

COMMON CORE COLLABORATIVE CARDS

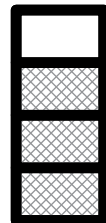
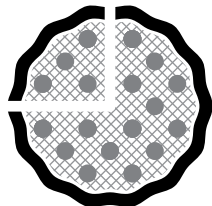
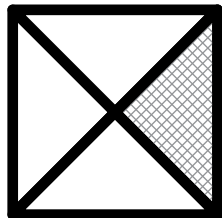


Grades 3–5

Additional resources available at

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TEACHER GUIDE



$$\frac{1}{4}$$

FRACTIONS

by Kit Norris

OVERVIEW

Common Core Collaborative Cards support the teaching and learning of mathematics in several ways. They can be used:

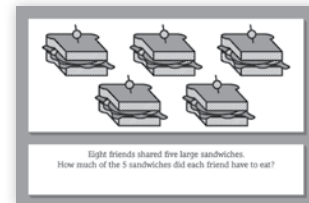
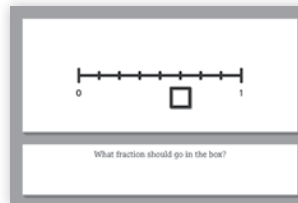
- As an activator for the day's lesson
- To review previous content
- As a learning center activity
- For students' independent practice

Common Core Collaborative Cards provide convenient and motivating ways to place students in collaborative teams for an upcoming unit or problem-solving lesson.

The Common Core Collaborative Cards series consists of three decks of cards per box, each focusing on the same domain in the Common Core State Standards (CCSS). Each deck provides problems representing the standards articulated in the CCSS for a particular grade level.

Teachers using these decks have commented that they have been able to observe what their students understand as well as identify their misconceptions. Teachers have also noted that their students began to rely on each other more instead of seeking out the teacher to answer their questions.

The cards are designed to place students in groups of four. Students are each given a card and asked to solve the problem on it. They then look for three other students who have the same solution. Once they have located their team, the students must be ready to explain why each team member's card belongs in the group. Here is one group of cards from the Grade 5 Fractions deck:



$$\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} =$$

Solve this equation.

5 divided by 8

Express as a fraction.

All four cards in this set have the same answer, $\frac{5}{8}$, so students who receive one of these cards form a group.

GROUP MEMBER ROLES

The cards offer a second feature; the reverse side of each card indicates the role the student holding the card is to perform in the group. After the students are presented with the task for that day's lesson, each member of the group takes on the role designated. These roles are as follows:

- Discussion Director
- Resource Manager
- Recorder
- Team Captain

Teachers can easily identify the roles that students are expected to perform since students place their cards on their desk with the side indicating the role facing up. The roles are explained as follows:

If you are the **Discussion Director**, your job is to ...

- Make sure that everyone has read the problem and understands what the question is asking. You can ask, "What do we know?" "What do we want to find out?" and "Can we make a prediction?"
- Invite everyone in the group to participate. You can use statements such as, "What is your idea?" and "What are you thinking?"

If you are the **Resource Manager**, your job is to ...

- Ask the teacher a question if all of the members of the team have the same question.
- Get any supplies needed by the group.
- Keep track of time.

The Resource Manager's role goes beyond taking care of the supplies. The Resource Manager is the only member of the group who may ask the teacher a question. Before asking a question, every member of the group must have the same question, and the teacher can then direct the answer to the whole group. This helps the members of the group become more interdependent, since group members can answer many of their questions themselves rather than relying on the teacher.

If you are the **Recorder**, your job is to ...

- Keep track of the thinking of the group. Be ready to answer how the group approached the problem. What strategy did the group use to solve the problem?
- Record the work of the group. Be organized and clear.
- Ask, "Is there anything else we need to include?"

If you are the **Team Captain**, your job is to . . .

- Make sure that everyone in your group can explain to the class the solution and the strategies used to solve the problem.
- Ask each member of your group, “How would you explain what we did to get this answer?” “What questions do you have?”
- Check the group’s solution by asking, “Does our answer make sense?”
- Take on any role if one member of your group is absent.

MANAGING THE CARDS IN YOUR CLASSROOM

Like any other classroom materials, you’ll need to manage your Common Core Collaborative Cards. It is essential to group the cards by shared answer after each use. Since the cards are designed to place students in groups of four and since class size will vary, this end-of-activity organizational task will make it easier to distribute the cards the next time you use them. Here are some suggestions for organizing the cards after each use:

- As you collect the cards from each student group, place a rubber band around each group of four cards with the same answer before storing.
- After the activity, collect the cards from the class in any order and designate a student to organize the cards into groups of four according to the answer.

WHAT THE RESEARCH SAYS

Research on the effectiveness of collaborative learning abounds. For more information on the research that informs this product, as well as a complete list of bibliographic references and suggestions for further reading, please visit didax.com/cccc.

COMMON CORE STATE STANDARDS – MATHEMATICAL PRACTICES

The Common Core State Standards define what mathematically proficient students know and are able to demonstrate. Combining the process standards from NCTM’s Principles and Standards for School Mathematics with the definition of mathematical proficiency from Kilpatrick, Swafford, and Findell’s *Adding It Up: Helping Children Learn Mathematics*, the Common Core Standards present the Mathematical Practices.

The eight mathematical practices focus on the specific actions taken by students who are mathematically proficient. They are:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

(*Common Core State Standards for Mathematics*, 2010, pp. 6–8)

The authors of the Common Core carefully chose to begin the mathematical practices with problem solving. “Problem solving is not only a goal of learning mathematics but also a major means of doing so” (NCTM, 2000, p. 52). Students who are engaged in solving meaningful tasks are in the process of building their understanding. They are making connections, constructing arguments, analyzing approaches, looking for patterns, and reflecting on their thinking. These students are learning mathematics, and they have opportunities to exhibit the eight mathematical practices.

The Collaborative Cards provide students with opportunities to develop proficiency in the eight mathematical practices. Students solve problems, discuss strategies, and reason mathematically (Mathematical Practices 1–3). They work with patterns and apply them in various contexts (Mathematical Practices 7–8). They determine whether to calculate problems mentally or use paper and pencil (Mathematical Practice 5). By attending to the use of appropriate vocabulary and the accuracy of their responses, they are attending to precision (Mathematical Practice 6). They use equations to model problem situations (Mathematical Practice 4).

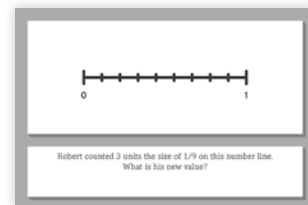
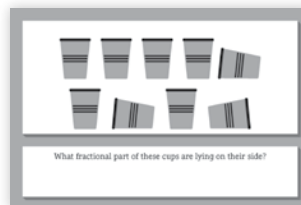
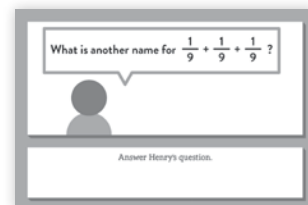
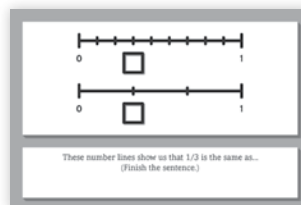
The Collaborative Cards provide teachers with insights into what individual students truly understand. As they apply their knowledge in new contexts, students use what they know. As one fifth-grade teacher in Grafton, Massachusetts stated, “I gained insights into my students’ misconceptions. These cards are an easy way to learn about students’ strengths.”

NUMBER AND OPERATIONS – FRACTIONS: GRADE 3

The Grade 3 deck of cards focuses on the fraction standards laid out on page 24 of the Common Core State Standards for Mathematics. This deck presents opportunities for students to connect partitioning shapes with unit fractions (fractions having a numerator of 1), view fractions as distances on a number line, and work with the idea that equivalent fractions represent the same point on a number line. The Common Core emphasizes the use of the number line. Just as whole numbers can be represented as locations on a number line, so can fractions. Thus, the number line serves as a tool to help students realize that fractions are indeed part of our number system.

The Common Core begins the formal study of fractions in Grade 3 by emphasizing unit fractions coupled with the knowledge of the number of parts needed to make a whole. Given a rectangle partitioned into four equal sections, one such section can be represented as $\frac{1}{4}$ and 4 sections create the whole. Consequently, students do not need to consider “proper and improper” fractions at this time. Student can interpret $\frac{7}{3}$ as 7 parts, when the whole is composed of 3 equal parts.

Here is one group of four cards from the Grade 3 Fractions deck:



Students who have these cards are asked to connect fractions as parts of a whole to their location on a number line. The first card in this group of four illustrates fraction equivalence by showing that $\frac{1}{3}$ and $\frac{3}{9}$ are located at the same point on number lines of equal length. Consider extending the task by presenting two number lines that are not of equal length, with each showing $\frac{1}{4}$. Students should recognize that the whole must be the same for the fractional parts to be equivalent.

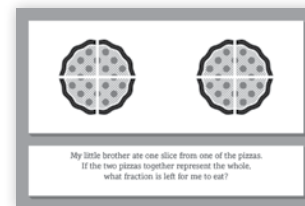
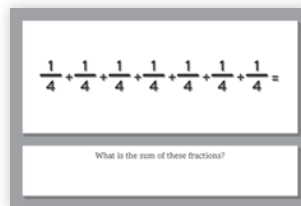
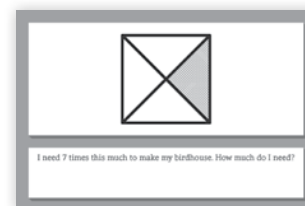
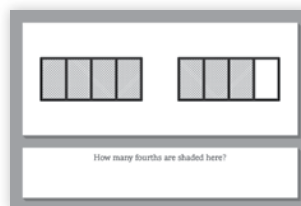
In some cases, students may not have studied a particular topic. In the process of finding their group, many students learn from each other. This opportunity initiates thinking upon which students can build in the future.

Answers for the Grade 3 Fractions deck are provided on pages 10–12 of this guide.

NUMBER AND OPERATIONS – FRACTIONS: GRADE 4

The Grade 4 deck focuses on the fraction standards laid out on pages 30–31 of the Common Core State Standards for Mathematics. In Grade 4, students build on the understanding of unit fractions they gained in Grade 3 by focusing on equivalent fractions. They come to understand that they can create equivalent fractions by multiplying both the numerator and denominator by the same value.

Here is one group of four cards from the Grade 4 Fractions deck:



In Grade 4, students continue to use a variety of models to represent equivalent fractions, such as line diagrams and area models. As seen in the set of four cards preceding, each card has the same answer, $7/4$. Students are presented with different representations of this quantity. Their job, after they have found their group, is to determine exactly why each of these representations is equivalent.

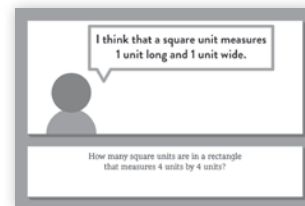
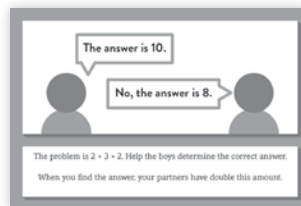
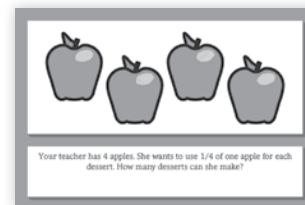
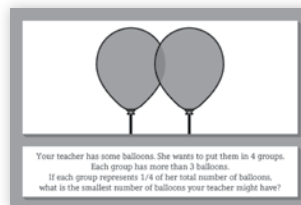
Students in Grade 4 also study the connection between fractions and decimal fractions by focusing on the denominators 10 and 100. They compare two decimals by focusing on the size of the decimal.

Answers for the Grade 4 Fractions deck are provided on pages 13–15 of this guide.

NUMBER AND OPERATIONS – FRACTIONS: GRADE 5

The Grade 5 deck focuses on the fraction standards laid out on pages 36–37 of the Common Core State Standards for Mathematics. In Grade 5, students use equivalent fractions to add and subtract, and they apply previous knowledge about multiplication and division to working with fractions. Students make the connection that a fraction is an equivalent representation of a numerator being divided by the denominator. Students also work with division of a whole number by a unit fraction and a unit fraction by a whole number. Students work with these skills in the context of solving problems.

Here is one group of four cards from the Grade 5 Fractions deck:



The cards in this group illustrate the concept of division of a whole number by a fraction. Students work to make sense of the situation to arrive at the solution. Once they have formed their group, students can compare the cards and make connections among the various situations.

Answers for the Grade 5 Fractions deck are provided on pages 16–18 of this guide.

VISIT DIDAX.COM/CCCC ...

For the following important resources:

- A complete bibliography and links to research that informed this product
- A complete correlation to the Common Core State Standards for each grade-level deck
- Meaningful tasks to be used at each grade level (once students have used the Common Core Collaborative Cards to form their groups)

ADDITIONAL MEANINGFUL TASKS

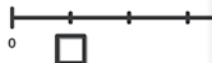
One of the best sources of meaningful tasks related to the Common Core is the book *NCSM: Great Tasks for Mathematics (K-5)* by Connie Schrock, Kit Norris, David K. Pugalee, Richard Seitz, and Fred Hollingshead. (National Council of Supervisors of Mathematics, 2013, ISBN: 978-0-9890765-0-0.)

GRADE 3 GROUPINGS

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/ccsc.

ANSWER
1/4

one-fourth



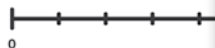
What is this value written as a fraction?

What fraction represents the shaded circle?

What number should go in the box?

What part of the circle is not shaded?

ANSWER
1/5



There are 5 marbles in the bag.
Susie reached in and took one marble from the bag.
What fraction represents the amount Susie took?

What size is each unit on this number line?

What part of this rectangle is shaded?

What fraction represents the shaded circle in the set?

ANSWER
1/3



What unit fraction is represented by the shaded part of the rectangle?
Your team has an equivalent fraction.

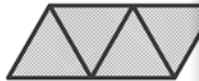
Sharon has three kittens. Two are black and white, and one is white.
What fraction of the kittens is white?

What value should go in the box?

What part of the rectangle is shaded?

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/ccsc.

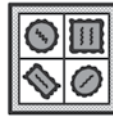
GRADE 3 GROUPINGS



This shape has 4 triangles.
All of them are shaded.
What fraction represents the shaded part?



What fraction of this rectangle is shaded?



A box contained four chocolates.
Henry ate the entire box of chocolates.
What fraction represents how much Henry ate?



ANSWER
4/4

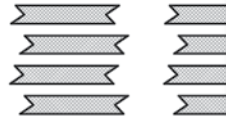
What fraction should go in the box?

one-eighth

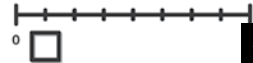
What is this value written as a fraction?



How much of the rectangle is shaded?



Mrs. Wilson cut a long ribbon into 8 pieces.
She gave one of the pieces to Ramon.
What part of the ribbon did she give to Ramon?

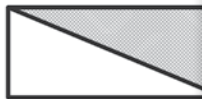


ANSWER
1/8

What fraction should be placed in the box?

one-half

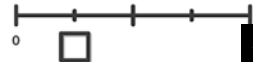
What is this value written as a fraction?



How much of the rectangle is shaded?



My brother shared his pizza with me.
The pizza was cut into 6 slices, and he gave me one slice.
How much of the pizza did my brother give me?
(Your partners have the same solution written as a fraction.)



ANSWER
1/2

What fraction should go in this box?

GRADE 3 GROUPINGS

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/cccs.

ANSWER
3/4



How much of this rectangle would we have if we combined 3 units the size of $\frac{1}{4}$?



What fraction should be placed in the box?

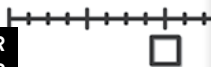
three-fourth

What is this value written as a fraction?

$$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} =$$

Solve this equation.

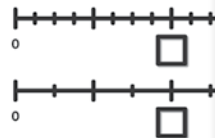
ANSWER
8/4 or 2



What fraction goes in this box?



How many whole pies are there? How can we write this as a fraction?



What fractions go in the boxes? Are these fractions equivalent? How do you know?

Your partners have the values in these boxes.



Mom has two candy bars. She says that I can have them both! How can we write this as a fraction?

ANSWER
3/9



These number lines show us that $\frac{1}{3}$ is the same as $\frac{3}{9}$. (Finish the sentence.)

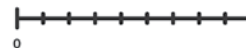
What is another name for $\frac{1}{9} + \frac{1}{9}$?



Answer Henry's question.



What fractional part of these cups are lying on their sides?



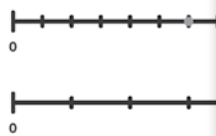
Robert counted 3 units the size of $\frac{1}{9}$ on this number line. What is his new value?

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/cccc.

GRADE 4 GROUPINGS



What fraction is represented by the shaded



What is another name for this fraction when it has a denominator of 4?

$$\frac{5}{4} - \frac{2}{4} =$$

Solve this equation.



Find the sum of these fractions.

ANSWER
3/4



Mom cut the pizza into 8 slices. I ate one slice and my brother ate 2 slices. How much of the pizza did we eat?

$$3 \text{ times } \frac{1}{8}$$

What value is this?

$$\frac{2}{8} + \frac{1}{8} =$$

What is the sum of these two fractions?



What is the sum of the shaded amounts on these two number lines?
Question for your group: How do you know that your sum is correct?

ANSWER
3/8

0.7

What is this value as a fraction?

7 multiplied by

What value is this?

$$\frac{3}{10} + \frac{1}{10} + \frac{3}{10}$$

Solve this equation.



Name the fraction represented by the shaded regions.

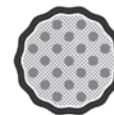
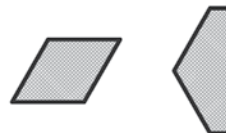
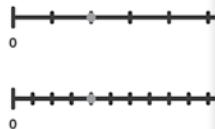
ANSWER
7/10

GRADE 4 GROUPINGS

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/ccsc.

ANSWER
1/3

$$\frac{5}{15} \text{ and } \frac{2}{6}$$



Find the unit fraction that is equivalent to both of

Are these fractions equal?

The rhombus covers how much of the

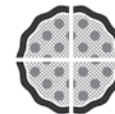
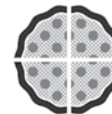
Jerry ate $\frac{2}{3}$ of the pizza. How much did he leave for me to eat?

If yes, what unit fraction is equivalent to both of

ANSWER
7/4



$$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$$



How many fourths are shaded here

I need 7 times this much to make my birdhouse. How

What is the sum of these fractions

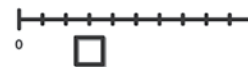
My little brother ate one slice from one of the pizzas.
If the two pizzas together represent the whole,
what fraction is left for me to eat?

ANSWER
3/10

0.3

3 multiplied by

3 divided by 1



State this decimal as a fraction.

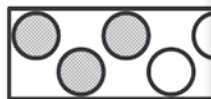
Represent this value as a fraction

Represent this as a fraction.

What value should be placed in this box?

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/ccsc.

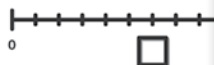
GRADE 4 GROUPINGS



What fraction of the circles is shaded?

3 times $\frac{1}{5}$

Represent this value as a fraction.



What value should be placed in this box?
Your partners have a fraction equivalent to $\frac{3}{5}$.



ANSWER
 $\frac{3}{5}$

Five friends are sharing 3 large sandwiches.
How much will each friend get to eat?

$\frac{3}{4} \times \frac{2}{2}$ is the same as $\frac{3}{4}$, because a number multiplied by 1 is the number.



If so, what is $\frac{3}{7} \div \frac{2}{2}$?

Find the value.

3 times $\frac{1}{7}$

State this value as a fraction.



Use the number line to determine the length of the shaded bar.

$\frac{3}{7}$ or $\frac{3}{4}$

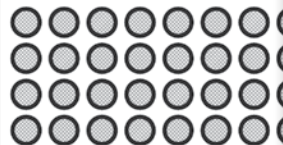
Which is closer to 0?

Explain how you know to your group.

ANSWER
 $\frac{3}{7}$

4.0 0.04
0.4 3.9

Select the largest value.



How much is $\frac{1}{10}$ of this amount?

25.1 10.34
8.6 4.00

Select the smallest value.



ANSWER
4

Your mom has \$40 dollars.
She says that you can have $\frac{1}{10}$ of that amount.
How much money is she going to give you?

GRADE 5 GROUPINGS

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/cccc.

ANSWER
12/4 or 3

$$\frac{3}{4} + \frac{3}{4} + \frac{3}{4} +$$



$$\frac{3}{4} \times 4 =$$



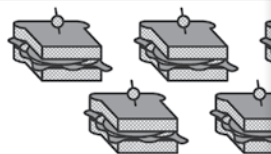
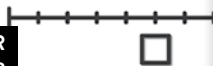
Solve this equation.

Mom brought four pizzas home. I was so hungry that I ate 1/4 of each pizza. How many whole pizzas were left for my family?

Solve this equation.

How much is shaded altogether?

ANSWER
5/8



$$\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$$

5 divided by 8

What fraction should go in the box?

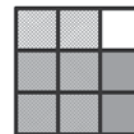
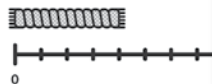
Eight friends shared five large sandwiches. How much of the 5 sandwiches did each friend get?

Solve this equation.

Express as a fraction.

ANSWER
4/9

4 multiplied by



Express as a fraction.

Nine friends want to share 4 pizzas. How much pizza will each friend be given?

Using this number line, how long is the distance from 0 to the shaded square?

Two-thirds of the columns are shaded. Two-thirds of the rows are shaded. What fraction of the total picture has both types of shading?

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/ccsc.

GRADE 5 GROUPINGS



How long would the shaded sections be if you put

$$\frac{20}{24}$$

Find the equivalent fraction that has the smallest



Six friends want to share 5 candy bars.
How much of a candy bar will each friend

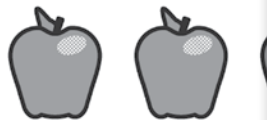
$$\frac{5}{6} \times \frac{3}{3} =$$

ANSWER
5/6

Solve this equation.

$$\frac{2}{3} + \frac{2}{3} + \frac{2}{3}$$

Solve this equation.



My brother had three apples. I ate 1/3 of each.
How many apples did my brother have

$$\frac{2}{3} \times 3$$

Express as a fraction.



ANSWER
6/3 or 2

There are 4 windows here.

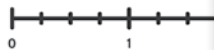
How many windows can we make using just the shaded parts?

$$3 \text{ times } \frac{1}{4}$$

Express this value in its simplest form.



Four teachers are presenting their lesson.
They have 3 hours to do this.
How long will each teacher have if they share the



What is 0.75 as a fraction?
Show your group where this fraction is located on

$$\frac{30}{40}$$

Find the equivalent fraction with the smallest denominator.

ANSWER
3/4

GRADE 5 GROUPINGS

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/cccc.

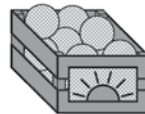
ANSWER
20



Marie has 4 pieces of cloth. She wants to make dolls using $\frac{1}{5}$ of a piece for each doll. How many dolls can she make with these pieces? Be ready to share your strategy with your group.



Brian has some baseball cards. He wants to put them into 4 equal piles. Each pile represents $\frac{1}{5}$ of his cards. What is the smallest number of baseball cards that he can have? Discuss with your group: Are there different answers?

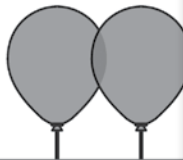


An orange grower is packaging the fruit to send to customers. He has 360 oranges to put in 18 crates. How many oranges will be in each crate?

$$2 \text{ times } \left[\frac{1}{2} \times 20 \right]$$

Express this value in its simplest form.

ANSWER
16



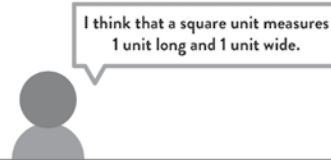
Your teacher has some balloons. She wants to put them into 4 equal groups. Each group has more than 3 balloons. If each group represents $\frac{1}{4}$ of her total number of balloons, what is the smallest number of balloons your teacher could have?



Your teacher has 4 apples. She wants to use $\frac{1}{4}$ of an apple for each dessert. How many desserts can she make?

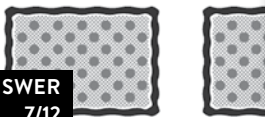


The problem is $2 \times 3 \times 2$. Help the boys determine the correct answer. When you find the answer, your partners have to explain how they got it.

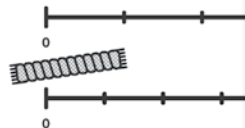


How many square units are in a rectangle that measures 4 units by 4 units?

ANSWER
 $\frac{7}{12}$



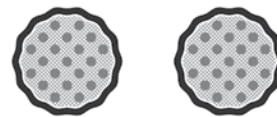
Terry brought home two rectangular pizzas to share with his friends. The two pizzas were the same size. Terry was so hungry that he ate $\frac{1}{4}$ of the first pizza. His brother Barry then ate $\frac{1}{4}$ of the second pizza. How much of the pizza did Terry and Barry eat together?



The rope is the same length as one unit from each end. How long is the rope?

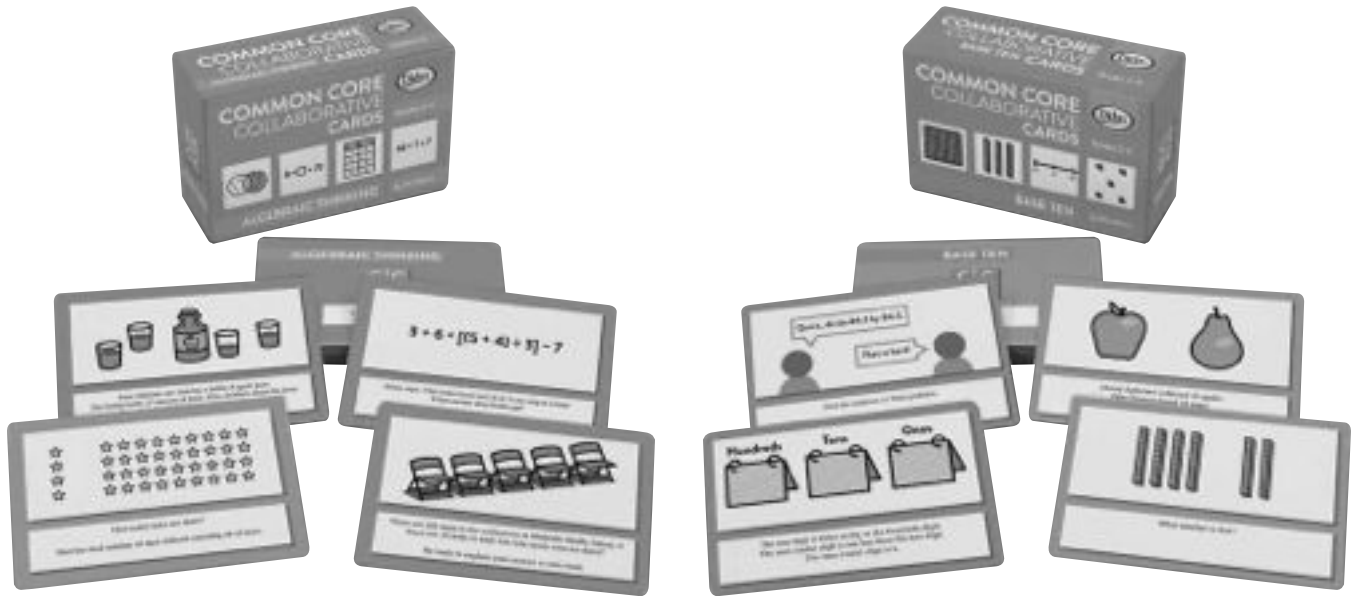
$$3 \text{ times } \frac{1}{12} + 4 \text{ times } \frac{1}{12}$$

Express this value in its simplest form.



Deval invited 11 friends to his house to have pizza. Deval's mother purchased 7 pizzas for the boys to share. How much pizza will each of the 12 boys get to have?

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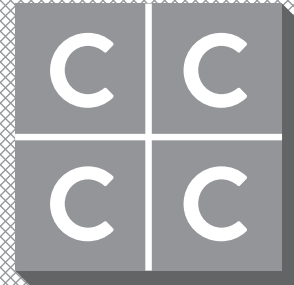
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FRACTIONS

TEACHER GUIDE



Practice and reinforce the content from the Common Core State Standards with these innovative activity cards.

Created using the standards in the Number and Operations – Fractions domain, these cards actively engage students in problem solving and promote mathematical discussion. Students solve the question on their individual card and then look for others who have the same solution. The students holding cards with the same answer form a group; the back of their cards show the role that each student will play as the group works on the next task. Based on the most recent research about the effectiveness of collaborative learning, and in accordance with the Common Core Mathematical Practices, these card sets can be used repeatedly to group students for an upcoming unit or problem-solving lesson. Cards can also be used for small-group instruction or as an independent activity. Each set includes 40 durable, two-color cards per grade level for a total of 120 cards. Teacher's Guide includes suggestions for classroom use, activities, and access to website with additional tasks and resources.



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