multiple of a number is the number itself. For example, 5 is a multiple of 5 using the equation 5×1 .
-  The number of factors a number has is not related to the size of the number. A number with a greater value may not have a larger amount of factors.
-  Prime numbers only have factors of one and itself. Two is the smallest prime number. Composite numbers are numbers that have factors other than one or itself.

Sample Items 4–6

Item 4

35×43

- A. 245
- B. 1,295
- C. 1,305
- D. 1,505

Item 5

There are three times as many red crayons in the bucket as blue crayons. There are 8 blue crayons.

Which equation represents the number of red crayons?

- A. $16 \div 8 = 3$
- B. $8 - 3 = 5$
- C. $3 + 8 = 11$
- D. $3 \times 8 = 24$

Item 6

There are 60 books that need to be shipped to the bookstore. Each shipping box holds 8 books.

How many boxes are needed?

<p>_____ boxes</p>

Explain how you found the answer.

<p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>

Unit 3: Fraction Equivalents

In this unit, you will work with fractions, including improper and equivalent fractions and mixed numbers. You will compare fractions and create common denominators and numerators.

KEY TERMS

Fraction: A number used to represent equal parts of a whole. (NF.1)

Fractions less than 1, with the numerator less than the denominator, are proper fractions.

Fractions greater than 1 are written as **improper fractions**, where the numerator is greater than the denominator, or as **mixed numbers**, which include a whole number and a fraction. (NF.1)

Equivalent fractions: Fractions that are the same size or the same point on the number line. (NF.1)

Equivalent fractions are created by **multiplying** the numerator and denominator by the same number, which is the same as multiplying the fraction by 1. For example, $\frac{(1 \times 4)}{(2 \times 4)} = \frac{4}{8}$ so $\frac{4}{8}$ is equivalent to $\frac{1}{2}$. The fraction now includes a different number of parts and the parts are different sizes, but the value remains the same. (NF.1)

Compare: Determine the value or size of two fractions to see which fraction is larger. Fractions can be compared by looking at the number of equal parts and the size of the equal parts of the same size whole.

- **Greater than:** If a fraction is larger in size and value, use the symbol $>$.
- **Less than:** If a fraction is smaller in size and value, use the symbol $<$.
- **Equal to:** If the fractions are the same size (equivalent fractions), use the symbol $=$. (NF.2)

Fractions with different numerators and denominators can be compared in two ways.

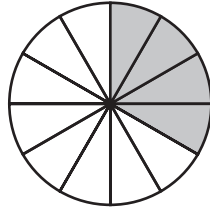
Using the same strategies for creating equivalent fractions, create a **common denominator** or **common numerator** between the two fractions. Or, both fractions can be compared to a **benchmark fraction** such as $\frac{1}{2}$. (NF.2)

Important Tips

- ✍ When comparing fractions, use both the numerator and the denominator to find the value of the fraction. The numerator tells the number of parts out of the whole, and the denominator tells the size of each part.
- ✍ Fractions in a comparison must represent parts of the same whole. When using models to compare fractions, use models that are the same size and shape.

Sample Items 7–9**Item 7**

Look at the model.



Which fraction is equivalent to the shaded part of this model?

- A. $\frac{1}{4}$
- B. $\frac{1}{3}$
- C. $\frac{1}{2}$
- D. $\frac{1}{6}$

Item 8

Look at the expression.

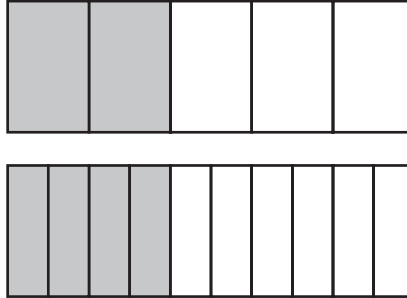
$$\square > \frac{1}{2}$$

Which fraction goes in the \square to make this expression TRUE?

- A. $\frac{1}{4}$
- B. $\frac{2}{3}$
- C. $\frac{2}{4}$
- D. $\frac{1}{3}$

Item 9

These models show two equivalent fractions.



Part A: Write the two equivalent fractions.

_____ = _____

Part B: Explain why the fractions are equivalent.

A large rectangular box containing 12 horizontal lines for writing.

Part C: Describe how you could model a third fraction that is equivalent to these two.

A large rectangular box containing 12 horizontal lines for writing.

Unit 4: Operations with Fractions

In this unit, you will add, subtract, and multiply fractions. You will continue to work with improper fractions and mixed numbers.

KEY TERMS

Proper fractions that have a numerator of 1 are called **unit fractions**.

Adding and **subtracting** fractions is joining or separating parts referring to the same whole.

Decompose a fraction by separating the given fraction into a sum of smaller fractions.

For example, $\frac{3}{5} = \frac{1}{5} + \frac{2}{5}$. (NF.3)

Before adding or subtracting fractions, find a **common denominator**. If the fractions in the equation have **unlike denominators**, replace each fraction with an **equivalent** fraction that has the same denominator. (NF.3)

After creating a like denominator, **add** the numerators to find the **sum** or **subtract** the numerators to find the **difference**. (NF.3)


Fractions greater than 1 can be written as **improper fractions**, where the numerator is larger than the denominator, or as **mixed numbers**, which include a whole number and a fraction. (NF.3)

A fraction is a **multiple** of a **unit fraction**. For example, $\frac{2}{3}$ is $2 \times \frac{1}{3}$. This strategy can be used to multiply a fraction by a whole number. (NF.4)

Multiplying a fraction by a whole number is the same as repeatedly adding the fraction.

If the equation asks for $\frac{1}{4} \times 3$, find the total sum of $\frac{1}{4}$ three times. **Word problems** can be represented using an equation or a fraction model. (NF.4)

Important Tip

 Fractions in an equation must represent parts of the same whole. When using models to solve the equations, use models that are the same size and shape.

Sample Items 10–12**Item 10**

Which equation is TRUE?

- A. $\frac{2}{5} = \frac{1}{2} + \frac{1}{3}$
- B. $\frac{3}{5} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$
- C. $\frac{4}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$
- D. $\frac{4}{5} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$

Item 11

Sarita has 3 rolls of ribbon. Each roll is 3 yards long. Sarita cuts off $\frac{1}{2}$ yard from each roll.

How much ribbon does she cut off in all?

- A. 1 yard
- B. $1\frac{1}{2}$ yards
- C. 3 yards
- D. $3\frac{1}{2}$ yards

Unit 5: Fractions and Decimals

In this unit, you will add and subtract fractions. You will compare decimals and work with place value.

KEY TERMS

Add and subtract fractions with the denominators of 10 and 100 by creating a **common denominator**. (NF.5)

A **decimal** is another way to write a **fraction**. Both a decimal and fraction show a value that is between whole numbers. For example: $\frac{6}{10}$ or 0.6 is a value between the whole numbers of 0 and 1. (NF.6)

Place Value is the value of a digit in a number based on its location related to the decimal point. A digit in the tenths place of a number is 10 times the value of the same digit in the hundredths place. A digit in the tenths place is $\frac{1}{10}$ the value of the same digit in the ones place. (NF.6)

- **Tenths place:** This is the first place to the right of the decimal point. A decimal of 0.1 would have a value equivalent to $\frac{1}{10}$.
- **Hundredths place:** This is the second place to the right of the decimal point. A decimal of 0.01 would have a value equivalent to $\frac{1}{100}$. (NF.6)

A decimal such as 0.35 can be written as $\frac{35}{100}$ or $\frac{3}{10} + \frac{5}{100}$. (NF.6)

To **compare decimal numbers**, determine the value or size of two decimal numbers and identify the number that has a greater or equal value, if possible.

- **Greater than:** If the decimal number has a greater value than the other number in the comparison, use the symbol $>$.
- **Less than:** If the decimal number has a smaller value than the other number in the comparison, use the symbol $<$.
- **Equal to:** If both numbers in the comparison have the same value, use the symbol $=$. (NF.7)

Important Tips

- ✍ When comparing decimal numbers, look at the place value of each digit. The location of the digit determines its value.
- ✍ Fraction models and drawings can be used to compare decimals. Decimals can be changed into fractions with a denominator of 10 or 100 and then used to create the model.

Sample Items 13–15

Item 13

Which fraction is equivalent to $\frac{3}{10}$?

- A. $\frac{3}{100}$
- B. $\frac{6}{100}$
- C. $\frac{10}{100}$
- D. $\frac{30}{100}$

Item 14

Which decimal is equivalent to $\frac{43}{100}$?

- A. 0.043
- B. 0.43
- C. 4.3
- D. 43.00

Unit 6: Geometry

In this unit, you will study two-dimensional figures and their properties. You will work with angles, parallel and perpendicular lines, points, lines, line segments, rays, and lines of symmetry.

KEY TERMS

Two-dimensional figures: A **plane figure** that is measured in two dimensions, such as a rectangle that is measured using length and width. (G.2)

The **properties** of two-dimensional figures include:



- **Angles:**
 - * **Acute:** An angle measure less than 90° .
 - * **Obtuse:** An angle measure greater than 90° .
 - * **Right:** An angle measure equal to 90° .
- **Parallel lines:** Two lines that are always an equal distance apart.
- **Perpendicular lines:** Two lines that intersect at a 90° angle.
- **Point:** A location represented by a dot.
- **Line:** A straight line that continues in each direction with no endpoints.
- **Line segment:** Part of a straight line that begins and ends at two specific points.
- **Ray:** A part of a straight line that continues in one direction and has one endpoint. (G.1)

These parts of geometric figures can be **drawn** on their own or included in a two-dimensional shape. **Identify** the properties within a given shape to place it in a category. (G.2)

Category: A group of two-dimensional figures that share at least one property. For example: All shapes with four sides belong to the category of quadrilateral. (G.2)

Line of symmetry: A line across a figure such that the figure can be folded along the line into matching parts. (G.3)

Important Tips

-  The measure of an angle is not impacted by the length of the lines that make up the angle. When comparing angles, use a protractor to measure the angles or visually compare the degrees of measure.
-  A right angle can be estimated using the corner of a piece of paper or book. These everyday objects are rectangles and therefore have four right angles.

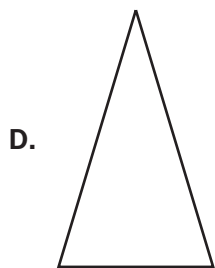
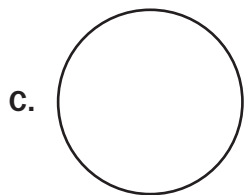
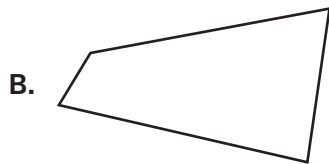
Sample Items 16–18**Item 16**

What type of lines meet at a 90° angle?

- A. curved
- B. diagonal
- C. parallel
- D. perpendicular

Item 17

Which figure has exactly one line of symmetry?



Unit 7: Measurement

In this unit, you will work with different units of measurement, including time. You will record measurements on line plots and use protractors to measure angles. You will determine the area and perimeter of rectangles.

KEY TERMS

Conversion: Changing between units within the same measurement system. (MD.1)

Customary Measurement

- **Liquid volume** is measured in cups, pints, quarts, and gallons.
- **Length** is measured in inches, feet, yards, and miles.
- **Weight** is measured in ounces, pounds, and tons. (MD.1)

Metric Measurement

- **Liquid volume** is measured in milliliters and liters.
- **Length** is measured in centimeters, meters, and kilometers.
- **Mass** is measured in grams and kilograms. (MD.1)

Time is measured in seconds, minutes, and hours. (MD.1)

Use the **four operations** to solve **word problems** involving liquid volume, mass, intervals of time, and money within the same units of measure. If the units of measure are not the same, convert larger units into smaller units, such as feet into inches. These word problems may include decimals or fractions. (MD.2)

Use the length and width of a rectangle given in a problem to find the area and perimeter. **Area** can be found using the formula $A = l \times w$. **Perimeter** can be found using the formula $P = 2l + 2w$. (MD.3)

A **line plot** is used to record measurements for a group of objects. These measurements can include liquid volume, length, mass, and time. For example, a line is marked with measurements using fractions, including $\frac{1}{8}$, $\frac{1}{4}$, and $\frac{1}{2}$. Place a mark above the measurement on the line. Use the line plot to answer questions by adding or subtracting the measurements shown. (MD.4)

Angles are made by two rays that have the same endpoint. They are measured as part of a circle with the endpoint as the center. The measure of an angle is the part between the two rays. (MD.5)

Angles are measured in degrees using a protractor. (MD.6)

An angle can be divided into smaller angles that do not **overlap**. The measure of non-overlapping parts can be **added** together to find the measure of the whole angle. You can also find the measure of **unknown angles** by writing an equation with a letter for the unknown angle measure. (MD.7)

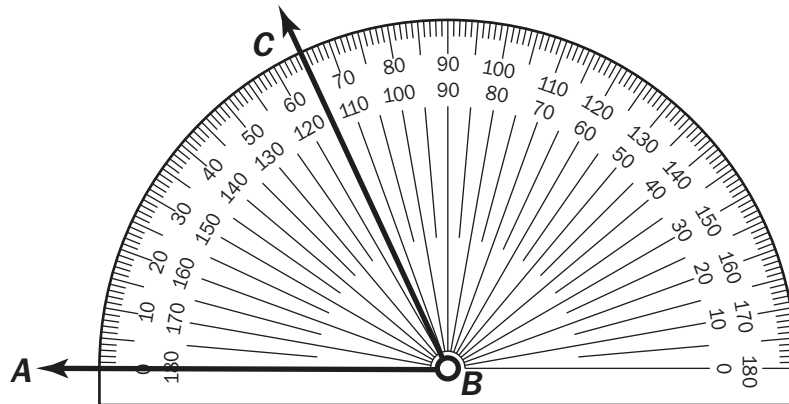
Important Tips

- ✍ To convert a measurement such as yards, choose another unit used to measure length within the customary measurement system, such as feet or inches.
- ✍ Estimate the size of an angle as greater than or less than 90° before measuring with a protractor. If the estimate of the angle is less than 90° , then use the smaller number listed on the protractor. If the estimate is greater than 90° , then use the larger number listed on the protractor.

Sample Items 19–21

Item 19

Consider the angle and protractor.



What is the measure of angle ABC to the nearest whole degree?

Angle ABC measures _____ $^\circ$.

Classify the angle as *acute*, *right*, or *obtuse*. Explain how you know.

Item 20

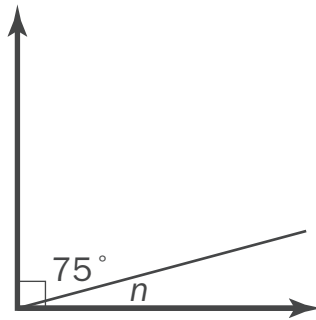
Ms. Johnson built a rectangular fence around her garden. The length of the fence is 8 feet. The width is 7 feet.

What is the perimeter of the fence?

- A. 15 feet
- B. 30 feet
- C. 56 feet
- D. 64 feet

Item 21

Look at the angle measures in the right angle.



What is the measure of the unknown angle, n ?

- A. 15°
- B. 25°
- C. 90°
- D. 180°

MATHEMATICS ADDITIONAL SAMPLE ITEM KEYS

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
1	MGSE4.NBT.3	2	D	The correct answer is choice (D) 2,400. To round to the nearest hundred, the value of the digit in the tens place is evaluated. If the digit in the tens place is greater than 5, the digit in the hundreds place rounds to the greater hundred. Choice (A) is incorrect because it is the result of rounding to the nearest thousand. Choice (B) is incorrect because it incorrectly shows rounding to the nearest hundred. Choice (C) is incorrect because it shows rounding to the nearest ten.
2	MGSE4.NBT.4	2	A	The correct answer is choice (A) 2,249. This subtraction problem requires regrouping with a zero. Choices (B) and (C) are incorrect because both were regrouped incorrectly. Choice (D) is incorrect because digits were subtracted without regrouping.
3	MGSE4.OA.3	2	N/A	See scoring rubric and sample response beginning on page 99.
4	MGSE4.NBT.5	2	D	The correct answer is choice (D) 1,505. This multi-digit multiplication problem requires regrouping. Choice (A) is incorrect because the place value of the digits was not calculated correctly. Choices (B) and (C) are incorrect because there were calculation errors.
5	MGSE4.OA.1	2	D	The correct answer is choice (D) $3 \times 8 = 24$. This word problem asks which equation represents the number of red crayons. This was best shown with the operation of multiplication. Choice (A) is incorrect because the product is incorrect. Choices (B) and (C) are incorrect because they use the wrong operations.
6	MGSE4.NBT.6	2	N/A	See scoring rubric and sample response beginning on page 102.
7	MGSE4.NF.1	1	B	The correct answer is choice (B) $\frac{1}{3}$. The circle is divided into 12 equal parts, and 4 of them are shaded. Four out of 12 is equivalent to $\frac{1}{3}$. Choice (A) is incorrect because it is equivalent to 3 out of 12 parts shaded. Choice (C) is incorrect because it is equivalent to 6 out of 12 parts shaded. Choice (D) is incorrect because it is equivalent to 2 out of 12 parts shaded.

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
8	MGSE4.NF.2	1	B	The correct answer is choice (B) $\frac{2}{3}$. Rewriting both fractions with a common denominator gives $\frac{2}{3} = \frac{4}{6}$ and $\frac{1}{2} = \frac{3}{6}$. Since $\frac{4}{6} > \frac{3}{6}$, then $\frac{2}{3} > \frac{1}{2}$. Choice (A) is incorrect because $\frac{1}{4} < \frac{1}{2}$. Choice (C) is incorrect because $\frac{2}{4} = \frac{1}{2}$. Choice (D) is incorrect because $\frac{1}{3} < \frac{1}{2}$.
9	MGSE4.NF.1	3	N/A	See scoring rubric and sample response beginning on page 104.
10	MGSE4.NF.3a	2	C	The correct answer is choice (C) $\frac{4}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$. $\frac{4}{5}$ can be made by joining 4 unit fractions of the same denominator. Choice (A) is incorrect because the sum of the unit fractions equals $\frac{5}{6}$, not $\frac{2}{5}$. Choice (B) is incorrect because the sum of the unit fractions equals $\frac{3}{3}$, not $\frac{3}{5}$. Choice (D) is incorrect because the sum of the unit fractions equals $\frac{5}{4}$, not $\frac{4}{5}$.
11	MGSE4.NF.4c	2	B	The correct answer is choice (B) $1\frac{1}{2}$ yards. This is the same as $\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$, which equals $\frac{3}{2}$. Two pieces of ribbon that are $\frac{1}{2}$ yard equal 1 yard in total plus an additional $\frac{1}{2}$ yard. Choice (A) is incorrect because it is the total amount cut off only 2 rolls. Choice (C) is incorrect because it is the number of pieces of ribbon. Choice (D) is incorrect because it is the sum of two of the two numbers given in the problem.
12	MGSE4.NF.3b	2	N/A	See scoring rubric and sample response beginning on page 108.
13	MGSE4.NF.5	2	D	The correct answer is choice (D) $\frac{30}{100}$. $\frac{3}{10}$ has the same value as $\frac{30}{100}$ since 3 times 10 equals 30 and 10 times 10 equals 100. Choices (A), (B), and (C) are not equivalent fractions to $\frac{3}{10}$.

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
14	MGSE4.NF.6	2	B	The correct answer is choice (B) 0.43. 0.43 means there are 43 hundredths; this is equivalent to $\frac{43}{100}$. Choice (A) is incorrect because 0.043 means 43 thousandths, or $\frac{43}{1000}$. Choice (C) is incorrect because 4.3 means 4 wholes and 3 tenths, or $4\frac{3}{10}$. Choice (D) is incorrect because 43.00 means 43 wholes.
15	MGSE4.NF.7	2	N/A	See scoring rubric and sample response beginning on page 110.
16	MGSE4.G.1	1	D	The correct answer is choice (D) perpendicular. Perpendicular lines intersect at a right angle, or 90 degrees. Choice (A) is incorrect because curved lines don't meet at an angle; an angle is formed by the intersection of two lines, segments, or rays. Choice (B) is incorrect because not all diagonal lines intersect. Choice (C) is incorrect because parallel lines are lines that will never intersect; they will always be the same distance apart from one another.
17	MGSE4.G.3	2	D	The correct answer is choice (D). An isosceles triangle has exactly one line of symmetry. Choice (A) is incorrect because a square has four lines of symmetry. Choice (B) is incorrect because the figure has no lines of symmetry. Choice (C) is incorrect because a circle has an infinite number of lines of symmetry.
18	MGSE4.G.2	3	N/A	See scoring rubric and sample response beginning on page 112.
19	MGSE4.MD.6	2	N/A	See scoring rubric and sample response beginning on page 114.
20	MGSE4.MD.3	2	B	The correct answer is choice (B) 30 feet. The perimeter is found by adding all side lengths of a figure. Choice (A) is incorrect because just two sides of the figure were added. Choice (C) is incorrect because it is the area, the space inside the figure. Choice (D) is incorrect because it is based on a calculation error when finding area.
21	MGSE4.MD.7	2	A	The correct answer is choice (A) 15°. The two smaller angles together form a right angle, so their sum must be 90°. Choice (B) is incorrect because a right angle does not measure 100°. Choice (C) is incorrect because 90° is the entire measurement of the right angle. Choice (D) is incorrect because it is the measurement of a straight line.

MATHEMATICS SAMPLE SCORING RUBRICS AND EXEMPLAR RESPONSES

Item 3

Scoring Rubric

Points	Description
4	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a complete understanding of using estimation to solve a multi-digit addition problem with more than two addends. • Give 4 points for the correct answer/estimate and a complete, correct explanation of how the answer was calculated/estimated. <ul style="list-style-type: none"> • Response is correct and complete. • Response shows application of a reasonable and relevant strategy. • Mathematical ideas are expressed coherently through a clear, complete, logical, and fully developed response using words, calculations, and/or symbols as appropriate
3	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a nearly complete understanding of using estimation to solve a multi-digit addition problem with more than two addends. • Give 3 points if the student response indicates 1 error in any of the 4 parts or 1 part is incomplete. <ul style="list-style-type: none"> • Response is mostly correct, but contains either a computation error or an unclear or incomplete explanation. • Response shows application of a relevant strategy, though it may be only partially applied or remain unexplained. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
2	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a partial understanding of using estimation to solve a multi-digit addition problem with more than two addends. • Give 2 points if student response indicates 2 errors in any of the 4 parts OR two parts are incomplete. <ul style="list-style-type: none"> • Response is only partially correct. • Response shows application of a relevant strategy, though it may be only partially applied or remain unexplained. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.

Points	Description
1	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a minimal understanding of using estimation to solve a multi-digit addition problem with more than two addends. • Give 1 point if student response indicates 3 errors in any of the 4 parts OR all 3 parts are incomplete. <ul style="list-style-type: none"> • Response is only partially correct. • Response shows incomplete or inaccurate application of a relevant strategy. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
0	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates limited to no understanding of using estimation to solve a multi-digit addition problem with more than two addends. <ul style="list-style-type: none"> • Response is incorrect. • Response shows no application of a strategy. • Mathematical ideas cannot be interpreted or lack sufficient evidence to support even a limited understanding.

Exemplar Response

Points Awarded	Sample Response
4	<p>The factory workers made ABOUT 900 teddy bears in three days. AND To calculate the answer, I used rounding. I rounded each number to the nearest hundred and then added the estimates together. 500 and 200 and 200 equal 900 <i>OR other valid process</i> AND The factory workers made EXACTLY 910 teddy bears in three days. AND My estimate was a reasonable answer because my estimate, 900, and the exact answer, 910, are close. <i>Or other valid process.</i></p>

Points Awarded	Sample Response
3	<p>The factory workers made ABOUT 900 teddy bears in three days.</p> <p>AND</p> <p>To calculate the answer, I used rounding. I rounded each number to the nearest hundred and then added the estimates together.</p> <p>500 and 200 and 200 equal 900</p> <p><i>OR other valid process</i></p> <p>AND</p> <p>The factory workers made EXACTLY 910 teddy bears in three days.</p> <p>AND</p> <p>My estimate was not reasonable answer because my estimate, 900, and the exact answer, 910, <i>were not the same.</i></p>
2	<p>The factory workers made ABOUT 900 teddy bears in three days.</p> <p>AND</p> <p>To calculate the answer, I used rounding. I rounded each number to the nearest hundred and then added the estimates together.</p> <p>500 and 200 and 200 equal 900</p> <p><i>OR other valid process</i></p> <p>AND</p> <p>The factory workers made EXACTLY 890 teddy bears in three days.</p> <p>AND</p> <p>My estimate was not reasonable answer because my estimate, 900, and the exact answer, 910, <i>were not the same.</i></p>
1	<p>The factory workers made ABOUT 900 teddy bears in three days.</p> <p>AND</p> <p>To calculate the answer, I used rounding. I rounded each number to the nearest ten and then added the estimates together.</p> <p>AND</p> <p>The factory workers made EXACTLY 890 teddy bears in three days.</p> <p>AND</p> <p>My estimate was not reasonable answer because my estimate, 900, and the exact answer, 910, <i>were not the same.</i></p>
0	<p><i>Response is irrelevant, inappropriate, or not provided.</i></p>

Item 6

Scoring Rubric

Points	Description
2	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a complete understanding of division and remainders. • Give 2 points for the correct answer/estimate and a complete, correct explanation of how the answer was calculated/estimated. <ul style="list-style-type: none"> • Response is correct and complete. • Response shows application of a reasonable and relevant strategy. • Mathematical ideas are expressed coherently through a clear, complete, logical, and fully developed response using words, calculations, and/or symbols as appropriate.
1	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a partial understanding of division and remainders. • Give 1 point for the correct answer but no process shown OR a correct process with a calculation error. <ul style="list-style-type: none"> • Response is mostly correct, but contains either a computation error or an unclear or incomplete explanation. • Response shows application of a relevant strategy, though it may be only partially applied or remain unexplained. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
0	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates limited to no understanding of division and remainders. <ul style="list-style-type: none"> • Response is incorrect. • Response shows no application of a strategy. • Mathematical ideas cannot be interpreted or lack sufficient evidence to support even a limited understanding.

Exemplar Response

Points Awarded	Sample Response
2	<p>8 boxes are needed.</p> <p>AND</p> <p>To calculate, I used division: 60 divided by 8. The answer is 7 with a remainder of 4. That means that 7 boxes will be completely filled with 8 books in each box, and there will be 4 books left over. Since all 60 books need to be shipped, the remaining books will need to go in an eighth box that will not be completely full.</p> <p><i>OR other valid process</i></p>
1	<p>8 boxes are needed.</p> <p>OR</p> <p>7 boxes are needed. To calculate, I used division: 60 divided by 8. The answer is 6 with a remainder of 4. That means that 6 boxes will be completely filled with 8 books in each box, and there will be 4 books left over. Since all 60 books need to be shipped, the remaining books will need to go in a seventh box that will not be completely full.</p> <p><i>OR other valid process</i></p>
0	<p><i>Response is irrelevant, inappropriate, or not provided.</i></p>

Item 9

Scoring Rubric

Points	Description
4	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a complete understanding of equivalent fractions. • Give 4 points if student response identifies 2 equivalent fractions AND correctly describes a model of a third equivalent fraction AND provides a clear understanding of why the fractions are equivalent. <ul style="list-style-type: none"> • Response is correct and complete. • Response shows application of a reasonable and relevant strategy. • Mathematical ideas are expressed coherently through a clear, complete, logical, and fully developed response using words, calculations, and/or symbols as appropriate.
3	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a nearly complete understanding of equivalent fractions. • Give 3 points if student response indicates 1 error in any of the 3 parts OR 1 part is incomplete. <ul style="list-style-type: none"> • Response is mostly correct, but contains either a computation error or an unclear or incomplete explanation. • Response shows application of a relevant strategy, though it may be only partially applied or remain unexplained. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
2	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a partial understanding of equivalent fractions. • Give 2 points if student response indicates 2 errors in any of the 3 parts OR 2 parts are incomplete. <ul style="list-style-type: none"> • Response is only partially correct. • Response shows application of a relevant strategy, though it may be only partially applied or remain unexplained. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.

Points	Description
1	<p>The response achieves the following:</p> <ul style="list-style-type: none">• The response demonstrates a minimal understanding of equivalent fractions.• Give 1 point if student response indicates 3 errors in any of the 3 parts OR all 3 parts are incomplete.<ul style="list-style-type: none">• Response is only partially correct.• Response shows incomplete or inaccurate application of a relevant strategy.• Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
0	<p>The response achieves the following:</p> <ul style="list-style-type: none">• The response demonstrates limited to no understanding of equivalent fractions.<ul style="list-style-type: none">• Response is incorrect.• Response shows no application of a strategy.• Mathematical ideas cannot be interpreted or lack sufficient evidence to support even a limited understanding.

Exemplar Response

Points Awarded	Sample Response
4	$\frac{2}{5} = \frac{4}{10}$ <p><i>OR other equivalent fractions</i></p> <p>AND</p> <p>Equivalent fractions mean equal fractions. Even if the numbers in the numerator and denominator are different, two fractions can be equivalent because they represent the same value. The whole has to be the same size; otherwise you can't compare the fractions. When you divide a whole into smaller parts, the parts are smaller.</p> <p><i>OR other valid process or explanation</i></p> <p>AND</p> <p>Start with a rectangle that is the same size as the models. Divide the rectangle into 100 equal parts and shade 40 parts.</p> <p><i>OR other valid equivalent fraction or description</i></p>
3	$\frac{2}{5} = \frac{4}{10}$ <p><i>OR other equivalent fractions</i></p> <p>AND</p> <p>Equivalent fractions mean equal fractions. Even if the numbers in the numerator and denominator are different, two fractions can be equivalent because they represent the same value. The whole has to be the same size; otherwise you can't compare the fractions.</p> <p><i>OR other valid process or explanation</i></p> <p>AND</p> <p>Start with a rectangle that is the same size as the models. Divide the rectangle into 2 equal parts and shade 1 part.</p>
2	$\frac{2}{5} = \frac{4}{5}$ <p><i>OR other equivalent fractions</i></p> <p>AND</p> <p>Equivalent fractions mean equal fractions. Even if the numbers in the numerator and denominator are different, two fractions can be equivalent because they represent the same value. The whole has to be the same size; otherwise you can't compare the fractions.</p> <p><i>OR other valid process or explanation</i></p> <p>AND</p> <p>Start with a rectangle that is the same size as the models. Divide the rectangle into 2 equal parts and shade 1 part.</p>

Points Awarded	Sample Response
1	$\frac{2}{5} = \frac{4}{10}$ <i>OR other equivalent fractions</i> AND Equivalent fractions mean equal fractions. <i>OR other valid process or explanation</i> AND Start with a rectangle that is the same size as the models. Divide the rectangle into 2 equal parts and shade 1 part.
0	<i>Response is irrelevant, inappropriate, or not provided.</i>

Item 12

Scoring Rubric

Points	Description
2	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a complete understanding of decomposing a sum of fractions. • Give 2 points for a response that identifies the correct equation and accurately explains why the decomposition is correct. <ul style="list-style-type: none"> • Response is correct and complete. • Response shows application of a reasonable and relevant strategy. • Mathematical ideas are expressed coherently through a clear, complete, logical, and fully developed response using words, calculations, and/or symbols as appropriate.
1	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a partial understanding of decomposing a sum of fractions. • Give 1 point for a response that identifies the correct equation but has an incorrect explanation or no explanation. <ul style="list-style-type: none"> • Response is mostly correct, but contains either a computation error or an unclear or incomplete explanation. • Response shows application of a relevant strategy, though it may be only partially applied or remain unexplained. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
0	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates limited to no understanding of decomposing a sum of fractions. <ul style="list-style-type: none"> • Response is incorrect. • Response shows no application of a strategy. • Mathematical ideas cannot be interpreted or lack sufficient evidence to support even a limited understanding.

Exemplar Response

Points Awarded	Sample Response
2	Kate's equation is correct. All the fractions have the same denominator, so you just have to add the numerators to get the sum. Kate added numerators 2, 1, and 1, so the numerator in her fraction is 4. <i>OR other valid explanation</i>
1	Kate's equation is correct. <i>OR provides an invalid explanation.</i>
0	<i>Response is irrelevant, inappropriate, or not provided.</i>

Item 15

Scoring Rubric

Points	Description
2	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a complete understanding of comparing decimals to the hundredths. • Give 2 points for a correct answer and a complete, correct explanation of how the decimals were compared. <ul style="list-style-type: none"> • Response is correct and complete. • Response shows application of a reasonable and relevant strategy. • Mathematical ideas are expressed coherently through a clear, complete, logical, and fully developed response using words, calculations, and/or symbols as appropriate.
1	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a partial understanding of comparing decimals to the hundredths. • Give 1 point for choosing the correct answer for comparing the two decimals or a correct model to show how to compare the two decimals. <ul style="list-style-type: none"> • Response is mostly correct, but contains either a computation error or an unclear or incomplete explanation. • Response shows application of a relevant strategy, though it may be only partially applied or remain unexplained. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
0	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates limited to no understanding of comparing decimals to the hundredths. <ul style="list-style-type: none"> • Response is incorrect. • Response shows no application of a strategy. • Mathematical ideas cannot be interpreted or lack sufficient evidence to support even a limited understanding.

Exemplar Response

Points Awarded	Sample Response
2	greater than AND I compared the two decimals by using hundredths grids. I shaded in 54 of the 100 squares to show the first decimal. It is made up of 5 tenths and 4 hundredths. I shaded in 45 of the 100 squares to show the second decimal. It is made up of 4 tenths and 5 hundredths. The first decimal is the greater decimal. <i>OR other valid explanation</i>
1	greater than
0	<i>Response is irrelevant, inappropriate, or not provided.</i>

Item 18

Scoring Rubric

Points	Description
4	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a complete understanding of classifying a two-dimensional figure by its characteristics. • Give 4 points if student response indicates four correct characteristics AND provides clear explanation/description/diagram of each characteristic. <ul style="list-style-type: none"> • Response is correct and complete. • Response shows application of a reasonable and relevant strategy. • Mathematical ideas are expressed coherently through a clear, complete, logical, and fully developed response using words, calculations, and/or symbols as appropriate.
3	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a nearly complete understanding of classifying a two-dimensional figure by its characteristics. • Give 3 points if student response indicates three correct characteristics AND provides a clear explanation/description/diagram of each characteristic. <ul style="list-style-type: none"> • Response is mostly correct, but contains either a computation error or an unclear or incomplete explanation. • Response shows application of a relevant strategy, though it may be only partially applied or remain unexplained. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
2	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates a partial understanding of classifying a two-dimensional figure by its characteristics. • Give 2 points if student response indicates two correct characteristics with explanation/description/diagram of each characteristic OR three correct examples with minimal explanation/description/diagram of each characteristic. <ul style="list-style-type: none"> • Response is only partially correct. • Response shows application of a relevant strategy, though it may be only partially applied or remain unexplained. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.

Points	Description
1	<p>The response achieves the following:</p> <ul style="list-style-type: none"> The response demonstrates a minimal understanding of classifying a two-dimensional figure by its characteristics. Give 1 point if student response indicates at least one correct characteristic with explanation/description/diagram of each characteristic. <ul style="list-style-type: none"> Response is only partially correct. Response shows incomplete or inaccurate application of a relevant strategy. Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
0	<p>The response achieves the following:</p> <ul style="list-style-type: none"> The response demonstrates limited to no understanding of classifying a two-dimensional figure by its characteristics. <ul style="list-style-type: none"> Response is incorrect. Response shows no application of a strategy. Mathematical ideas cannot be interpreted or lack sufficient evidence to support even a limited understanding.

Exemplar Response

Points Awarded	Sample Response
4	<p>Characteristic 1: It has four sides. Characteristic 2: It has four right angles. Characteristic 3: Its opposite sides are parallel. Characteristic 4: Its opposite sides have the same length. <i>OR other valid characteristics</i></p>
3	<p>Characteristic 1: It has four sides. Characteristic 2: It has four right angles. Characteristic 3: Its opposite sides are parallel. <i>OR other valid characteristics</i></p>
2	<p>Characteristic 1: It has four sides. Characteristic 2: It has four right angles. <i>OR other valid characteristics</i></p>
1	<p>Characteristic 1: It has four sides. <i>OR other valid characteristics</i></p>
0	<p><i>Response is irrelevant, inappropriate, or not provided.</i></p>

Item 19

Scoring Rubric

Points	Description
2	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • Response demonstrates a complete understanding of measuring an angle using a protractor and identifying types of angles. • Give 2 points for correctly identifying the angle measurement AND correctly identifying the type of angle. <ul style="list-style-type: none"> • Response is correct and complete. • Response shows application of a reasonable and relevant strategy. • Mathematical ideas are expressed coherently through a clear, complete, logical, and fully developed response using words, calculations, and/or symbols as appropriate.
1	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • Response demonstrates a partial understanding of measuring an angle using a protractor and identifying types of angles. • Give 1 point for correctly identifying the angle measurement OR correctly identifying the type of angle. <ul style="list-style-type: none"> • Response is mostly correct, but contains either a computation error or an unclear or incomplete explanation. • Response shows application of a relevant strategy, though it may be only partially applied or remain unexplained. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
0	<p>The response achieves the following:</p> <ul style="list-style-type: none"> • The response demonstrates limited to no understanding of measuring an angle using a protractor and identifying types of angles. <ul style="list-style-type: none"> • Response is incorrect. • Response shows no application of a strategy. • Mathematical ideas cannot be interpreted or lack sufficient evidence to support even a limited understanding.

Exemplar Response

Points Awarded	Sample Response
2	65 AND The angle is an acute angle because it measures less than 90 degrees. <i>OR other valid explanation</i>
1	65 OR The angle is an acute angle because it measures less than 90 degrees. <i>OR other valid explanation</i>
0	<i>Response is irrelevant, inappropriate, or not provided.</i>

ACTIVITY

The following activities develop skills in Unit 2: Multiplication and Division of Whole Numbers.

Standards: MGSE4.OA.1, MGSE4.OA.2, MGSE4.OA.3, MGSE4.OA.4, MGSE4.OA.5, MGSE4.NBT.5, MGSE4.NBT.6

Complete the following activities with a partner.

Activity 1: Use place-value blocks to model three-digit whole numbers. Your partner should decompose the number in at least three different ways.

Example:

$$\begin{aligned} 317 &= 3 \text{ hundreds} + 1 \text{ ten} + 7 \text{ ones} = 300 + 10 + 7 \\ &= 3 \text{ hundreds} + 17 \text{ ones} = 300 + 17 \\ &= 2 \text{ hundreds} + 11 \text{ tens} + 7 \text{ ones} = 200 + 110 + 7 \end{aligned}$$

Switch roles and repeat so that each partner models at least five numbers.

Activity 2: Make a place-value chart that extends to millions. Write a whole number with 5 to 7 digits in the chart. Your partner should read the number aloud and write it in word form. Switch roles and repeat so that each partner writes at least five numbers.

Activity 3: Make a multiplication chart for whole numbers 0 to 10. Say a multiplication or division fact problem. Your partner should show how to use the chart to find the product or quotient. Switch roles and repeat so that each partner solves at least five multiplication or division problems. Then work together to find and describe at least five patterns in the chart.

ACTIVITY

The following activities develop skills in Unit 7: Measurement.

Standards: MGSE4.MD.1, MGSE4.MD.2, MGSE4.MD.3, MGSE4.MD.4, MGSE4.MD.5, MGSE4.MD.6, MGSE4.MD.7

Complete the following activities with a partner.

Activity 1: Use tools such as balances, scales, meter sticks, yardsticks, rulers, analog and digital clocks, and containers marked with cups, ounces, and liters to practice measuring objects or liquids in different units.

Activity 2: Make two conversion charts—one with customary units and one with metric units. Each chart should give rules for converting between at least 10 pairs of units in each system. Then choose one rule from each chart. Use each rule to record measurement equivalents in a two-column table. Then list each pair of equivalent measures as a number pair. For example, if you choose the rule for converting feet to inches, your number pairs might be (1, 12), (2, 24), (3, 36), etc.

Activity 3: Write at least five word problems that involve distances, intervals of time, liquid volumes, masses of objects, and money that can be solved using the four operations. At least two of the problems should involve simple fractions or decimals. Trade problems with another person and solve the problems you receive. Use diagrams in your solutions, when possible.

Activity 4: Search newspapers, magazines, or the Internet for articles or websites that mention measurements. For each example, identify what is measured and what unit is used. Explain why you think that unit was chosen. Then create a chart called “Measurements in Real Life” that shows real-world benchmarks for different types of measurements and units.