COMMON CORE ASSESSMENT COMPARISON FOR MATHEMATICS

GRADE 4

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Prepared by:

Delaware Department of Education
Accountability Resources Workgroup
401 Federal Street, Suite 2
Dover, DE 19901

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INTRODUCTION

The purpose of this document is to illustrate the differences between the Delaware Comprehensive Assessment System (DCAS) and the expectations of the next-generation Common Core State Standard (CCSS) assessment in Mathematics. A side-by-side comparison of the current design of an operational assessment item and the expectations for the content and rigor of a next-generation Common Core mathematical item are provided for each CCSS. The samples provided are designed to help Delaware's educators better understand the instructional shifts needed to meet the rigorous demands of the CCSS. This document does not represent the test specifications or blueprints for each grade level, for DCAS, or the next-generation assessment.

For mathematics, next-generation assessment items were selected for CCSS that represent the shift in content at the new grade level. Sites used to select the next-generation assessment items include:

- Smarter Balanced Assessment Consortium
- Partnership of Assessment of Readiness for College and Career
- Illustrative Mathematics
- Mathematics Assessment Project

Using released items from other states, a DCAS-like item, aligned to the same CCSS, was chosen. These examples emphasize the contrast in rigor between the previous Delaware standards, known as Grade-Level Expectations, and the Common Core State Standards.

Section 1, DCAS-Like and Next-Generation Assessment Comparison, includes content that is in the CCSS at a different "rigor" level. The examples are organized by the CCSS. For some standards, more than one example may be given to illustrate the different components of the standard. Additionally, each example identifies the standard and is separated into two parts. Part A is an example of a DCAS-like item, and Part B is an example of a next-generation item based on CCSS.

Section 2 includes at least one Performance Task that addresses multiple aspects of the CCSS (content and mathematical practices).

How to Use Various Aspects of This Document

- Analyze the way mathematics standards are conceptualized in each item or task.
- Identify the instructional shifts that need to occur to prepare students to address these more rigorous demands. Develop a plan to implement the necessary instructional changes.
- Notice how numbers (e.g., fractions instead of whole numbers) are used in the sample items.
- Recognize that the sample items and tasks are only one way of assessing the standard.
- Understand that the sample items and tasks do not represent a mini-version of the next-generation assessment.
- Instruction should address "focus," coherence," and "rigor" of mathematics concepts.
- Instruction should embed mathematical practices when teaching mathematical content.

- For grades K–5, calculators should not be used as the concepts of number sense and operations are fundamental to learning new mathematics content in grades 6–12.
- The next-generation assessment will be online and the scoring will be done electronically. It is important to note that students may not be asked to show their work and therefore will not be given partial credit. It is suggested when using items within this document in the classroom for formative assessments, it is good practice to have students demonstrate their methodology by showing or explaining their work.

Your feedback is welcome. Please do not hesitate to contact Katia Foret at katia.foret@doe.k12.de.us or Rita Fry at rita.fry@doe.k12.de.us with suggestions, questions, and/or concerns.

* The Smarter Balanced Assessment Consortium has a 30-item practice test available for each grade level (3-8 and 11) for mathematics and ELA (including reading, writing, listening, and research). These practice tests allow students to experience items that look and function like those being developed for the Smarter Balanced assessments. The practice test also includes performance tasks and is constructed to follow a test blueprint similar to the blueprint intended for the operational test. The Smarter Balanced site is located at: http://www.smarterbalanced.org/.

Priorities in Mathematics

Grade	Priorities in Support of Rich Instruction and Expectations of Fluency and Conceptual Understanding
K–2	Addition and subtraction, measurement using whole number quantities
3–5	Multiplication and division of whole numbers and fractions
6	Ratios and proportional reasoning; early expressions and equations
7	Ratios and proportional reasoning; arithmetic of rational numbers
8	Linear algebra

Common Core State Standards for Mathematical Practices

Mathematical Practices		Student Dispositions:	Teacher Actions to Engage Students in Practices:
Essential Processes for a Productive Math Thinker	**1. Make sense of problems and persevere in solving them**	▪ Have an understanding of the situation ▪ Use patience and persistence to solve problem ▪ Be able to use different strategies ▪ Use self-evaluation and redirections ▪ Communicate both verbally and written ▪ Be able to deduce what is a reasonable solution	▪ Provide open-ended and rich problems ▪ Ask probing questions ▪ Model multiple problem-solving strategies through Think-Aloud ▪ Promote and value discourse ▪ Integrate cross-curricular materials ▪ Promote collaboration ▪ Probe student responses (correct or incorrect) for understanding and multiple approaches ▪ Provide scaffolding when appropriate ▪ Provide a safe environment for learning from mistakes
	6. Attend to precision	▪ Communicate with precision—orally and written ▪ Use mathematics concepts and vocabulary appropriately ▪ State meaning of symbols and use them appropriately ▪ Attend to units/labeling/tools accurately ▪ Carefully formulate explanations and defend answers ▪ Calculate accurately and efficiently ▪ Formulate and make use of definitions with others ▪ Ensure reasonableness of answers ▪ Persevere through multiple-step problems	▪ Encourage students to think aloud ▪ Develop explicit instruction/teacher models of thinking aloud ▪ Include guided inquiry as teacher gives problem, students work together to solve problems, and debrief time for sharing and comparing strategies ▪ Use probing questions that target content of study ▪ Promote mathematical language ▪ Encourage students to identify errors when answers are wrong
Reasoning and Explaining	**2. Reason abstractly and quantitatively**	▪ Create multiple representations ▪ Interpret problems in contexts ▪ Estimate first/answer reasonable ▪ Make connections ▪ Represent symbolically ▪ Talk about problems, real-life situations ▪ Attend to units ▪ Use context to think about a problem	▪ Develop opportunities for problem-solving strategies ▪ Give time for processing and discussing ▪ Tie content areas together to help make connections ▪ Give real-world situations ▪ Demonstrate thinking aloud for students' benefit ▪ Value invented strategies and representations ▪ More emphasis on the process instead of on the answer
	3. Construct viable arguments and critique the reasoning of others	▪ Ask questions ▪ Use examples and counter examples ▪ Reason inductively and make plausible arguments ▪ Use objects, drawings, diagrams, and actions ▪ Develop ideas about mathematics and support their reasoning ▪ Analyze others arguments ▪ Encourage the use of mathematics vocabulary	▪ Create a safe environment for risk-taking and critiquing with respect ▪ Provide complex, rigorous tasks that foster deep thinking ▪ Provide time for student discourse ▪ Plan effective questions and student grouping ▪ Probe students

Mathematical Practices		Students:	Teacher(s) promote(s) by:
Modeling and Using Tools	**4. Model with mathematics**	▪ Realize that mathematics (numbers and symbols) is used to solve/work out real-life situations ▪ Analyze relationships to draw conclusions ▪ Interpret mathematical results in context ▪ Show evidence that they can use their mathematical results to think about a problem and determine if the results are reasonable—if not, go back and look for more information ▪ Make sense of the mathematics	▪ Allowing time for the process to take place (model, make graphs, etc.) ▪ Modeling desired behaviors (think alouds) and thought processes (questioning, revision, reflection/written) ▪ Making appropriate tools available ▪ Creating an emotionally safe environment where risk-taking is valued ▪ Providing meaningful, real-world, authentic, performance-based tasks (non-traditional work problems) ▪ Promoting discourse and investigations
	5. Use appropriate tools strategically	▪ Choose the appropriate tool to solve a given problem and deepen their conceptual understanding (paper/pencil, ruler, base ten blocks, compass, protractor) ▪ Choose the appropriate technological tool to solve a given problem and deepen their conceptual understanding (e.g., spreadsheet, geometry software, calculator, web 2.0 tools) ▪ Compare the efficiency of different tools ▪ Recognize the usefulness and limitations of different tools	▪ Maintaining knowledge of appropriate tools ▪ Modeling effectively the tools available, their benefits, and limitations ▪ Modeling a situation where the decision needs to be made as to which tool should be used ▪ Comparing/contrasting effectiveness of tools ▪ Making available and encouraging use of a variety of tools
Seeing Structure and Generalizing	**7. Look for and make use of structure**	▪ Look for, interpret, and identify patterns and structures ▪ Make connections to skills and strategies previously learned to solve new problems/tasks independently and with peers ▪ Reflect and recognize various structures in mathematics ▪ Breakdown complex problems into simpler, more manageable chunks ▪ "Step back" or shift perspective ▪ Value multiple perspectives	▪ Being quiet and structuring opportunities for students to think aloud ▪ Facilitating learning by using open-ended questions to assist students in exploration ▪ Selecting tasks that allow students to discern structures or patterns to make connections ▪ Allowing time for student discussion and processing in place of fixed rules or definitions ▪ Fostering persistence/stamina in problem solving ▪ Allowing time for students to practice
	8. Look for and express regularity in repeated reasoning	▪ Identify patterns and make generalizations ▪ Continually evaluate reasonableness of intermediate results ▪ Maintain oversight of the process ▪ Search for and identify and use shortcuts	▪ Providing rich and varied tasks that allow students to generalize relationships and methods and build on prior mathematical knowledge ▪ Providing adequate time for exploration ▪ Providing time for dialogue, reflection, and peer collaboration ▪ Asking deliberate questions that enable students to reflect on their own thinking ▪ Creating strategic and intentional check-in points during student work time

For classroom posters depicting the Mathematical Practices, please see: http://seancarberry.cmswiki.wikispaces.net/file/detail/12-20math.docx

OPERATIONS AND ALGEBRAIC THINKING (OA)

Cluster: Use the four operations with whole numbers to solve problems.

4.OA.1 – Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

DCAS-Like

1A

Alison ran a total of 200 miles over 8 weeks. She ran the same number of miles each week. The number sentence below can be used to find the number of miles, m, she ran each week.

$$m \times 8 = 200$$

How many miles, m, did Alison run each week?

A. 4 miles

B. 25 miles

C. 40 miles

D. 192 miles

1B

Hannah was doing a report on animals' sleep habits. She made the charts below to show the number of hours certain animals usually sleep each day.

Animal	Bat	Mouse	Guinea Pig	Possum	Gray Seal
Hours of Sleep	20 hours	12 hours	9 hours	18 hours	6 hours

Animal	Tiger	Horse	Cheetah	Cow	Goat
Hours of Sleep	16 hours	3 hours	12 hours	4 hours	15 hours

a. Fill in the blanks to make the statements true.

- A possum sleeps _____ times as many hours a day as a guinea pig.
- A bat sleeps _____ times as many hours per day as a cow.

b. Write a multiplication equation to show the relationship between the length of time a gray seal sleeps and the length of time a possum sleeps.

_____ × _____ = _____

c. When Hannah was reading about donkeys, she said, "I can't believe that goats sleep 5 times as many hours per day as donkeys." Find the number of hours per day a donkey sleeps. Show your thinking below using words, numbers, and/or pictures.

A donkey sleeps _____ hours per day.

4.OA.2 – Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. (See Glossary, Table 2, in CCSS document.)

DCAS-Like

2A

Last summer, Max earned 5 stickers for every book he read. He earned 40 stickers in all for reading books.

Which number sentence could be used to find b, the number of books Max read?

A. $b \div 5 = 40$

B. $5 + b = 40$

C. $b - 5 = 40$

D. $5 \times b = 40$

Next-Generation

2B

Sarah is 12 years old.

- George is g years old.
- Sarah is 3 times as old as George.

For items a.-c., choose **Yes** or **No** to indicate whether each statement is true.

a. George's age, in years, can be represented by the expression $12 \div 3$. ○ Yes ○ No

b. George is 15 years old. ○ Yes ○ No

c. George's age, in years, can be found by solving the equation $12 = 3 \times g$. ○ Yes ○ No

4.OA.3 – Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

DCAS-Like

3A

Anna bought 3 bags of red gumballs and 5 bags of white gumballs. Each bag of gumballs had 7 pieces in it. Which expression could Anna use to find the total number of gumballs she bought?

A. $(7 \times 3) + 5 =$

B. $(7 \times 5) + 3 =$

C. $7 \times (5 + 3) =$

D. $7 + (5 \times 3) =$

3B

Every year a carnival comes to Hallie's town. The price of tickets to ride the rides has gone up every year.

Year	Ticket Price
2008	$2.00
2009	$2.50
2010	$3.00
2011	$3.50
2012	$4.00

a. In 2008, Hallie's allowance was $9.00 a month. How many carnival tickets could she buy with one month's allowance?

_____

b. If her allowance had stayed the same, $9.00 a month, how many carnival tickets could she buy in 2012?

_____

c. In 2012, Hallie's allowance was $14.00 per month. How much did her monthly allowance increase between 2008 and 2012?

_____

d. How much more did a carnival ticket cost in 2012 than it did in 2008?

_____

e. Was Hallie able to buy more carnival tickets in 2008 or in 2012 with one month's allowance?

_____

f. What would Hallie's allowance need to be in 2012 in order for her to be able to buy as many carnival tickets as she could in 2008?

_____

g. What happens to your ability to buy things if prices increase and your allowance doesn't increase?

_____

4.OA.3 – Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

DCAS-Like

4A

There were 123 players at a soccer camp. The players were divided into teams having 11 players each.

What was the total number of teams and the total number of players left over?

A. 10 teams with 3 players left over

B. 11 teams with 1 player left over

C. 11 teams with 2 players left over

D. 12 teams with 3 players left over

Next-Generation

4B

Mr. Torres sold a total of 30 boxes of sports cards at his store on Monday. These boxes contained only baseball cards and football cards.

- Each box contained 25 sports cards.
- He earned $3 for each sports card he sold.
- He earned a total of $1134 from the football cards he sold.

What amount of money did Mr. Torres earn from the baseball cards he sold? In the space below, use pictures, numbers, and/or words to show how you got your answer.

Cluster: Gain familiarity with factors and multiples.

4.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.

DCAS-Like

5A

Which number is a common factor of 36 and 56?

A. 4

B. 6

C. 8

D. 9

Next-Generation

5B

Jason and Laura were at the soccer game. Jason told Laura that his two daughters, Penny and Lily, were celebrating birthdays that week. He didn't tell Laura how old they were. Instead he gave Laura these clues about their ages.

- Each of their ages is a factor of 24.
- 36 is a multiple of both Penny's age and Lily's age.
- 30 is a multiple of Lily's age, but not Penny's age.
- The sum of their ages is 14.

Use Jason's clues, the chart, and the space below to help figure what Penny and Lily's ages are.

Penny	Lily	Sum

Identify Penny and Lily's ages and explain how you figured out how old the girls are.

Cluster: Generate and analyze patterns.

4.OA.5 – Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

DCAS-Like

6A

What are the missing two numbers in this pattern?

_____, _____, 22, 29, 36, 43, 50

A. 7, 14

B. 8, 15

C. 20, 21

D. 36, 29

Next-Generation

6B

Laura looks for her favorite shells on the beach every morning. The first day, she finds 3 shells. The next day, she finds 8 shells. On the third day, she finds 13 shells in the cove. On the fourth day, she finds 18 shells as she walks by the water. If Laura keeps finding shells in this way, how many will she find on the eighth day?

Explain how you got your answer and how you know your answer is correct.

NUMBER AND OPERATIONS IN BASE TEN (NBT)*

* Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.

Cluster: Generalize place value understanding for multi-digit whole numbers.

4.NBT.1 – Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*

DCAS-Like

7A

What is the value of n?

$$50 \div n = 10$$

A. 5

B. 10

C. 40

D. 50

Next-Generation

7B

Tom wrote the number 45,378. Bill wrote the number 36,721.

How many times greater is the 7 in Bill's number than the 7 in Tom's number? _____

Use pictures, numbers, or words to demonstrate your reasoning.

4.NBT.2 – Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

DCAS-Like

8A

Which of the following shows 70,329 written in expanded notation?

A. 7 + 0 + 3 + 2 + 9

B. 70 + 3 + 2 + 9

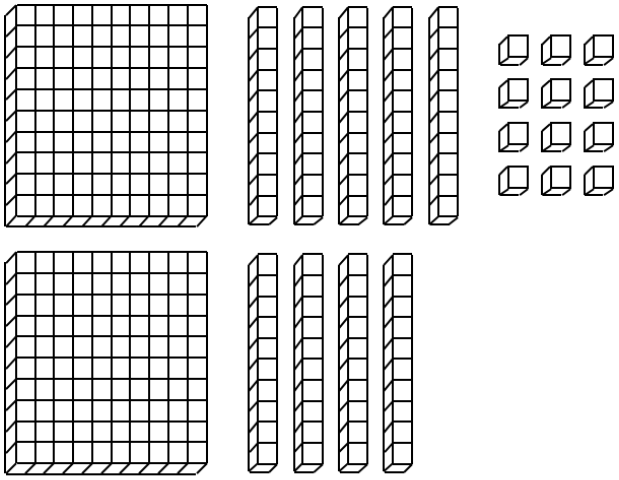
C. 7,000 + 300 + 20 + 9

D. 70,000 + 300 + 20 + 9

Next-Generation

8B

This set of place value blocks represents a number. The value of this number can be represented in many different ways.



For items a.–d., choose **Yes** or **No** to show whether the value is equivalent to the number represented by the place-value blocks.

a. 200 + 90 + 12 ○ Yes ○ No

b. Three hundred two ○ Yes ○ No

c. 1 hundred +20 tens + 2 ones ○ Yes ○ No

d. 300 + 12 ○ Yes ○ No

4.NBT.2 – Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

DCAS-Like

9A

Jamal's clues about his mystery number are shown in the box below.

My number has
▪ 5 tens ▪ 8 thousands ▪ 2 ones ▪ 6 ten thousands ▪ 0 hundreds

What is Jamal's mystery number?

A. 5,826

B. 6,285

C. 68,052

D. 86,520

Next-Generation

9B

Complete the numbers to make each sentence true.

a. $14{,}765 > 14{,}___75$

b. $26{,}243 < ___6{,}243$

c. $345{,}679 = 345{,}67___$

4.NBT.3 – Use place value understanding to round multi-digit whole numbers to any place.

DCAS-Like

10A

The total length of a vehicle is 205.83 inches. What is the length of the vehicle rounded to the nearest whole number?

A. 200 inches

B. 205 inches

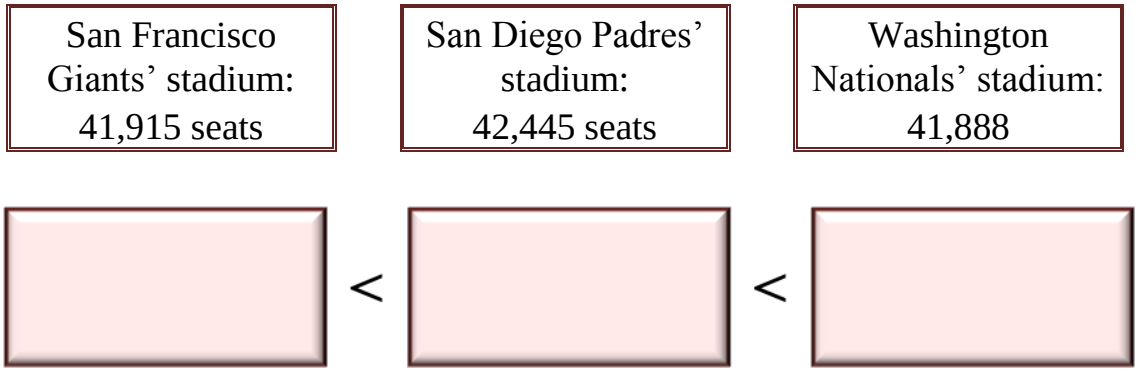
C. 206 inches

D. 207 inches

Next-Generation

10B

a. Baseball stadiums have different numbers of seats. Drag the tiles to arrange the stadiums from least to greatest number of seats.



b. Compare these statements from two students:

- Jeff said, "I get the same number when I round all three numbers of seats in these stadiums."
- Sara said, "When I round them, I get the same number for two of the stadiums, but a *different* number for the other stadium."

Can Jeff and Sara both be correct? Explain how you know.

Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic.

4.NBT.4 – Fluently add and subtract multi-digit whole numbers using the standard algorithm.

DCAS-Like

11A

What number makes this equation true?

$$\square - 446 = 227$$

A. 673

B. 661

C. 219

D. 221

Next-Generation

11B

Melanie has 819 green balloons. She gave Joan 334 of the balloons. How many green balloons does she now have?

Show 2 **different** ways for solving the problem.

4.NBT.5 – Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

DCAS-Like

12A

Sandy solved the problem below in her math class.

$$\begin{array}{r} 78 \\ \times\ 15 \\ \hline 390 \\ +\ 780 \\ \hline 1170 \end{array}$$

What is another way that Sandy could solve the problem?

A. Sandy can determine 78×10, then add that to 78×5.

B. Sandy can determine 78×10, then add that to 5×10.

C. Sandy can determine 70×10, then add that to 8×5.

D. Sandy can determine 70×10, then add that to 15×10.

Next-Generation

12B

Aidan earned $805 a month. How much money did he have by the end of the year? Show all your work.

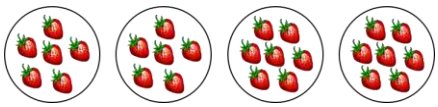
$\$$_____

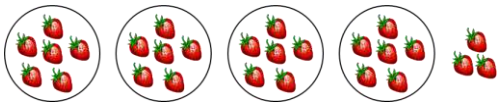
4.NBT.6 – Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

DCAS-Like

13A

Four friends are having pancakes with strawberries on top. There are 26 strawberries. Each friend will get an equal number of strawberries. Which model shows how the strawberries could be divided equally among the 4 friends?

A. 

B. 

C.

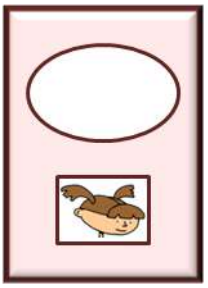
D.

Next-Generation

13B

There are 37 students in a class. Students go to a science lab in groups that contain no more than 7 students.

a. Make a model to show the fewest number of science lab groups that will need to be formed with these 37 students.



- Click on the oval to make a group. Continue as many times as necessary to make the correct number of groups. (When an oval is clicked, an oval will be created in the working space.)
- Click on a student and then click on an oval to put the student in a group. Continue as many times as necessary. (When a student icon is clicked and then an oval is clicked, student icons snap to position in the oval to allow for multiple icons.)

b. What is the fewest number of science lab groups that will need to be formed with these 37 students?

_____ lab groups

NUMBER AND OPERATIONS—FRACTIONS (NF)*

* Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, 100.

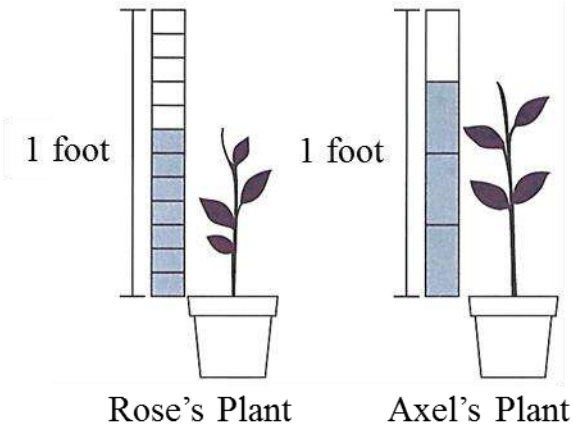
Cluster: Extend understanding of fraction equivalence and ordering.

4.NF.1 – Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

DCAS-Like

14A

In science class, Rose and Axel kept track of the height of their plants. The heights of their plants after 3 weeks are shown in the picture below.



What fraction of a foot are the heights of Rose's and Axel's plants?

a. Rose's plant is $\frac{7}{5}$ of a foot, and Axel's plant is $\frac{3}{1}$ of a foot.

b. Rose's plant is $\frac{12}{7}$ of a foot, and Axel's plant is $\frac{4}{3}$ of a foot.

c. Rose's plant is $\frac{5}{12}$ of a foot, and Axel's plant is $\frac{1}{4}$ of a foot.

d. Rose's plant is $\frac{7}{12}$ of a foot, and Axel's plant is $\frac{3}{4}$ of a foot.

14B

Aisha, Sara, and Brendan have 20 pencils. Aisha says 4 of the pencils are hers. Sara says $\frac{1}{5}$ of the pencils are hers. Brendan says $\frac{3}{5}$ of the pencils belong to him. Explain how they all could be right. Use words or drawings.

4.NF.2 – Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

DCAS-Like

15A

Which fraction is closest to $\frac{3}{4}$? Answer this problem without a calculator.

A. $\frac{5}{8}$

B. $\frac{5}{4}$

C. $\frac{1}{2}$

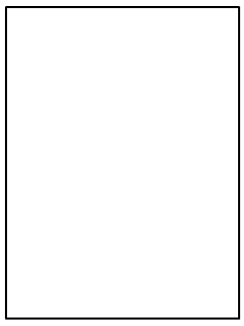
D. $\frac{2}{3}$

Next-Generation

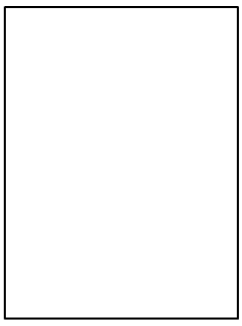
15B

Judy and Gregg are playing a game with fractions. They have to draw their own cards for each fraction. Whoever has the larger fraction wins both cards.

a. Draw the fraction card for each fraction below.



Judy gets the fraction $\frac{3}{4}$



Greg gets the fraction $\frac{5}{8}$

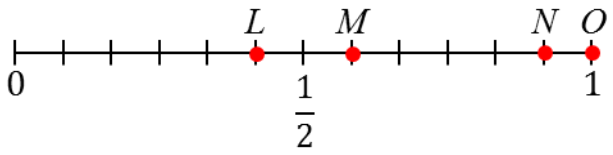
b. Explain who wins the round and how you know it.

4.NF.2 – Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

DCAS-Like

16A

Which point is located at $\frac{7}{12}$ on the number line below?



A. *L*

B. *M*

C. *N*

D. *O*

Next-Generation

16B

Decide whether each expression is True or False?

a. $\frac{3}{8} < \frac{1}{4}$ ○ True ○ False

b. $\frac{1}{2} < \frac{3}{6}$ ○ True ○ False

c. $\frac{3}{5} = \frac{8}{10}$ ○ True ○ False

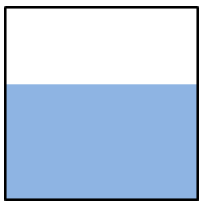
d. $\frac{2}{3} = \frac{4}{6}$ ○ True ○ False

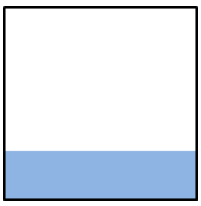
4.NF.2 – Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

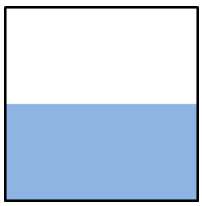
DCAS-Like

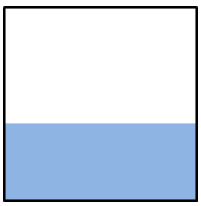
17A

About $\frac{2}{5}$ of the wetlands in the continental United States are in Louisiana. Which square's shaded area models Louisiana's portion of the wetlands?

A. 

B. 

C. 

D. 

Next-Generation

17B

Which is larger? $\frac{4}{6}$ or $\frac{6}{9}$?

a. $\frac{6}{9}$ because both numbers are greater than numbers in the other fraction. ○ Yes ○ No

b. They are both the same because they each have a 6 in it. ○ Yes ○ No

c. They are both the same because they are equivalent fractions. ○ Yes ○ No

d. $\frac{4}{6}$ because there is a smaller difference between numerator and denominator. ○ Yes ○ No

Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

4.NF.3 – Understand a fraction *a/b* with a > 1 as a sum of fractions 1/*b*.

a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.*

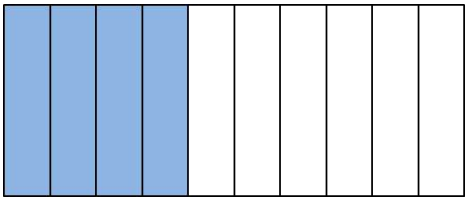
c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

DCAS-Like

18A

The diagram below shows a rectangle divided into equal sections. What fraction of the rectangle is shaded?



A. $\frac{1}{2}$

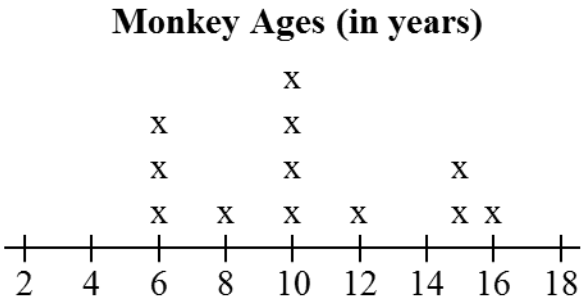
B. $\frac{1}{4}$

C. $\frac{2}{3}$

D. $\frac{2}{5}$

18B

A zookeeper made this line plot to show the ages of all the monkeys at a zoo.



Part A

What fraction of the monkeys at this zoo are eight years old?

$$\frac{\square}{\square}$$

Part B

What fraction of all the monkeys at this zoo are **not** 8 years old?

$$\frac{\square}{\square}$$

4.NF.3 – Understand a fraction *a/b* with a > 1 as a sum of fractions 1/*b*.

a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.*

c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

DCAS-Like

19A

Which fraction is equal to the difference of: $\frac{6}{8} - \frac{4}{8}$?

A. $\frac{2}{4}$

B. $\frac{2}{6}$

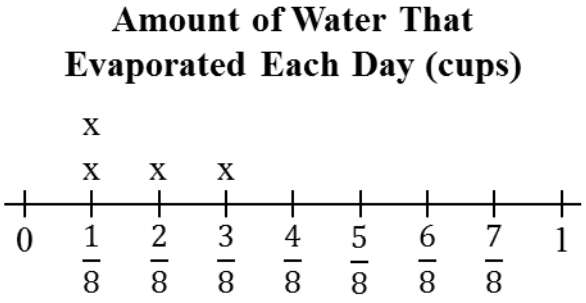
C. $\frac{2}{8}$

D. $\frac{2}{0}$

19B

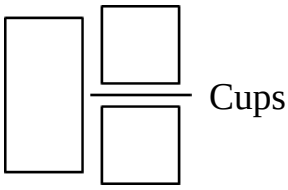
Judy conducted an experiment. She put a total of $2\frac{1}{8}$ cups of water into an empty container. Then, Judy recorded the amount of water that evaporated from the container each day for four days.

The plot line below shows the amount of water that evaporated from the container on each of the four days.



Each "x" represents 1 day.

What mixed number represents the amount of water left in the container at the end of the fourth day?



4.NF.4 – Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

a. Understand a fraction *a/b* as a multiple of *1/b*. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).*

b. Understand a multiple of *a/b* as a multiple of *1/b*, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)*

c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example: If each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*

DCAS-Like

20A

Chris has $\frac{4}{7}$ of a kilogram of garlic bread. He divides them equally among 4 children. How many grams of the garlic bread will each child get?

A. $\frac{1}{7}$

B. $\frac{16}{7}$

C. $\frac{28}{4}$

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

20B

A builder planned to build houses. Each house will be built on $\frac{5}{6}$ of an acre. How much land would be needed for 7 houses? Show your work.

_____ acres

The builder began with 10 acres of land. After 7 houses were built, how much land was left unused?

_____ acres

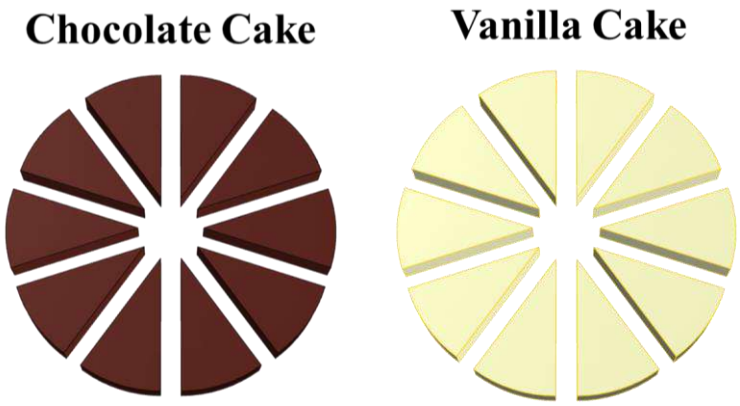
Cluster: Understand decimal notation for fractions, and compare decimal fractions.

4.NF.5 – Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express 3/10 as 30/100 and add 3/10 + 4/100 = 34/100.*
(Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.)

DCAS-Like

21A

Pat made the cakes shown below for a bake sale.



She sold $\frac{9}{10}$ of the chocolate cake and $\frac{6}{10}$ of the vanilla cake.

Which of the following fractions shows how much more chocolate cake was sold than vanilla cake?

A. $\frac{2}{10}$ B. $\frac{3}{10}$

C. $\frac{4}{10}$ D. $\frac{5}{10}$

Next-Generation

21B

Which equation is true?

a. $\frac{7}{100} + \frac{2}{10} = \frac{9}{100}$ ○ True ○ False

b. $\frac{7}{100} + \frac{2}{10} = \frac{9}{10}$ ○ True ○ False

c. $\frac{7}{100} + \frac{2}{10} = \frac{27}{100}$ ○ True ○ False

d. $\frac{7}{100} + \frac{2}{10} = \frac{72}{100}$ ○ True ○ False

4.NF.6 – Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 1 62/100 ; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*

DCAS-Like

22A

Which fraction means the same as 0.17?

A. $\frac{17}{10}$

B. $\frac{17}{100}$

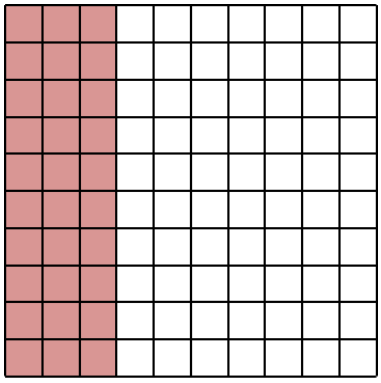
C. $\frac{17}{1000}$

D. $\frac{17}{1}$

Next-Generation

22B

Model Z is shaded to represent a value that is less than 1 whole.



Model Z

For items a., b., and c., choose **Yes** or **No** to indicate whether the value is equivalent to the value of the shaded part of Model Z.

a. $\frac{30}{100}$ ○ Yes ○ No

b. $\frac{3}{10}$ ○ Yes ○ No

c. 0.003 ○ Yes ○ No

4.NF.7 – Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.

DCAS-Like

23A

What is the equivalent decimal value of $\frac{67}{100}$?

A. 6.7

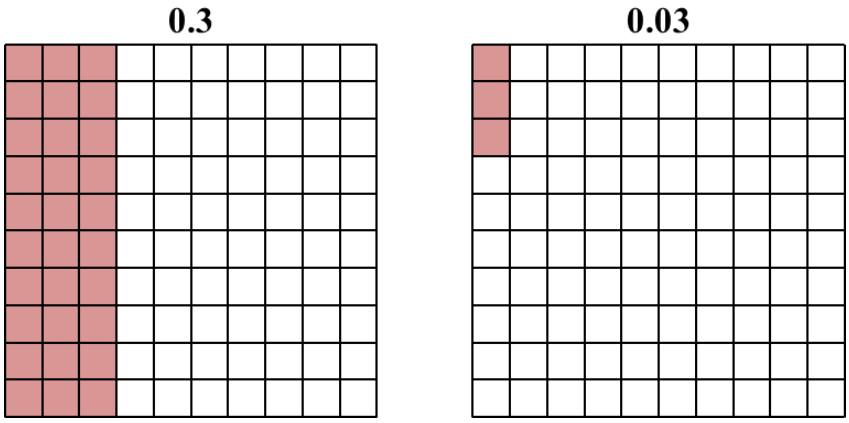
B. 0.067

C. 67

D. 0.67

Next-Generation

23B



Based on the two grids above, check all the equations that are **True**.

a. $0.3 > 0.03$ ○ True ○ False

b. $0.3 < 0.03$ ○ True ○ False

c. $\frac{3}{10} < \frac{3}{100}$ ○ True ○ False

d. $0.03 < 0.3$ ○ True ○ False

e. $0.03 = 0.3$ ○ True ○ False

f. $\frac{3}{100} > \frac{30}{10}$ ○ True ○ False

MATHEMATICS AND DATA (MD)

Cluster: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

4.MD.1 – Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of smaller unit. Record measurement equivalents in a two-column table. *For example: know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*

DCAS-Like

24A

Juliana has two pieces of rope.

- The first piece is $1\frac{1}{2}$ meters long.
- The second piece is 2 meters long.

What is the total length, **in centimeters**, of the two pieces of rope?

A. 300 centimeters

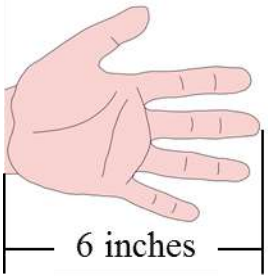
B. 350 centimeters

C. 3000 centimeters

D. 3500 centimeters

24B

Spencer uses his hand to measure different lengths. He knows that the length of his hand is 6 inches, as shown below.



The table below shows the total number of hand lengths that Spencer used to measure each object.

Measuring Objects

Object	Number of Hand Lengths	Number of Inches	Number of Feet
Computer monitor	4		
Picture frame	6		
Classroom door	16		

Complete the table above. Click in a box and then type the correct number of inches or feet for each number of Spencer's hand lengths.

Use Spencer's measurement to identify the object(s) below that has a length **greater** than 1 yard.

(Click on the object(s) to select it.)

Computer Monitor	Picture Frame	Classroom Door

4.MD.2 – Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

DCAS-Like

25A

Roberto began his homework at 4:25 p.m. He finished it one-and-a-half hours later. At what time did Roberto finish his homework?

A. 5:05 p.m.

B. 5:55 p.m.

C. 6:05 p.m.

D. 6:15 p.m.

Next-Generation

25B

Mike's basketball game starts at 5:10 p.m. Mike's coach wants the team to arrive at the gym 45 minutes before the game starts. It takes Mike 20 minutes to ride his bike from his house to the gym.

a. What is the latest time Mike can leave home and still arrive at the gym when his coach wants him to?

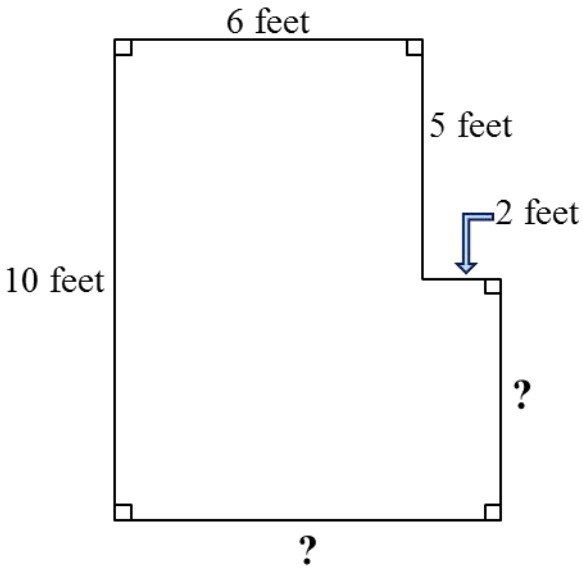
b. Mike rides his bike to the gym 4 times a week. How long, **in hours**, does he spending riding his bike? Show your work.

4.MD.3 – Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

DCAS-Like

26A

What is the perimeter of the figure below?



A. 36 feet

B. 28 feet

C. 23 feet

D. 13 feet

Next-Generation

26B

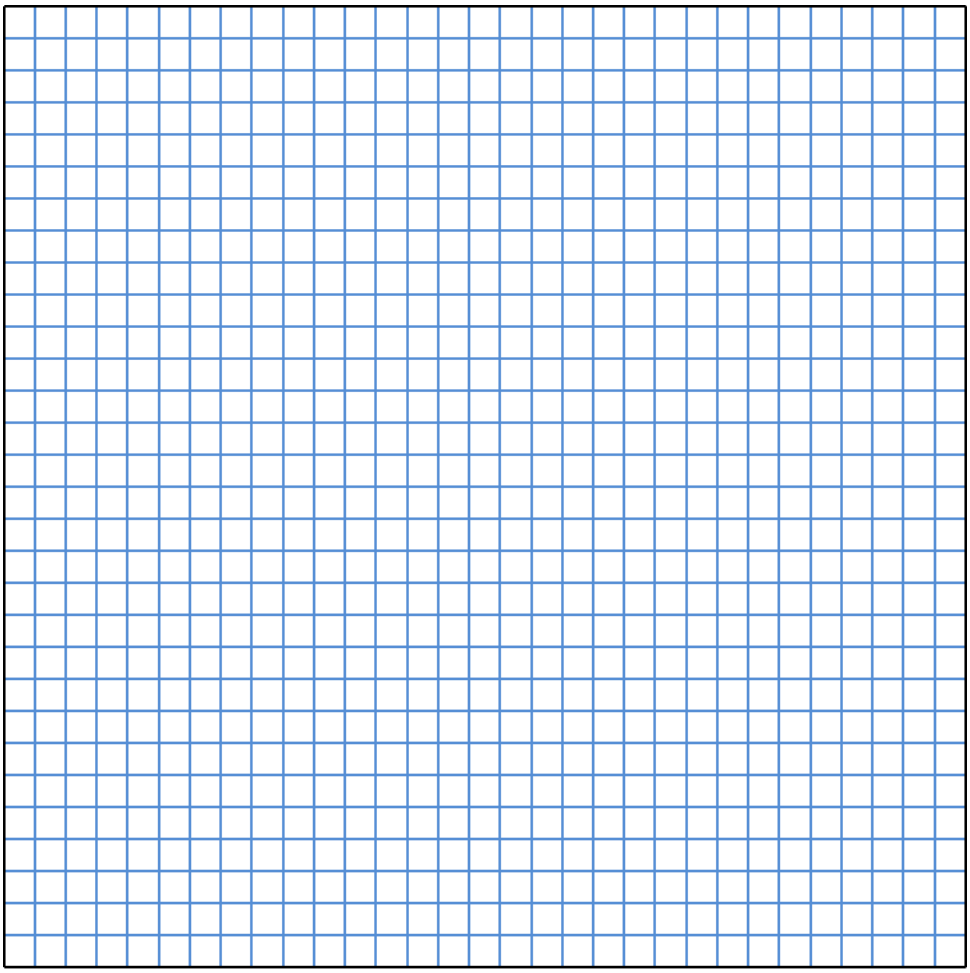
Ms. McCrary wants to make a rabbit pen in a section of her lawn. Her plan for the rabbit pen includes the following:

- It will be in the shape of a rectangle.
- It will take 24 feet of fence material to make.
- Each side will be longer than 1 foot.
- The length and width will measure whole feet.

Part A

Draw 3 **different** rectangles that can each represent Ms. McCrary's rabbit pen. Be sure to use all 24 feet of fence material for each pen.

Use the grid below. Click the places where you want the corners of your rectangle to be. Draw one rectangle at a time. If you make a mistake, click on your rectangle to delete it. Continue as many times as necessary.



☐ = 1 square foot

Use your keyboard to type the length and width of each rabbit pen you draw. Then type the area of each rabbit pen. Be sure to select the correct unit for each answer.

(Students will input length, width, and area for each rabbit pen. Students will choose unit from drop down menu.)

Pen 1

Length:			(feet, square feet)
Width:			(feet, square feet)
Area:			(feet, square feet)

Pen 2

Length:			(feet, square feet)
Width:			(feet, square feet)
Area:			(feet, square feet)

Pen 3

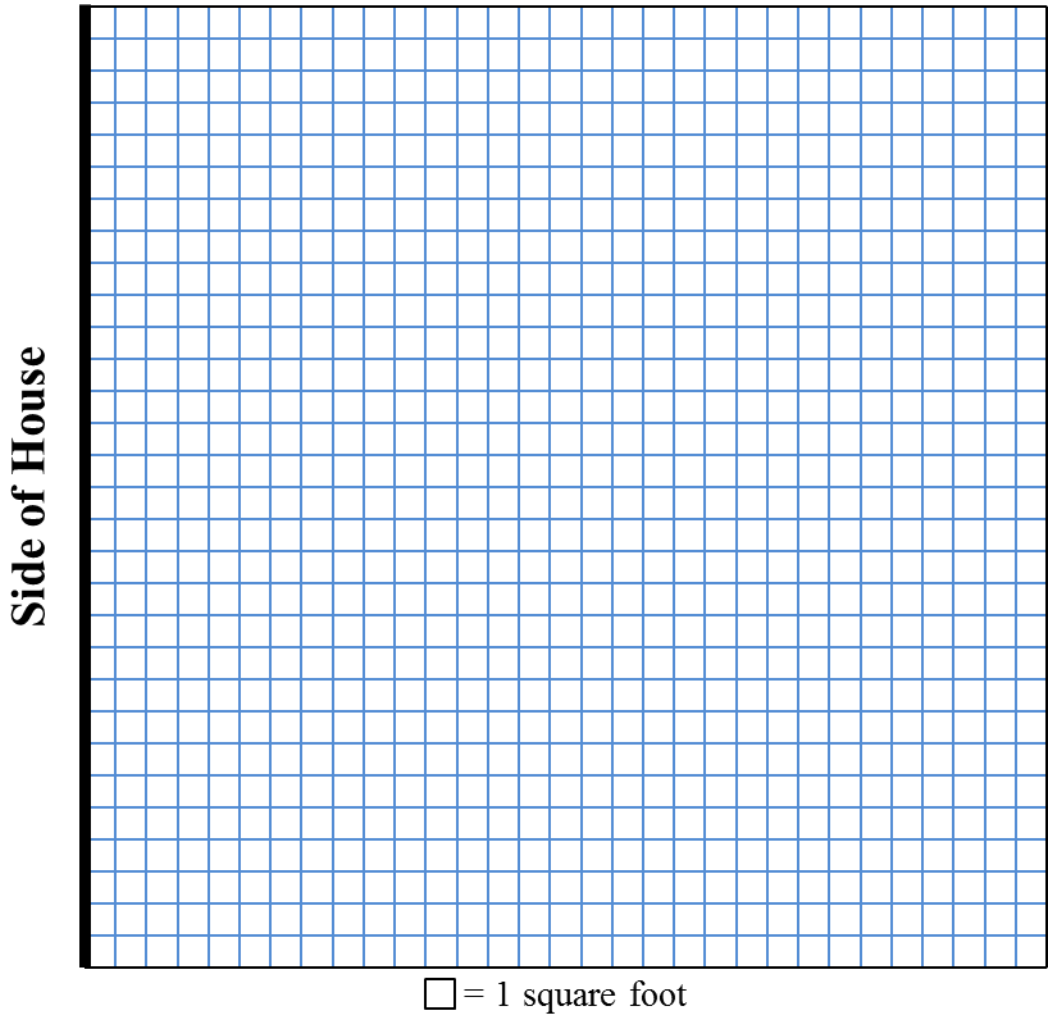
Length:			(feet, square feet)
Width:			(feet, square feet)
Area:			(feet, square feet)

Part B

Ms. McCrary wants her rabbit to have more than 60 square feet of ground area inside the pen. She finds that if she uses the side of her house as one of the sides of the rabbit pen, she can make the rabbit pen larger.

- Draw another rectangular rabbit pen.
- Use all 24 feet of fencing for 3 sides of the pen.
- Use one side of the house for the other side of the pen.
- Make sure the ground area inside the pen is greater than 60 square feet.

Use the grid below. Click the places where you want the corners of your rectangle to be. If you make a mistake, click on your rectangle to delete it.



Use your keyboard to type the length and width of your new rabbit pen you draw. Then type the area of the rabbit pen. Be sure to select the correct unit for each answer.

Length:			(feet, square feet)
Width:			(feet, square feet)
Area:			(feet, square feet)

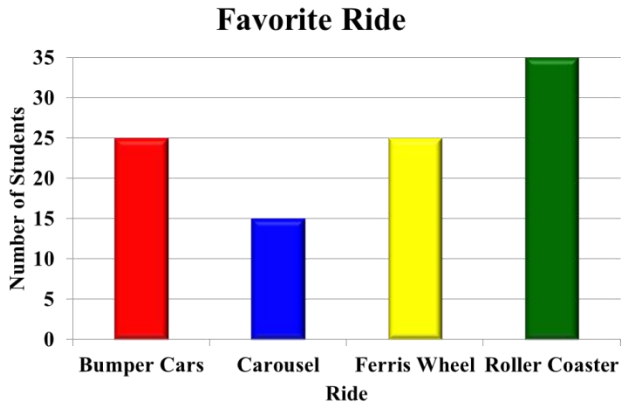
Cluster: Represent and interpret data.

4.MD.4 – Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*

DCAS-Like

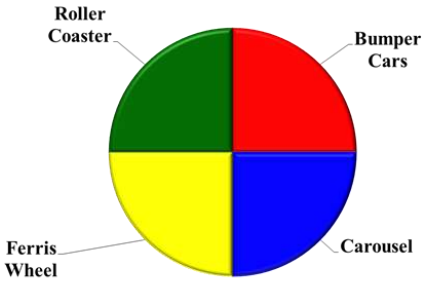
27A

A survey asked students to identify their favorite ride at an amusement park. The bar graph below shows the results of 100 students' answers to the survey.

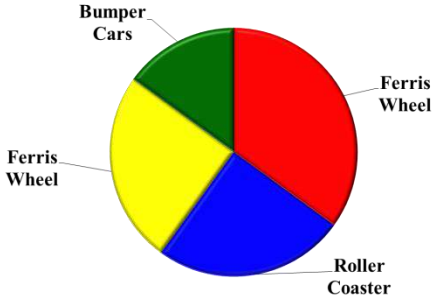


Which circle graph correctly shows the results of the survey?

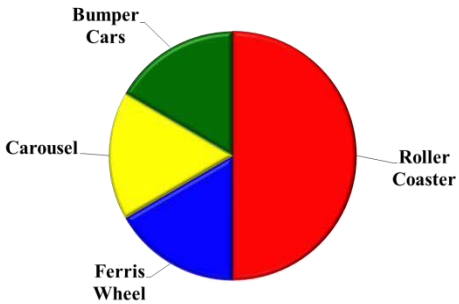
A.



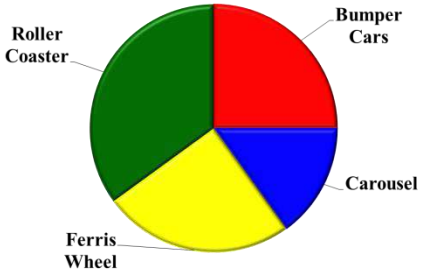
B.



C.



D.



27B

Jessica has been collecting data for a project. Her data is as follows. She forgot to label her data.

Sample	1	2	3	4	5	6	7	8	9	10	11	12
Length (in.)	$\frac{7}{8}$	$\frac{3}{8}$	$\frac{6}{8}$	$\frac{5}{8}$	1	$\frac{5}{8}$	$\frac{3}{8}$	$\frac{7}{8}$	$\frac{1}{8}$	$\frac{1}{2}$	1	$\frac{1}{8}$

Sample	13	14	15	16	17	18	19	20	21	22	23	24
Length (in.)	$\frac{7}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	1	$\frac{6}{8}$	$\frac{5}{8}$	$\frac{3}{8}$	1	$\frac{7}{8}$	$\frac{5}{8}$	$\frac{3}{8}$	$\frac{6}{8}$

- Display the data on a line plot
- Label your line plot
- Create a situation that would fit the set of data given
- Give three interpretations from the given set of data

What is the difference between the shortest and longest length?

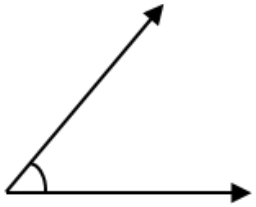
Cluster: Geometric measurement: understand concepts of angle and measure angles.

4.MD.6 – Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

DCAS-Like

28A

Which is the estimated measure of this angle?



A. 10°

B. 40°

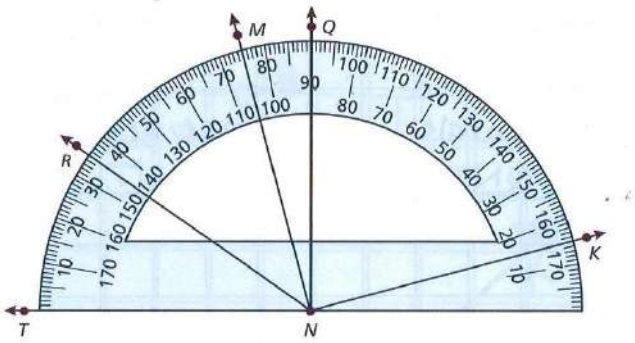
C. 90°

D. 120°

Next-Generation

28B

This drawing shows several angles on a protractor.



a. Name one angle that appears to be a right angle. _____

b. Name one angle that appears to be an obtuse angle. _____

4.MD.7 – Geometric measurement: understand concepts of angle and measure angles. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

DCAS-Like

29A

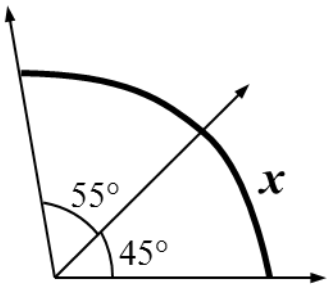
What is the value of angle x?

A. 90°

B. 100°

C. 110°

D. 160°



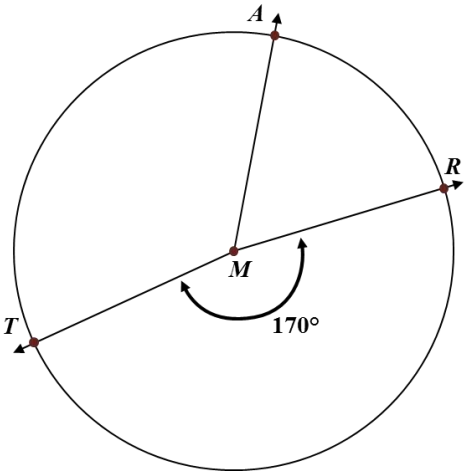
Next-Generation

29B

The circle to the right is divided into three angles: angle AMT, angle RMT, and angle AMR.

- The sum of the three angles is 360°.
- Angle RMT measures 170°.
- Angle AMT is about twice as large as angle AMR.

What are three possible measurements for angle AMT and angle AMR? You cannot use a protractor.



Possibility #1	
Angle AMT	Angle AMR
_____°	_____°

Possibility #2	
Angle AMT	Angle AMR
_____°	_____°

Possibility #3	
Angle AMT	Angle AMR
_____°	_____°

GEOMETRY (G)

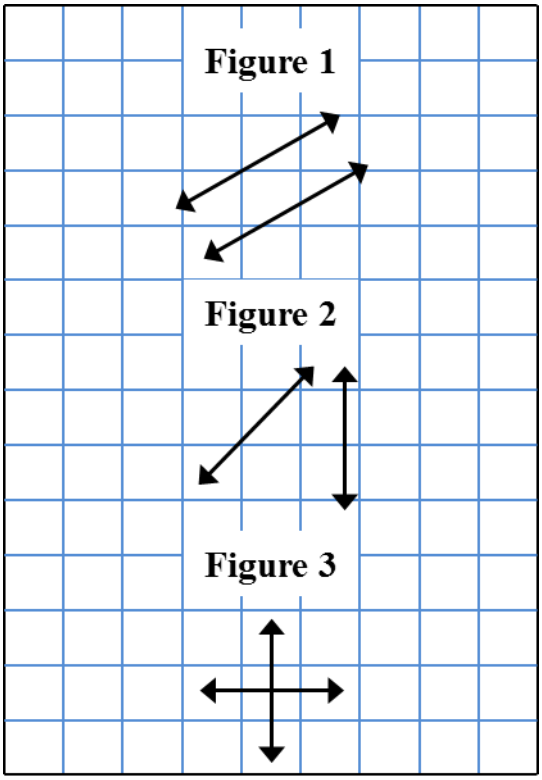
Cluster: Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

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

DCAS-Like

30A

Which figures below show pairs of lines that appear to be parallel?



A. Figure 1 only

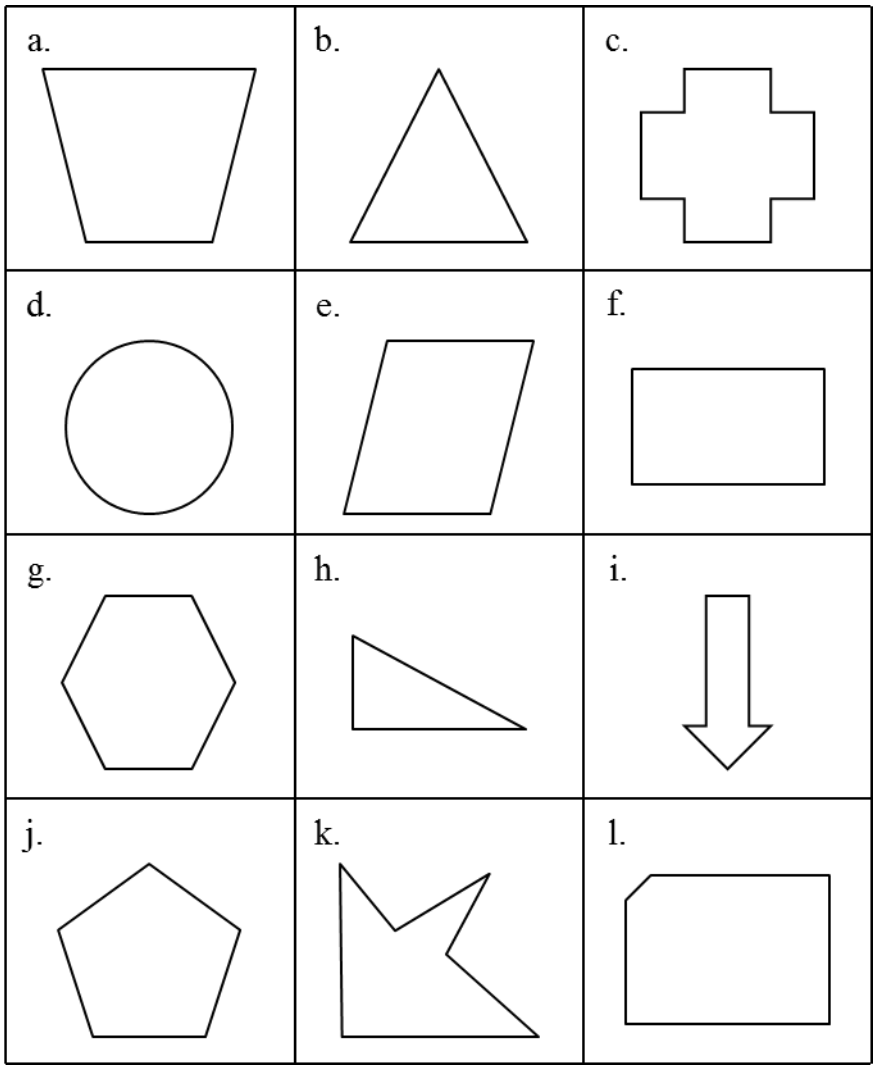
B. Figure 3 only

C. Figure 1 and figure 2

D. Figure 2 and figure 3

30B

Which shapes contain parallel lines?



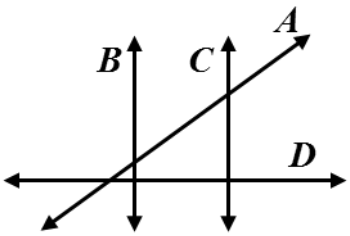
Write **Yes** or **No** next to each shape to indicate whether they have parallel lines.

4.G.2 – Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of specified size. Recognize right triangles as a category, and identify right triangles.

DCAS-Like

31A

Which lines are parallel?



A. *A* and *C*

B. *A* and *B*

C. *B* and *C*

D. *B* and *D*

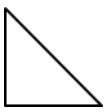
Next-Generation

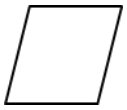
31B

Andy drew a shape with the following properties:

- Perpendicular line segments
- At least 1 line of symmetry
- No parallel line segments

For items a., b., c., and d., choose **Yes** or **No** to show whether each shape below appears to meet the properties of Andy's shape.

a.  ○ Yes ○ No

b.  ○ Yes ○ No

c. ○ Yes ○ No

d. ○ Yes ○ No

4.G.3 – Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

DCAS-Like

32A

Which letter has exactly one line of symmetry?

A. **C**

B. **T**

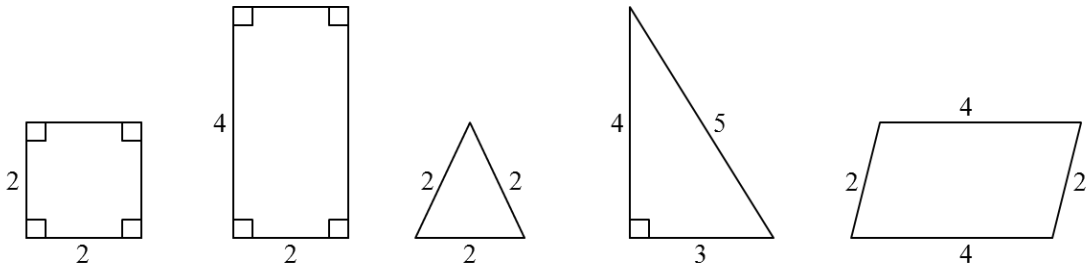
C. **O**

D. **F**

Next-Generation

32B

Each shape below has side lengths labeled in units. Determine the number of lines of symmetry for each shape. Put each shape in the correct box. Some boxes may have more than one shape. Some boxes may not have any shapes.



To place a shape in a box, click the shape, move the pointer over the box, and click again. To return all shapes to their original positions, click the Reset button.

Number of Lines of Symmetry	0	Only 1	Exactly 2	Exactly 3	Exactly 4	More Than 4
Shape						

ANSWER KEY AND ITEM RUBRICS

Operations and Algebraic Thinking (OA)

DCAS-Like Answer	Next-Generation Solution
1A: B (4.OA.1)	**1B:** *Solution:* a. A possum sleeps 2 times as many hours a day as a guinea pig. A bat sleeps 5 times as many hours a day as a cow. b. $3 \times 6 = 18$ or $6 \times 3 = 18$ c. Students need to figure out that donkeys sleep 3 hours per day. Note: If the student writes "75," while still incorrect, this will show some level of understanding that the situation in the task is multiplicative, since $5 \times 15 = 75$. Even though "75" is a completely unreasonable answer in terms of size, it does show more understanding of the target concept than "10" or "20" would show.
2A: D (4.OA.2)	**2B:** *Key:* YNY

DCAS-Like Answer	Next-Generation Solution
3A: C (4.OA.3)	**3B:** *Solution* a. If she has \$9 and tickets cost \$2 each, we divide 9 by 2 to find out how many tickets she has (this is a "How many groups?" division problem). $9 \div 2 = 4$, with a remainder of 1. So, she could buy 4 carnival tickets with one month's allowance in 2008 and would have \$1 left over. b. As before, we divide to find how many tickets she can buy. $9 \div 4 = 2$, with a remainder of 1. So, if her allowance was \$9 in 2012, she could only buy 2 tickets with one month's allowance. c. Her allowance was \$9 and now it is \$14, and $14 - 9 = 5$. So, her allowance increased by \$5. d. Since tickets cost \$4 in 2012 and they cost \$2 in 2008, and $4 - 2 = 2$, a carnival ticket costs \$2 more in 2012 than it did in 2008. e. We will divide as we did in parts a. and b., $14 \div 4 = 3$, with a remainder of 2. So, she could buy 3 carnival tickets with one month's allowance in 2012 and would have \$2 left over. Even though her allowance went up, the number of tickets she could buy went down. f. Since carnival tickets cost \$4 in 2012 and she could buy 4 tickets in 2008, and $4 \times 4 = 16$, her allowance in 2012 would need to be at least \$16. g. You can buy fewer things if prices increase but your allowance doesn't increase.

<table>
<tr><th>DCAS-Like Answer</th><th>Next-Generation Solution</th></tr>
<tr><td>4A: C
(4.OA.3)</td><td>
4B:
Sample Top-Score Response

$1116
<table>
<tr><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td></tr>
<tr><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td></tr>
<tr><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td></tr>
</table>
$30 \text{ boxes} \times 25 \text{ cards} = 750 \text{ cards}$ in all the boxes together.

$750 \times 3 = 2250$ The total amount earned from all cards is $2250
$2250 - 1134 = 1116$ The total amount earned ($2250) minus the amount earned from football cards ($1134) is the amount earned from baseball cards ($1116).

Scoring Rubric

Responses to this item will receive 0-2 points based on the following:
2 points: Student has a thorough understanding of how to solve multistep word problems with whole numbers using multiplication and division. The student correctly answers $1116 and provides a thorough explanation of reasoning that makes sense with the answer given.
1 point: Student has a partial understanding of how to solve multistep word problems with whole numbers using multiplication and division. The student correctly answers $1116 but provides an explanation of reasoning that is incomplete or flawed. OR The student knows operations/steps needed to solve the problem but makes an error in computation, carries this error out, and provides a thorough explanation of reasoning that makes sense with the answer given.
0 points: Student has little or no understanding of how to solve multistep word problems with whole numbers using multiplication and division. The student incorrectly solves the problem and provides no explanation of reasoning or an explanation of reasoning that does not make sense to the answer given.
</td></tr>
</table>

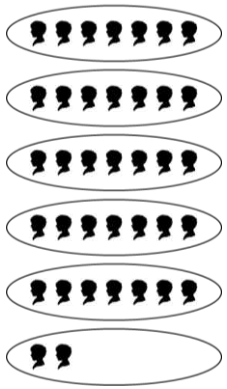
DCAS-Like Answer	Next-Generation Solution
5A: A (4.OA.4)	**5B:** Students should ultimately indicate that Penny is 12 and Lily is 2. Common errors for this task would be for students to identify a pair of ages that meets some but not all of the given criteria. For example, they might select 10 for Lily's age and 4 for Penny's age. These ages would meet some of the criteria (sum of 14, 30 is a multiple of 10 but not 4, 36 is a multiple of 4, 4 is a factor of 24) but not others (10 is not a factor of 24 and 36 is not a multiple of 10). Teachers should cover prime and composite terminology when solving such problems. Note: The students' work can be helpful in determining whether students have a plan or strategy finding factors (i.e., finding them in pairs or beginning with a low number and working up) or if students seem to be using a more random, guess-and-check style method.
6A: B (4.OA.5)	**6B:** Answer may be similar to the following: Each day Laura finds 5 more shells than she did the day before. I made a table showing the day and the number of shells Laura found. The rule for this table is $+5$. If you keep adding $+5$ until you get to the 8^{th} day, you will find out that Laura found 38 shells on the 8^{th} day.

Number and Operations in Base Ten (NBT)

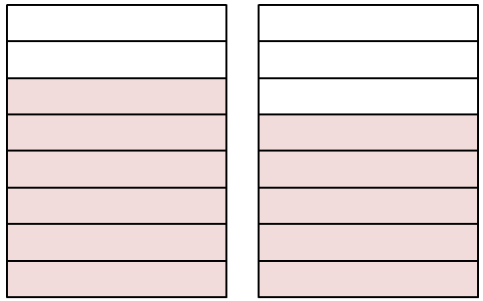
DCAS-Like Answer	Next-Generation Solution
7A: A (4.NBT.1)	**7B:** Students should identify that the 7 in Bill's number is 10 times the size of the 7 in Tom's number. Their word should show an understanding that the 7 in Bill's number is worth 700 and the 7 in Tom's number is worth 70, and 700 is ten times the size of 70. When scoring this task, you may choose to use the level of student work to distinguish between a 3 and a 2 or a 2 and a 1. If you decide to account for the student's work when grading, it is important to make sure the students know in advance of working that the task will be graded based on the correct answers and their work.
8A: D (4.NBT.2)	**8B:** *Key:* YYYN *Scoring Rubric* Responses to this item will receive 0-2 points based on the following: **2 points:** YYYN – The student thoroughly understands place value in multi-digit whole numbers. **1 point:** YYNN, YNYN, NYYN – The student partially understands place value in multi-digit whole numbers. The student does not fully understand that, in multi-digit whole numbers, values can be represented in word form, standard form, and expanded form as well as in many other ways. **0 points:** YYYY, YNNN, YNYY, YYNY, YNNY, NNNN, NYYY, NNYY, NNNY, NYNN, NNYN, NYNY – The student has little or inconsistent understanding of place value in multi-digit whole numbers. The student only answered one part correctly. OR The student thought the answer to item d. (which serves to confirm no understanding) was "Yes."
9A: C (4.NBT.2)	**9B:** a. Any digit 0 through 6 b. Any digit 3 through 9 c. The digit 9 only

DCAS-Like Answer	Next-Generation Solution
10A: C (4.NBT.3)	**10B:** a. Student places the stadium seating tiles in the correct order: 1 point Washington Nationals' stadium: 41,888 < San Francisco Giants' stadium: 41,915 seats < San Diego Padres' stadium: 42,445 seats b. Student gives a clear and correct explanation such as: 2 points ▪ Yes. Rounding to different values gives you a different estimate number. ▪ Yes. If you round all three numbers to the nearest thousand or ten thousand, all three numbers round the same. ▪ Any other mathematically valid explanation. Note: If a student answers that either Sara or Jeff are wrong, the student can receive partial credit at most. Partial credit: (1 point) The student's explanation lacks precision, but he or she shows some understanding of rounding—as related to the problem.
11A: A (4.NBT.4)	**11B:** *1st Method* ▪ $819 - 334 = 485$ *2nd Method* ▪ $819 + 15 = 834$ ▪ $834 - 334 = 500$ ▪ Now subtract 15 to get 485 balloons

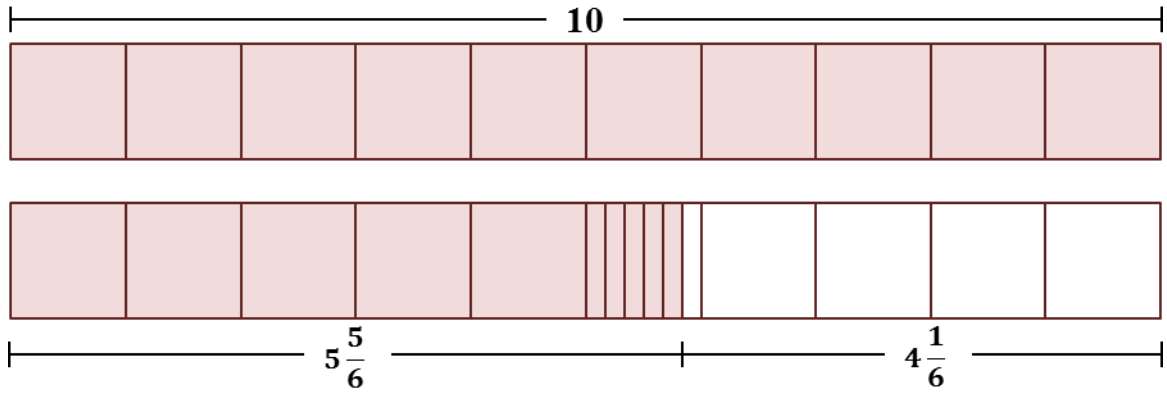
DCAS-Like Answer	Next-Generation Solution
12A: A (4.NBT.5)	**12B:** *1st Method* ▪ As we know, a year contains 12 months. ▪ $\$805 \times 12 = \$9{,}660$ *2nd Method* ▪ $(\$800 \times 12) + (\$5 \times 12) = \$9{,}660$ OR ▪ $(\$805 \times 10) + (\$805 \times 2) = \$9{,}660\backslash$

DCAS-Like Answer	Next-Generation Solution
13A: C (4.NBT.6)	**13B:** *Sample Top-Score Response* a.  b. Student creates model with 6 groups containing a total of 37 students, with no more than 7 students in each group. *Scoring Rubric* Responses to this item will receives 0-2 points based on the following: **2 points:** The student has thorough understanding of finding whole-number quotients and remainders. The student creates a model that shows 6 groups containing a total of 37 students, with no more than 7 students in each group. The student also answers 6 to the question. **1 point:** The student has partial understanding of finding whole-number quotients and remainders. The student's model contains a minor error but still shows understanding of modeling in a division situation. OR The student models only 5 equal groups, does not consider the remainder, and answers 5 to the question. **0 points:** The student has little or no understanding of finding whole-number quotients and remainders. The student's model does not show understanding of division and remainders. The student does not answer 6 to the question.

Number and Operations—Fractions (NF)

DCAS-Like Answer	Next-Generation Solution
14A: D (4.NF.1)	**14B:** *Solution* ▪ Aisha has 4 pencils ▪ $\frac{1}{5}$ of 20 pencils is 4 pencils. ▪ $\frac{3}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$ or $\frac{3}{5} = 3 \times \frac{1}{5}$ So, $\frac{3}{5}$ of 20 pencils is 12 pencils. ▪ Aisha, Sara, and Brendan are all correct because altogether they have 20 pencils. $4 + 4 + 12 = 20$ pencils. ▪ Drawings should show clear understanding of groupings of 4s or 5s. For Brendan, there are 5 groupings (denominator), so each group contains 4 pencils because $5 \times 4 = 4 \times 5 = 20$ pencils.
15A: D (4.NF.2)	**15B:** a.  $\frac{3}{4} = \frac{6}{8}$ $\frac{5}{8}$ b. Judy wins the round because $\frac{3}{4}$ is larger than $\frac{5}{8}$.

DCAS-Like Answer	Next-Generation Solution
16A: B (4.NF.2)	**16B**: *Key:* False, False, False, True
17A: D (4.NF.2)	**17B**: a. No b. No c. Yes d. No
18A: D (4.NF.3)	**18B:** Each part of this task is scored separately and earns 1 point for the correct response. *Part A* $\frac{4}{12}$ or $\frac{1}{3}$ *Part B* $\frac{8}{12}$ or $\frac{2}{3}$
19A: C (4.NF.3)	**19B:** *Key:* $1\frac{2}{8}$

DCAS-Like Answer	Next-Generation Solution
20A: A (4.NF.4)	**20B:** *Solution:* The correct answer to the first part of the item could be arrived at by multiplying the number of acres needed for one house by the number of houses that will be built: $\frac{5}{6} \times 7 = \frac{35}{6} = 5\frac{5}{6}$ acres. Another approach could be repeated addition. The number of acres needed for seven houses could also be achieved by adding $\frac{5}{6}$ seven times: $\frac{5}{6}+\frac{5}{6}+\frac{5}{6}+\frac{5}{6}+\frac{5}{6}+\frac{5}{6}+\frac{5}{6} = \frac{35}{6} = 5\frac{5}{6}$. After finding the amount of land needed for seven houses, the student would subtract this amount from 10. The student may convert the whole number 10 to a mixed number with a denominator of 6: $9\frac{6}{6} - 5\frac{5}{6} = 4\frac{1}{6}$. A student could also use a visual fraction model to compare $5\frac{5}{6}$ with 10: 

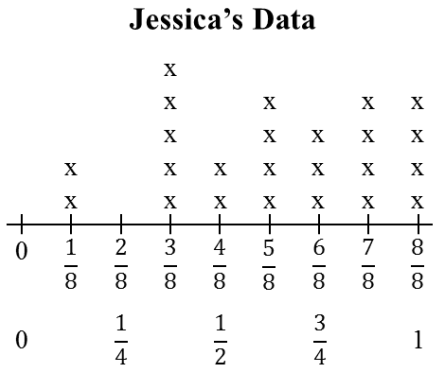
DCAS-Like Answer	Next-Generation Solution
21A: B (4.NF.5)	**21B:** *Key and Distractor Analysis:* a. Added as if both fractions had denominators of 100 b. Added as if both fractions had denominators of 10 c. Correct d. Multiplied numerator of first fraction by 10 instead of multiplying numerator of second fraction by 10
22A: B (4.NF.6)	**22B:** a. Yes b. Yes c. No
23A: D (4.NF.7)	**23B:** a. True b. False c. False d. True e. False f. False

Measurement and Data (MD)

<table>
<tr><th>DCAS-Like Answer</th><th>Next-Generation Solution</th></tr>
<tr><td>24A: B
(4.MD.1)</td><td>
24B:
Sample Top-Score Response
Measuring Objects
<table>
<tr><th>Object</th><th>Number of Hand Lengths</th><th>Number of Inches</th><th>Number of Feet</th></tr>
<tr><td>Computer monitor</td><td>4</td><td>24</td><td>2</td></tr>
<tr><td>Picture frame</td><td>6</td><td>36</td><td>3</td></tr>
<tr><td>Classroom door</td><td>16</td><td>96</td><td>8</td></tr>
</table>
Student selects “Classroom Door.”
Computer Monitor | Picture Frame | Classroom Door
Scoring Rubric
Responses to this item will receive 0-3 points based on the following:
3 points: The student has a thorough understanding of converting measurement units within one system of units. The student completed the conversion table without error and chose “Classroom Door” as the only object with a length that is greater than 1 yard.
2 points: The student has a good understanding of converting measurement units within one system of units. The student completed the conversion table with an error made with one object (the error may be carried through on that single row) and chose “Classroom Door” as the only object with a length that is greater than 1 yard. OR The student made no errors in the table conversions but identified the picture frame incorrectly (not paying attention to “greater than” 1 yard).
</td></tr>
</table>

DCAS-Like Answer	Next-Generation Solution
	1 point: The student has a partial understanding of converting measurement units within one system of units. The student was only able to convert hands to inches in the table but not to yards. OR The student made the same error consistently in converting hands to inches (e.g., multiplies each hand length by 12 instead of 6) but correctly converted inches to yards for at least two of the objects. OR The student correctly converted only one row of the table and chose "Classroom Door" in the last part. **0 points:** The student has a limited or no understanding of converting measurement units within one system of units. The student did not complete any part of the table correctly. Without correct conversions in the table, answering "Classroom Door" is not enough to earn any points.
25A: B (4.MD.2)	**25B:** a. Student uses addition and subtraction to solve this problem. 45 min + 20 min = 1 hour, 5 minutes before the game starts. So, 1 hour, 5 minutes before 5 p.m. is 3:55 p.m. b. 4 × 20 minutes = 80 minutes = 80 1 hour, 20 minutes or $1\frac{1}{3}$ hour

DCAS-Like Answer	Next-Generation Solution
26A: A (4.MD.3)	**26B:** *Sample Top-Score Response:* Draws 3 different rectangles with a perimeter of 24 feet ($2 \times 10,\ 3 \times 9,\ 4 \times 8,\ 5 \times 7,\ 6 \times 6$). **Pen 1:** Length: 4 feet Width: 9 feet Area: 36 square feet **Pen 2** Length: 2 feet Width: 10 feet Area: 36 square feet **Pen 3:** Length: 3 feet Width: 9 feet Area: 27 square feet Using the house as one side of the pen, student draws a rectangle that has an area greater than 60 square feet. Length: 4 feet Width: 16 feet Area: 64 square feet *Scoring Rubric* Responses to this item will receive 0-4 points based on the following: **4 points:** The student has thorough understanding of applying area and perimeter formulas for rectangles in real-world and mathematical problems. This is shown by completing the following. • Draws 3 different rectangles with a perimeter of 24 ($2 \times 10,\ 3 \times 9,\ 4 \times 8,\ 5 \times 7,\ 6 \times 6$). • Writes the length and width of each rectangle correctly with the corresponding area ($2 \times 10 = 20,\ 3 \times 9 = 27,\ 4 \times 8 = 32,\ 5 \times 8 = 35,\ 6 \times 6 = 36$). • Using the house as one side of the pen, draws a rectangle that has a greater area than each of the other three that were drawn. • Labels length, width, and area appropriately. (Note: The second dimension is the side opposite the house: ~~$1 \times 22 = 22$~~, ~~$2 \times 20 = 40$~~, ~~$3 \times 18 = 54$~~, $4 \times 16 = 64,\ 5 \times 14 = 70,\ 6 \times 12 = 72,\ 7 \times 10 = 70,\ 8 \times 8 = 64,$~~$9 \times 6 = 54$~~, ~~$10 \times 4 = 40$~~. Crossed-out dimensions will not yield an area greater than 60 square feet, but these could be counted for partial credit.)

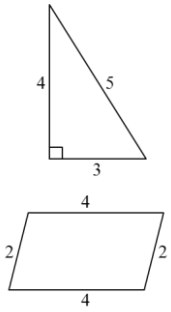
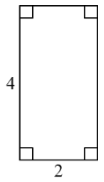
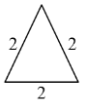
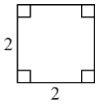
DCAS-Like Answer	Next-Generation Solution
27A: D (4.MD.4)	**27B:** *Line plot:*  *Situation:* These data could have represented the length of wings of different insects she collected after science field trip. *Interpretations from set of data:* ▪ More than half of insects/data have lengths greater than $\frac{5}{8}$ of an inch. ▪ There were at least 2 insects/data of each length. ▪ There were no insects/data for $\frac{2}{8}$ or $\frac{1}{4}$. ▪ Optional: The average length was about $\frac{5}{8}$ inch $\left[\frac{123}{8} \div 24 = 64\right]$. The difference between the smallest/shortest and longest insect/data was $\frac{6}{8}$ or $\frac{3}{4}$.
28A: B (4.MD.6)	**28B:** a. Angle KNM because $KNQ = 75°$ and $QNM = 15°$. b. Angle KNR because it is greater than 90°: $KNR = 130°$.

DCAS-Like Answer	Next-Generation Solution
29A: B (4.MD.7)	**29B:** ▪ This task is designed to be completed **without** the use of a protractor. ▪ The total of the two angles that the students are working with is 190°. When they list pairs of possible measurement for AMT and AMR, there are a number of criteria to consider. The student's pairs of possible measurements should add to 190° and have one measurement that is approximately double the other measurement. ▪ If it is clear that a given error is due to a misunderstanding of a learned fact or calculation error (such as incorrect regrouping when subtracting 360 – 170), then the student's overall work shows an understanding of the relationship between angles.

Geometry (G)

DCAS-Like Answer	Next-Generation Solution
30A: A (4.G.1)	**30B:** a. Yes b. No c. Yes d. No e. Yes f. Yes g. Yes h. No i. Yes j. No k. No l. Yes
31A: C (4.G.2)	**31B:** *Scoring Rubric* Responses to this item will receive 0-2 points based on the following: **2 points:** YNNN – Thoroughly understands parallel and perpendicular line segments and symmetry. **1 point:** YNYN, YNNY – Accounted for two of the three properties. (YNNY – missed the no parallel part, and YNYN – missed the symmetry part) **0 points:** YYYY, YYYN, YNYY, YYNN, YYNY, NYYYY, NYNY, NYYN, NNNN, NNNY, NNYY, NNYN, NYNN

DCAS-Like Answer	Next-Generation Solution
32A: B (4.G.3)	**32B:** *Sample Top-Score Response*

Number of Lines Symmetry	0	Only 1	Exactly 2	Exactly 3	Exactly 4	More Than 4
Shape						

PERFORMANCE TASK

Performance Task

The following is a link to a grade 4 Performance Task released by Smarter Balanced Assessment Consortium. The Performance Task is Claim 4, Modeling and Data Analysis.

MAT.04.PT.4.GROCE.A.074* – *Grocery Store

- Primary Content Domain: Measurement and Data
- Secondary Content Domains: Number and Operations; Operations and Algebraic Thinking