4th Grade Number and Operations- Fractions Tasks and Answer Key

NUMBER AND OPERATIONS - FRACTIONS: TASKS OVERVIEW

Resources:

Attached you will find a set of 6 **tasks for Number and Operations - Fractions**. These tasks are interchangeable with the practice items. If your students, or a group of students, are ready for problems that are a bit more rigorous, feel free to use the tasks. The tasks are best used by partners or small groups. Since these tasks are more in-depth than the practice items, you would not want to use them every day. It is not unusual to spend the entire math class on a high-level task. You could use them once or twice a week, or if they address a standard you are working on that day, you could use them as the foundation of your lesson.

The purpose of using tasks is to help you see how students solve problems, and understand their thought process while they work. Students working with others and engaging in productive discourse, explaining their thinking to another student, and developing a solution, is the most effective way to get to student understanding. These tasks require students to do just that: think about an efficient strategy to solve the problem, show their work and justify their reasoning. This is the ultimate goal for what we want students to be able to do. Being able to gather evidence of student learning and misconceptions in the moment, will give you the flexibility to change your instruction to meet their needs. As the instructional decision-maker, you are able to adjust your methods for whole class or small groups to address student misconceptions and move them toward proficiency.

The goal is to have tasks that can be interchanged with the practice items when needed. There are tasks that represent the 5 domains in 4th grade. We would like for you to use these tasks along with the practice items for a 10 week period between the time you receive them and the end of January.

At the end of each task packet, you will find an answer key for your use. Some tasks include possible responses that students might have on the constructed response items.

Recommendations or Tips:

When implementing the tasks with your students, please take the time to have the students read through the tasks before starting to see if they have any questions about vocabulary or what the task is asking them to do. Taking the time to do these things now, will help assure that the students are familiar with mathematical vocabulary and different question types before the actual test.

Providing Feedback to Students:

Since the purpose of the tasks and practice items is to get at student understanding, it is not enough just to give them as bell ringers or engagement items. A key part of the process in advancing student thinking is to debrief the tasks and provide specific feedback on the student's thinking and performance. The key to getting at student understanding and thinking is to always have them explain how they solved the problem. This can be done during the sharing out process by asking effective questions. It is difficult to make student thinking and understanding visible by just letting students solve the problems and determining whether their response is correct or incorrect. Asking questions similar to the ones below can help students verbalize the reasoning for their solutions:

- To solve the problem, what concept do you have to be aware of?
- Why do you think your solution is correct?
- What strategy did you use to solve the problem? Why did you use that particular strategy?

- Is there another strategy that you could use to solve the problem?

The above questions can be used with **short response** and **constructed response** also. Other questions to consider when prompting students to verbalize or justify their thinking are:

Monitoring as students work:

- What is the problem asking you to find?
- How would/did you start the problem?
- What else do you need to do?

During debriefing:

- What did the problem ask you to do?
- What information do you see in the problem?
- What did you do first to solve this problem?
- Who else started this same way?
- What did you do next?
- Who started a different way?
- What are some strategies that you heard today that you would like to try when solving a similar problem in the future?

Another option is to let the groups draw out their solution(s) to the task on chart paper, or use a document camera to display and explain their thinking to the class. They can then share out with the whole class. With this option the students are able to present their thinking, justify their reasoning, and answer questions from the other students.

Answer Key:

The information above is intended to help teachers get at student understanding of the mathematical idea(s) in each problem. Also provided is an Answer Key for each set of tasks. The Answer Key provides more information on the expected student response for each task, as well as the standard being addressed. While it is important for students to get the answer right, it is equally important for them to understand how their thinking leads or does not lead to a correct solution. Incorrect solutions set the stage for teachable moments!!!!

Name: _____ Date: _____

Task 1 – Standard #12

Splitting to Make Equivalent Fractions

Part 1:
Jenna ate 1/3 of a cake and had 2/3 leftover for her friends. She split each of the remaining thirds into four pieces. How many pieces of cake did she have? What fraction of the whole was each piece?

Each of her friends ate the same amount of cake as Jenna. How many pieces would each friend get to eat 1/3 of the whole cake? Write or draw this fraction in two different ways.

Splitting to Make Equivalent Fractions

Part 2:
Ronoldo ate ¼ of a pizza for dinner and had ¾ of the pizza leftover. He cut the leftover pizza into 6 equal slices for his friends. What fraction of the whole pizza was each piece?

Each of his friends ate the same amount of pizza as Ronoldo. How many pieces would each friend get in order to eat ¼ of the whole pizza? Represent (write or draw) the solution (fraction) in two different ways.

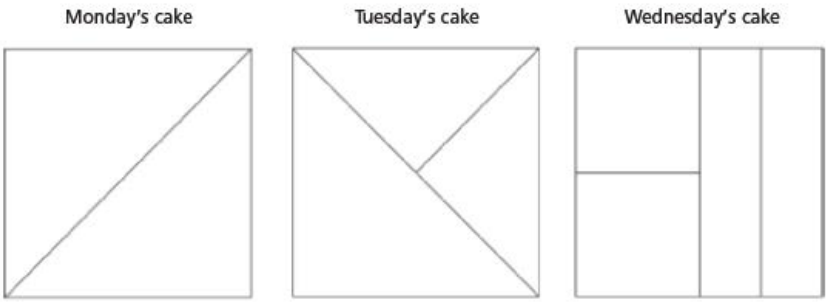
Name: _____ Date: _____

Task 2 – Standard #12

Weird Pieces of Cake

Part 1:

A baker makes square cakes and decides to cut the pieces different each day of the week. If she wants to make 8 dollars for the whole cake, how much money will each individual piece sell for?



Part 2: While shopping on Wednesday, Martina says to the baker, "Buying 2 pieces of cake today will cost the same as one piece of cake on Monday. Is Martina correct? Explain why or why not.

(Modified from the Unusual Baker, NCTM, 2012)

Name: _____ Date: _____

Task 3 – Standard #13

Who Has More Gum?

A group of friends buys a big long strip of gum and tears it into pieces. Sally has 2/3 of a foot of gum. Josey has 3/4 of a foot of gum. Mitch has 4/6 of a foot of gum. Gary has 3/6 of a foot of gum.

Part 1:

Draw pictures and write an expression using the >, <, or = signs to show who has more gum between:

Gary or Sally?

Mitch or Sally?

Josey or Mitch?

Part 2:

Taylor comes in and gets ½ of a foot of gum. Gary says, "We have the same amount." Is Gary correct? Why or why not?

Name: _____ Date: _____

Task 4 – Standards #14, 14c, 14d

Boxing Up Leftover Brownies

Amaria has brownies at her birthday party. At the end of the party there are the following brownies left over:

5 brownies with cream cheese frosting
4 plain chocolate brownies
3 chocolate brownies with nuts
7 brownies with caramel frosting

Part 1:
After the party the brownies are put into boxes. A box can hold 8 brownies. If each type of brownie were packed into their own box, what fraction of a box does each type of brownie take up? Draw pictures below to show your work.

Part 2:
Amaria and her Mom want to use fewer boxes and put different types of brownies into the same box. How many whole boxes do they fill? Will there be a box partially filled? If so what fraction of the box is partially filled? Draw pictures to show your work.

Part 3:

Write an equation to match the picture that you drew in Part 2.

Part 4:

Is there space for any more brownies? If so how many more brownies do you have room for? Write an equation that shows your work.

Name: _____ Date: _____

Task 5 – Standard #15

Pasta Party

Part 1:
Katie makes 1/4 pound of pasta for each person at her dinner party. If seven people attend the party, how many pounds of pasta will be needed for her guests?

Write an **addition** equation to show this situation.

Show your answer with a number line or an area model.

Use numbers or words to explain how your model shows addition.

Part 2:
Write a multiplication equation to show this situation.

Show your answer with a number line or an area model.

Use numbers or words to explain how your model shows multiplication.

Part 3:
How are your addition and multiplication equations alike? Different?
Would you use one over the other? Why or why not?

Extension:
Write your own word problem using ¼ x 7.

Name: _____ Date: _____

Task 6 – Standard #15

Chris's Cookies

Chris is making cookies for his friend's birthday party using the following recipe.

Chocolate Chip Cookies:
Makes 2 dozen cookies

- 2 cups flour
- 1/2 teaspoon baking soda
- 1 teaspoon salt
- 3/5 cups butter, softened
- 3/4 cups sugar
- 1/2 cup light brown sugar
- 1 egg
- 1 teaspoon vanilla extract
- 1 package (6 ounces) chocolate chips
- 1/2 cup chopped walnuts

From http://www.mccormick.com/

1. How much butter will he need to make 3 batches of cookies? Write an equation to show your answer.

2. How much butter will Chris need to make 6 batches of cookies? Write an equation to show your answer.

3. How much butter will Chris need to make 9 batches of cookies? Write an equation to show your answer.

4. What patterns do you notice in the amounts of butter needed for 3 batches, 6 batches, and 9 batches of cookies?

5. How can we use these patterns to predict the amount of butter needed for 18 batches? 36 batches?

ANSWER KEY

Task 1: Splitting to Make Equivalent Fractions

This standard addresses the idea that equivalent fractions can be made by multiplying the numerator and the denominator by the same number. It also introduces the idea that dividing or splitting the numerator and denominator by the same number results in an equivalent fraction. Students will make models to show that splitting the number in the whole also splits the number in a part of the whole. The resulting fraction is the same.

Students can show with numbers or models that a/b = $(a \div n)/(b \div n)$, and are able to explain why dividing the numerator and denominator of a fraction by the same number yields an equivalent fraction.

Part 1:

Solution:

There are 8 pieces of cake leftover, each piece is 1/12 of the whole, so 8/12 is leftover. Each friend will need to eat 4/12 to eat the same amount as Jenna (1/3). 1/3 = 4/12.

Part 2:

Solution:

There are 6 pieces leftover, each piece is 1/8 of the whole. If each friend ate ¼ of the whole, that would be 2 pieces that are eighths, or 2/8, so 2/8 = ¼.

Task 2: Weird Pieces of Cake

Solutions:

Part 1:

Monday- $4 each.
Tuesday- $4 for large piece. Small pieces are $2 each.
Wednesday- $2 each.

Part 2:

The explanation says something about, “Monday’s slices are ½ of the whole cake. Wednesday’s slices are 2/4 of the whole cake. ½ = 2/4.”

Task 3: Who Has More Gum?

Solutions:

Part 1:

Sally. 3/6 < 2/3.

The same. 4/6 = 2/3.

Mitch. ¾ < 4/6.

Part 2:

Gary is correct. 3/6 = ½.

Task 4: Boxing Up Leftover Brownies

Solutions:

Part 1:
Pictures are correctly drawn and fractions are correctly labeled.

Cream cheese: 5/8
Plain: 4/8
Nuts: 3/8
Caramel: 7/8.

Part 2:
Picture is correctly drawn.
Answer is 2 and 3/8.

Part 3:
5/8 + 4/8 + 3/8 + 7/8 = 2 and 3/8.

Part 4:
There is space for 5 more brownies or there is 5/8 of a box empty.
Equation: 3 – 2 and 3/8 = 5/8.

Task 5: Pasta Party

Solutions:

Part 1:
Student writes a correct addition equation that totals 7/4 (i.e., ¼ + ¼ + ¼ + ¼ + ¼ + ¼ + ¼ = 7/4).They show the sum on a number line as seven 'jumps' of ¼, or as an area model, and clearly explain how the model matches their addition equation.

- **Part 2:** Student writes a correct multiplication equation (¼ x 7= 7/4). They show the total 7/4 on a number line or area model, and clearly explain how the model matches their multiplication equation.
- **Part 3:** Students understand how they are alike and different and clearly states.

Task 6: Chris's Cookies

Students will work together or independently to show their solutions to the fraction word problems.

Solutions:

1. 3 x 3/5 = 9/5
2. 6 x 3/5 = 18/5
3. 9 x 3/5 = 27/5
4. Students may notice patterns such as:
    - Alternating odd and even totals (9/5, 18/5, 27/5)
    - n x a/b = (n x a)/b Multiplying the numerator times the whole number always yields the answer.
    - As the multiplier (3) grows by 3, the amount of butter increases by 9. Students may notice that this is because the numerator is 3.
5. To predict the amount of butter for 18 batches, students may notice that they can double 3/5 x 9 since 9 doubled is 18 so that they have (3/5 x 9) x 2 = 27/5 x 2 = 54/2.

   To predict the amount of butter needed for 36 batches, students may double the amount for 18 batches, multiply the amount needed for 9 batches by 4, etc.

   (3/5 x 3) x 12 = 9/5 x 12 = 108/5
   (3/5 x 6) x 6 = 18/5 x 6 = 108/5
   (3/5 x 9) x 4 = 27/5 x 4 = 108/5