

Add and Subtract Mixed Numbers

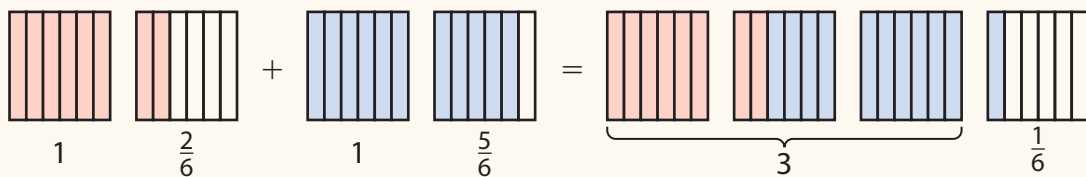


Dear Family,

This week your child is learning to add and subtract mixed numbers.

A mixed number is a number with a whole-number part and a fractional part.

Using models can help your child add mixed numbers, such as $1\frac{2}{6} + 1\frac{5}{6}$.



The model shows that you can add the wholes, $1 + 1 = 2$.

Then you can add the parts, $\frac{2}{6} + \frac{5}{6} = \frac{7}{6}$.

The fraction $\frac{7}{6}$ is another whole, $\frac{6}{6}$ or 1, and $\frac{1}{6}$.

The model shows the sum is 3 wholes and $\frac{1}{6}$ of a whole.

So, $1\frac{2}{6} + 1\frac{5}{6} = 3\frac{1}{6}$.

Invite your child to share what he or she knows about adding and subtracting mixed numbers by doing the following activity together.



ACTIVITY ADDING AND SUBTRACTING MIXED NUMBERS

Do this activity with your child to add and subtract mixed numbers.

Materials construction paper ($8\frac{1}{2} \times 11$ inches or 9×12 inches), magazine or newspaper with pictures (or a picture of your own), scissors, ruler, glue or tape

- Use a sheet of construction paper to make a paper frame for a fun photo. Choose a picture from a newspaper or a magazine or use a photo of your own. Choose a picture that is smaller than 5 inches by 8 inches.
- Measure the length and width of your picture to the nearest $\frac{1}{8}$ of an inch.
- Add 2 inches to the length and 2 inches to the width of your picture. That will be the size of the construction paper you need.

Example: The length of your picture is $5\frac{7}{8}$ inches. $5\frac{7}{8} + 2 = 7\frac{7}{8}$ inches
The width of your picture is $3\frac{3}{8}$ inches. $3\frac{3}{8} + 2 = 5\frac{3}{8}$ inches

- Subtract your totals from the construction paper's width and length. That is how many inches to cut off the length and width of the construction paper.
- Measure and cut your construction paper to size. Then center the photo and attach it so that there is a 2-inch frame all around the photo.

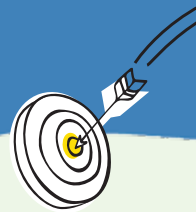


Look for other real-life opportunities to add and subtract mixed numbers with your child.



Explore Adding and Subtracting Mixed Numbers

Previously, you learned about adding and subtracting fractions. In this lesson, you will learn about adding and subtracting whole numbers and fractions. Use what you know to try to solve the problem below.



Learning Target

- Add and subtract mixed numbers with like denominators.

SMP 1, 2, 3, 4, 5, 6, 7



Raquel measures milk with a $\frac{1}{2}$ -cup measuring cup. She fills the cup 5 times and pours each $\frac{1}{2}$ of a cup of milk into a bowl. How much milk does Raquel pour into the bowl?



TRY IT



Math Toolkit

- fraction circles
- fraction tiles
- number lines 
- index cards
- fraction models 



DISCUSS IT

Ask your partner: How did you get started?

Tell your partner: I started by ...

CONNECT IT

1 LOOK BACK

Explain how you found the total amount of milk Raquel pours into the bowl.

2 LOOK AHEAD

Suppose Raquel has another bowl with $2\frac{3}{4}$ cups of milk. She then pours $1\frac{3}{4}$ cups of milk into this bowl. How much milk is in this bowl now?



The numbers $2\frac{3}{4}$ and $1\frac{3}{4}$ are **mixed numbers**.

Mixed numbers have a whole-number part and a fractional part. You can think of $2\frac{3}{4}$ as $2 + \frac{3}{4}$.

You can break apart numbers to add $2\frac{3}{4}$ and $1\frac{3}{4}$ in different ways.

- a. How can you decompose $2\frac{3}{4}$?
- b. How can you decompose $1\frac{3}{4}$?
- c. Write an addition equation to decompose $\frac{3}{4}$
- d. What are two different ways you can add $2\frac{3}{4}$ and $1\frac{3}{4}$?

Way 1:

Way 2:

3 REFLECT

How does decomposing numbers help you add mixed numbers?

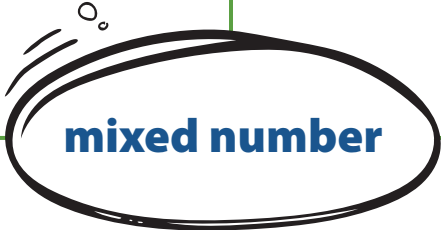
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Prepare for Adding and Subtracting Mixed Numbers

- 1 Think about what you know about mixed numbers. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.

In My Own Words	My Illustrations
Examples	Non-Examples


mixed number

- 2 a. Is $1\frac{2}{5}$ a mixed number? Explain.

- b. How can you decompose $1\frac{2}{5}$?

- 3 Solve the problem. Show your work.

Paco measures water with a $\frac{1}{4}$ -cup measuring cup. He fills the cup 7 times and pours each $\frac{1}{4}$ of a cup of water into a bowl. How much water does Paco pour into the bowl?

Solution

- 4 Check your answer. Show your work.



Develop Adding Mixed Numbers



Read and try to solve the problem below.

Markers come in boxes of 8. For an art project, one group of students uses $1\frac{5}{8}$ boxes of markers, and another group uses $1\frac{6}{8}$ boxes. How many boxes of markers do the two groups use altogether?

TRY IT



Math Toolkit

- fraction circles
- fraction tiles
- number lines 
- index cards
- fraction models 



DISCUSS IT

Ask your partner: Why did you choose that strategy?

Tell your partner: At first, I thought . . .

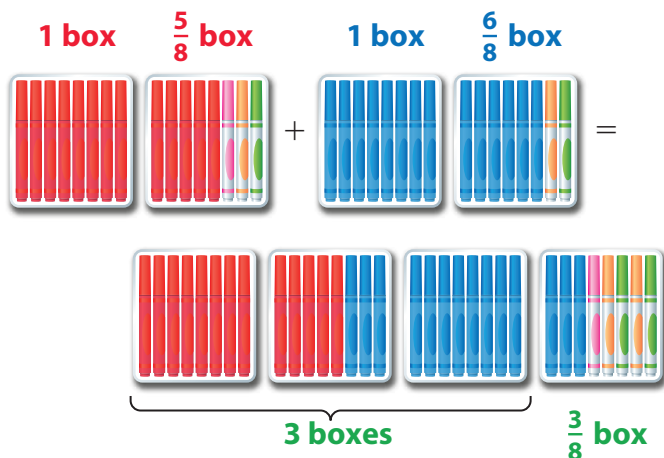
Explore different ways to understand adding mixed numbers.

Markers come in boxes of 8. For an art project, one group of students uses $1\frac{5}{8}$ boxes of markers, and another group uses $1\frac{6}{8}$ boxes. How many boxes of markers do the two groups use altogether?

PICTURE IT

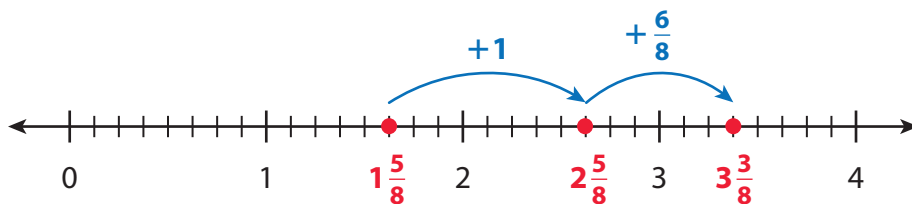
You can use pictures to help add mixed numbers.

The picture shows the boxes of markers. Each marker is $\frac{1}{8}$ of the whole box.



MODEL IT

You can also use a number line to help add mixed numbers.



Remember that 1 whole box is 8 markers, or $\frac{8}{8}$ of a box.



CONNECT IT

Now you will use the problem from the previous page to help you understand how to add mixed numbers.

- 1 What is the sum of just the whole-number parts of $1\frac{5}{8}$ and $1\frac{6}{8}$?
- 2 What is the sum of just the fractional parts of $1\frac{5}{8}$ and $1\frac{6}{8}$?
- 3 Think about how many wholes are in $\frac{11}{8}$ and how many extra eighths there are.

Complete the equations below.

$$\frac{11}{8} = \frac{8}{8} + \frac{\square}{8} \quad \frac{8}{8} = \dots\dots\dots \quad \text{So, } \frac{11}{8} = 1 + \frac{\square}{8}.$$

- 4 Now add the sum of the whole numbers to the sum of the fractions.

$$2 + 1 + \frac{3}{8} = \dots\dots\dots$$

- 5 Explain how you add mixed numbers.

6 REFLECT

Look back at your **Try It**, strategies by classmates, and **Picture It** and **Model It**. Which models or strategies do you like best for adding mixed numbers? Explain.

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APPLY IT

Use what you just learned to solve these problems.

- 7 Mrs. Suarez sells pies at a fair. She sells $3\frac{5}{6}$ pies the first day and $1\frac{3}{6}$ pies the second day. How many pies does she sell in all? Show your work.



Solution

- 8 Show two different ways to add $3\frac{2}{5} + 2\frac{1}{5}$. Show your work.
- 9 Beth goes on vacation for $4\frac{1}{2}$ days in June and $8\frac{1}{2}$ days in July. How many days is Beth on vacation in June and July altogether? Show your work.

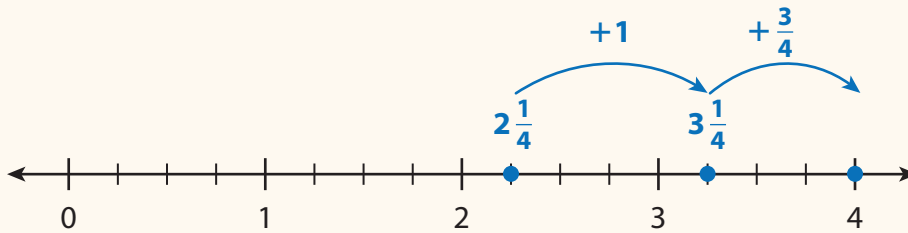
Solution

Practice Adding Mixed Numbers

Study the Example showing a way to add mixed numbers.
Then solve problems 1–5.

EXAMPLE

Aaron uses $2\frac{1}{4}$ cups of flour to make muffins and another $1\frac{3}{4}$ cups of flour to make pancakes. How many cups of flour does he use altogether?



Find $2\frac{1}{4} + 1\frac{3}{4}$.

Add the whole numbers. $2 + 1 = 3$

Add the fractions. $\frac{1}{4} + \frac{3}{4} = \frac{4}{4}$, or 1

Add the two sums. $3 + 1 = 4$

Aaron uses 4 cups of flour.



1 Marissa uses $3\frac{1}{3}$ cups of oats to make oatmeal and $2\frac{1}{3}$ cups of oats to make snack bars. How many cups of oats does Marissa use in all?

a. Add the whole numbers.

b. Add the fractions.

c. Add the two sums.

Marissa uses cups of oats.

Vocabulary

mixed number a number with a whole-number part and a fractional part.

$2\frac{1}{4}$ and $1\frac{3}{4}$ are mixed numbers.

2 Draw and label a number line to show $1\frac{1}{4} + 2\frac{2}{4}$.

3 Tell whether each addition equation is *True* or *False*.

	True	False
$10\frac{2}{5} + 5\frac{1}{5} = 15\frac{3}{10}$	(A)	(B)
$5\frac{3}{8} + 3\frac{5}{8} = 9$	(C)	(D)
$8\frac{3}{4} + 1\frac{2}{4} = 9\frac{1}{4}$	(E)	(F)
$3\frac{2}{3} + 2\frac{1}{3} + 1 = 7$	(G)	(H)

4 Tim uses $4\frac{1}{2}$ cups of oranges, $3\frac{1}{2}$ cups of apples, and $5\frac{1}{2}$ cups of pears in a fruit salad. How many cups of fruit does Tim use altogether? Show your work.

Solution

5 Jerry and two friends take a trip together. Jerry drives $80\frac{7}{10}$ miles. Arthur drives $60\frac{5}{10}$ miles. Charlie drives $40\frac{8}{10}$ miles. How many miles do they drive in all? Show your work.

Solution

Develop Subtracting Mixed Numbers

Read and try to solve the problem below.



Ursula picks carrots and radishes from her garden. She picks $4\frac{1}{4}$ pounds of carrots and $1\frac{3}{4}$ pounds of radishes. How many more pounds of carrots does she pick than radishes?



TRY IT



Math Toolkit

- fraction circles
- fraction tiles
- number lines 
- index cards
- fraction models 



DISCUSS IT

Ask your partner: Do you agree with me? Why or why not?

Tell your partner: I agree with you about ... because ...

Explore different ways to understand subtracting mixed numbers.

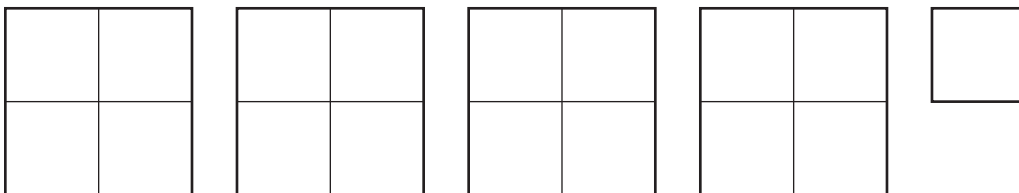


Ursula picks carrots and radishes from her garden. She picks $4\frac{1}{4}$ pounds of carrots and $1\frac{3}{4}$ pounds of radishes. How many more pounds of carrots does she pick than radishes?

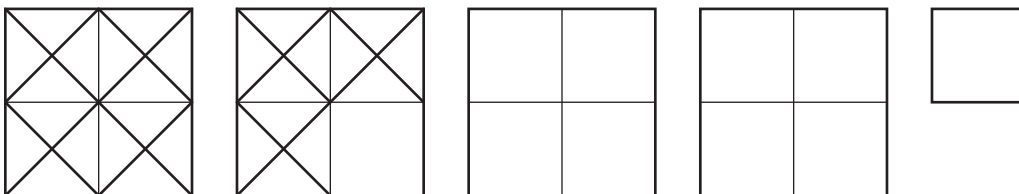
PICTURE IT

You can use a picture to help subtract mixed numbers.

This picture shows $4\frac{1}{4}$ pounds of carrots.



This picture shows $4\frac{1}{4}$ pounds of carrots minus $1\frac{3}{4}$ pounds of radishes.

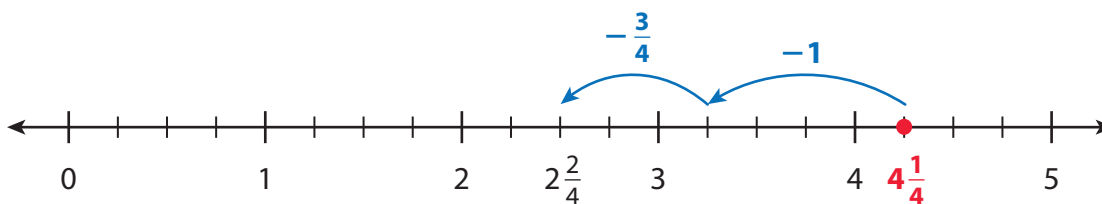


$$4\frac{1}{4} - 1\frac{3}{4} = ?$$

MODEL IT

You can also use a number line to help subtract mixed numbers.

To subtract using a number line, start at the number you are subtracting from and move left the amount you are subtracting.



CONNECT IT

Now you will use the problem from the previous page to help you understand how to subtract mixed numbers.

Find the difference: $4\frac{1}{4} - 1\frac{3}{4}$.

- 1 Complete the equations to write $4\frac{1}{4}$ as a fraction greater than 1.

$$4\frac{1}{4} = \frac{16}{\square} + \frac{1}{4} \qquad \text{So, } 4\frac{1}{4} = \frac{\square}{4}.$$

- 2 Complete the equations to write $1\frac{3}{4}$ as a fraction greater than 1.

$$1\frac{3}{4} = \frac{\square}{4} + \frac{3}{4} \qquad \text{So, } 1\frac{3}{4} = \frac{\square}{4}.$$

- 3 Subtract the fractions. Write an equation that shows the difference.

- 4 How many more pounds of carrots does Ursula pick than radishes?

- 5 Explain how you can use fractions greater than 1 to subtract mixed numbers.

6 REFLECT

Look back at your **Try It**, strategies by classmates, and **Picture It** and **Model It**. Which models or strategies do you like best for subtracting mixed numbers? Explain.

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APPLY IT

Use what you just learned to solve these problems.

- 7 Monica rides her bike $3\frac{1}{4}$ miles on Monday. She rides $2\frac{2}{4}$ miles on Tuesday. How much farther does Monica ride on Monday than on Tuesday? Show your work.

Solution

- 8 Look at problem 7. Monica wants to ride $8\frac{2}{4}$ miles in all. How many more miles does she need to ride? Show your work.

Solution

- 9 What is the difference of $8\frac{1}{3}$ and $5\frac{2}{3}$? Write your answer as a fraction and a mixed number. Show your work.

Solution

Practice Subtracting Mixed Numbers

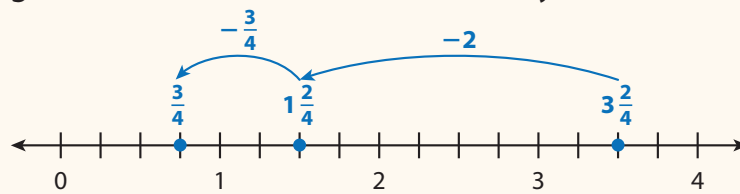
Study the Example showing a way to subtract mixed numbers.
Then solve problems 1–7.

EXAMPLE

On a holiday, Sara's family drives $3\frac{2}{4}$ hours to her cousin's house. The drive usually takes $2\frac{3}{4}$ hours. How much longer does the drive take on the holiday?

Find $3\frac{2}{4} - 2\frac{3}{4}$.

$$3\frac{2}{4} - 2\frac{3}{4} = \frac{3}{4}$$



The drive takes $\frac{3}{4}$ of an hour longer on the holiday.

Steve makes $9\frac{3}{6}$ cups of pancake batter on a weekend camping trip.
He uses $3\frac{4}{6}$ cups of batter for breakfast on Saturday.

- 1 Write each mixed number as a fraction greater than one.

$$9\frac{3}{6} = \frac{\square}{6} + \frac{3}{6} = \frac{\square}{6}$$

$$3\frac{4}{6} = \frac{\square}{6} + \frac{4}{6} = \frac{\square}{6}$$

- 2 Subtract the fractions to find how many cups of batter are left for breakfast on Sunday.

$$\frac{\square}{6} - \frac{\square}{6} = \frac{\square}{6}$$

- 3 Write the difference as a mixed number.

$$\frac{\square}{6} = \square \frac{\square}{\square}$$

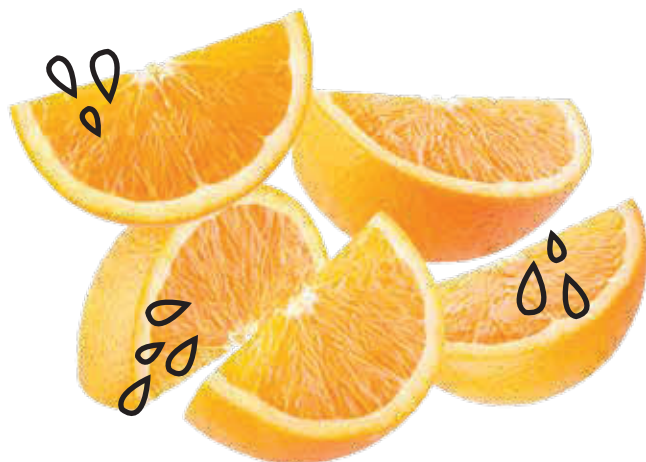
- 4 Use addition to check the answer.

$$3\frac{4}{6} + \square \frac{\square}{\square} = \dots\dots\dots$$



- 5 Which expressions have the same value as $7\frac{5}{6} - 2\frac{3}{6}$?
- Ⓐ $10\frac{2}{6}$
- Ⓑ $\frac{47}{6} - \frac{15}{6}$
- Ⓒ $(7 - 2) + (\frac{5}{6} - \frac{3}{6})$
- Ⓓ $5\frac{2}{6}$
- Ⓔ $9\frac{2}{6}$

- 6 Helen buys 5 pounds of oranges. She slices $2\frac{3}{10}$ pounds of oranges to bring to a party. How many pounds of oranges does Helen have left that are not sliced? Show your work.



Solution

- 7 Kira reasons that $6\frac{1}{4} - 2\frac{3}{4} = 4\frac{2}{4}$ because the difference between 6 and 2 is 4 and the difference between $\frac{1}{4}$ and $\frac{3}{4}$ is $\frac{2}{4}$. Is Kira's reasoning correct? Explain.

Refine Adding and Subtracting Mixed Numbers

Complete the Example below. Then solve problems 1–9.

EXAMPLE

A soccer team drinks $5\frac{2}{3}$ liters of water during a game. Their opponents drink $4\frac{2}{3}$ liters of water. How much water do both teams drink?

Look at how you could show your work using pictures.



Solution

The student added the whole numbers and then combined the fractions!



PAIR/SHARE

How could you use a number line to help you solve this problem?

APPLY IT

- Kelly buys $4\frac{7}{8}$ pounds of apples and $2\frac{3}{8}$ pounds of oranges. How many pounds of fruit does she buy altogether? Show your work.

Solution

What operation do you need to use?

PAIR/SHARE

Is there one way that works the best to solve this problem?

- 2 Kari reads a total of $20\frac{2}{4}$ pages in her science and social studies books combined. She reads $12\frac{3}{4}$ pages in her science book. How many pages does she read in her social studies book? Show your work.

Sometimes counting up or back can help you solve problems like this.



Solution

- 3 Which of the following shows a correct way to find $15\frac{4}{5} - 9\frac{3}{5}$?
- A Subtract the whole numbers and then subtract the fractions. Subtract the differences.
 - B Add the whole numbers and then add the fractions. Subtract the sums.
 - C Subtract the whole numbers and then subtract the fractions. Add the differences.
 - D Write the mixed numbers as fractions greater than one. Then add the fractions.

Marella chose A as the correct answer. Did she do each step correctly? Explain.

PAIR/SHARE

How can you tell if your answer is reasonable?

Solve the problem on your own and then check for your answer!

PAIR/SHARE

Draw a model to check your answer.

- 4 Ella orders 16 pizzas for a party. There are $3\frac{5}{8}$ pizzas left after the party. How many pizzas are eaten?
- (A) $12\frac{3}{8}$
(B) $13\frac{3}{8}$
(C) $13\frac{5}{8}$
(D) $19\frac{5}{8}$
- 5 Shawn works in his yard for $3\frac{5}{6}$ hours on Saturday. He works another $4\frac{1}{6}$ hours in his yard on Sunday. How many hours does he work in the yard in all?
- (A) $\frac{2}{6}$ of an hour
(B) 7 hours
(C) $7\frac{5}{6}$ hours
(D) 8 hours
- 6 Four friends share 3 orders of chicken wings.
- Alex eats $\frac{5}{8}$ of an order.
 - Chase eats $\frac{7}{8}$ of an order.
 - Ella eats $\frac{6}{8}$ of an order.



How much of an order of chicken wings is left for the fourth friend?

Solution

- 7 Marnel uses $4\frac{2}{3}$ cups of cereal and $3\frac{1}{3}$ cups of marshmallows to make cereal bars. How many more cups of cereal does Marnel use than marshmallows? Show your work.



Solution

- 8 Kieran runs the first part of a relay in $4\frac{4}{6}$ minutes. David runs the next part in $3\frac{5}{6}$ minutes. How long do they take to run both parts of the relay? Show your work.

Solution

9 MATH JOURNAL

Show two ways to add $2\frac{3}{8} + 3\frac{4}{8}$.



SELF CHECK Go back to the Unit 4 Opener and see what you can check off.