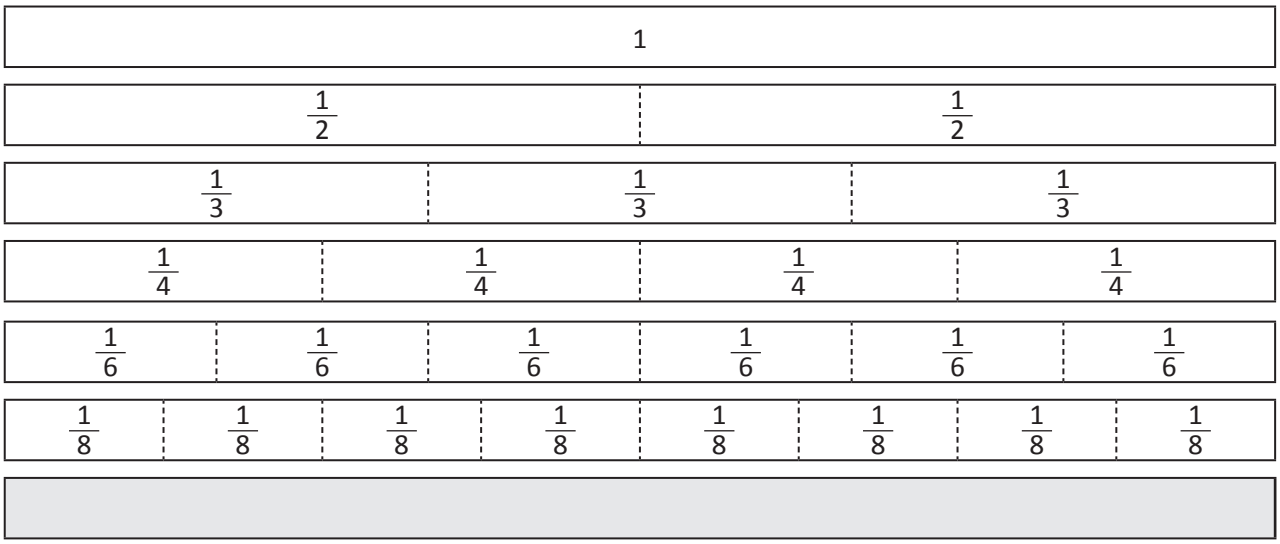
Fractions – equivalent fractions

Equivalent fractions have the same value but they have different denominators.
This means they have been divided into a different number of parts.



1 **Use the wall to find the equivalent fractions:**

a What fractions can you find that are equivalent to $\frac{2}{3}$? _____

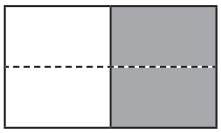
b What fractions can you find that are equivalent to $\frac{3}{4}$? _____

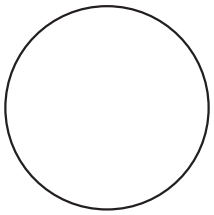
c How many eighths are equivalent to $\frac{1}{2}$? _____

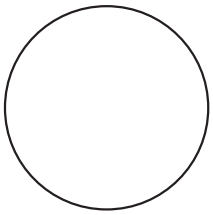
d How many quarters are equivalent to $\frac{4}{8}$? _____

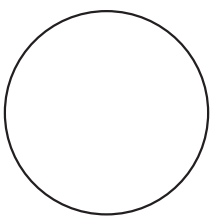
e Divide the bottom row into twelfths. Find some equivalent fractions for $\frac{4}{12}$. _____

2 **Divide and shade the shapes to show the following equivalent fractions. The first one has been done for you.**

a $\frac{1}{2} = \frac{2}{4}$ 

b $\frac{1}{4} = \frac{2}{8}$ 

c $\frac{3}{4} = \frac{6}{8}$ 

d $\frac{1}{2} = \frac{2}{4}$ 

e $\frac{1}{4} = \frac{2}{8}$ 

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Fractions – equivalent fractions

To find equivalent fractions without drawing diagrams we use the numerators and denominators to guide us.

Imagine your share of a cake is half. It is too big to pick up so you cut your half into halves. You now have 2 quarters of the cake.

You have doubled the number of parts (the denominator) and by doing this you have doubled the number of parts (the numerator).

This method can be used to find all equivalent fractions.

$\frac{1}{2} = \frac{\boxed{2}}{4}$ (× 2 above, × 2 below)

3 **Use the clues to help you make the equivalent fractions:**

a $\frac{1}{3} = \frac{\square}{12}$ (× 4 above, × 4 below)

b $\frac{1}{2} = \frac{3}{\square}$ (× 3 above, × 3 below)

c $\frac{2}{3} = \frac{\square}{9}$ (× 3 above, × 3 below)

d $\frac{3}{8} = \frac{\square}{40}$ (× 5 above, × 5 below)

e $\frac{1}{3} = \frac{\square}{9}$

f $\frac{1}{4} = \frac{\square}{8}$

g $\frac{3}{4} = \frac{15}{\square}$

h $\frac{2}{4} = \frac{\square}{2}$

4 **We can also reduce the number of parts in a whole. We divide to do this:**

a $\frac{18}{24} = \frac{3}{\square}$ (÷ 6 above, ÷ 6 below)

b $\frac{9}{21} = \frac{3}{\square}$ (÷ 3 above, ÷ 3 below)

c $\frac{40}{48} = \frac{5}{\square}$ (÷ 8 above, ÷ 8 below)

d $\frac{12}{18} = \frac{\square}{3}$

e $\frac{12}{21} = \frac{4}{\square}$

f $\frac{25}{40} = \frac{\square}{8}$

5 **Answer the following:**

a Cassie's table of kids won a pizza for having the most table points at the end of term. There are 6 kids at the table. What fraction of the pizza will they each receive? $\frac{\square}{\square}$

b The pizza has been cut into 12 pieces. How many slices does each kid get? _____

What is this as a fraction? $\frac{\square}{\square}$

c Stavros reckons that because they got 2 slices they got more than they would have if the pizza had been cut into 6 pieces. Is he right? Explain your answer with words or diagrams.

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Fractions – mixed numerals and improper fractions

Mixed numerals are made up of whole numbers and fractions.

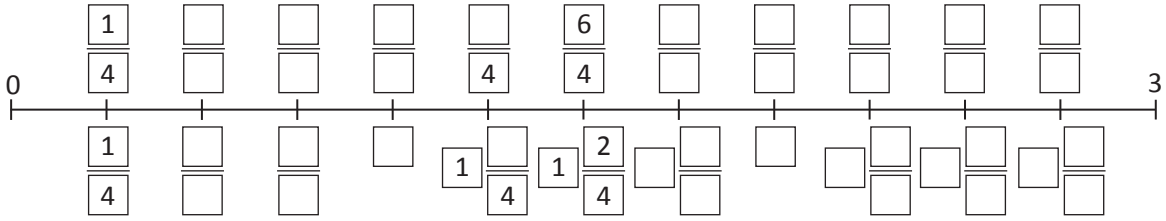
$2\frac{1}{2}$ is a mixed number.

Mixed numbers can also be expressed as improper fractions.

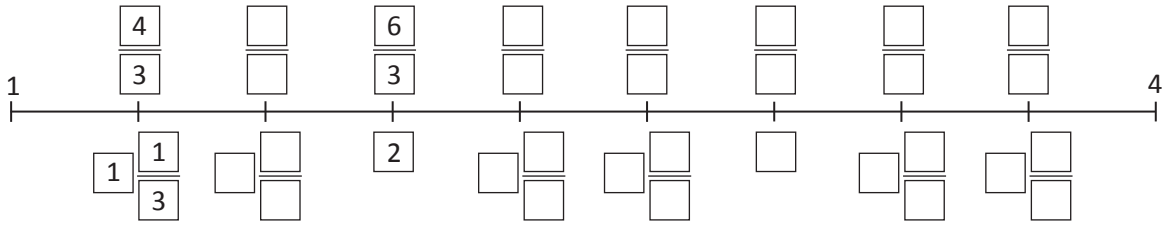
$2\frac{1}{2}$ can also be written as $\frac{5}{2}$.

1 **Complete the number lines by filling in the boxes:**

a



b



2 **Use the number lines above to help you find the mystery fractions. Score 5 points for a correct answer. Lose 3 points for a wrong answer. For some questions, more than 1 answer is correct. The first one has been done for you.**

My score

Q1 This improper fraction is equivalent to 2.

A1 $\frac{6}{3}$ or $\frac{8}{4}$

Q2 This improper fraction comes directly before $1\frac{2}{4}$.

A2 _____

Q3 This improper fraction is one third greater than $3\frac{1}{3}$.

A3 _____

Q4 This mixed numeral is the same as $\frac{10}{4}$.

A4 _____

Q5 This improper fraction is equivalent to 3.

A5 _____

Q6 This mixed numeral comes directly after $\frac{9}{3}$.

A6 _____

Q7 This improper fraction is equivalent to 4.

A7 _____

Q8 This improper fraction is equivalent to 6.

A8 _____

Q9 This improper fraction is equivalent to $2\frac{2}{3}$.

A9 _____

Q10 This mixed numeral is one third less than $\frac{8}{3}$.

A10 _____

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Fractions – simplifying fractions

These fractions are all equivalent to one half: $\frac{1}{2}$ $\frac{2}{4}$ $\frac{6}{12}$ $\frac{75}{150}$ $\frac{3455}{6910}$

Which is the simplest? $\frac{1}{2}$

A fraction is in its simplest form when 1 is the only number that both numbers can be divided by.
We simplify fractions to make reading and working with fractions easier.

1 **Circle the simplest fraction in each group:**

a $\frac{1}{2}$ $\frac{2}{4}$ $\frac{50}{100}$

b $\frac{33}{99}$ $\frac{3}{9}$ $\frac{1}{3}$

c $\frac{25}{100}$ $\frac{1}{4}$ $\frac{5}{20}$

d $\frac{2}{3}$ $\frac{6}{9}$ $\frac{16}{24}$

To find the simplest fraction, we divide both the numerator and the denominator by the same number. It makes sense for this to be the biggest number we can find so we don't have to keep dividing. This number is called the **Highest Common Factor (HCF)**.

Look at: $\frac{6}{18} = \frac{?}{?}$ What is the biggest number that goes into both 6 and 18?

6 is the biggest number that goes into 18 and 6.

$\frac{6 \div 6}{18 \div 6} = \frac{1}{3}$

2 **Find the highest common factor and then simplify:**

a $\frac{15}{20}$ HCF is $\square \rightarrow \frac{15 \div \square}{20 \div \square} = \frac{\square}{\square}$

b $\frac{9}{30}$ HCF is $\square \rightarrow \frac{9 \div \square}{30 \div \square} = \frac{\square}{\square}$

c $\frac{16}{24}$ HCF is $\square \rightarrow \frac{16 \div \square}{24 \div \square} = \frac{\square}{\square}$

d $\frac{12}{36}$ HCF is $\square \rightarrow \frac{12 \div \square}{36 \div \square} = \frac{\square}{\square}$

3 **Wally says he has simplified these fractions as far as he can. Is he right? If not, find the simplest fraction:**

a $\frac{16}{20} \rightarrow \frac{8}{10}$

b $\frac{50}{100} \rightarrow \frac{25}{50} \rightarrow \frac{5}{10}$

c $\frac{24}{36} \rightarrow \frac{4}{6}$

d $\frac{15}{20} \rightarrow \frac{3}{4}$

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Fractions – simplifying fractions

4 **Write the following fractions in their simplest form:**

a $\frac{28}{49} = \frac{\square}{\square}$ **b** $\frac{12}{20} = \frac{\square}{\square}$ **c** $\frac{24}{42} = \frac{\square}{\square}$ **d** $\frac{13}{39} = \frac{\square}{\square}$

e $\frac{32}{36} = \frac{\square}{\square}$ **f** $\frac{9}{15} = \frac{\square}{\square}$ **g** $\frac{16}{48} = \frac{\square}{\square}$ **h** $\frac{15}{55} = \frac{\square}{\square}$

If you are not sure what the HCF is, guess, check and improve is a useful strategy. Try your choice out and then look at your new fraction.

Could it be any simpler? Is 1 the ONLY number that could go into both the numerator and the denominator?

5 **Solve the following problems. Write your answers in the simplest form:**

a Luke scored $\frac{16}{20}$ on a test. What fraction was incorrect? $\frac{\square}{\square}$

b Marika scored $\frac{12}{20}$ on the same test. What fraction did she get right? $\frac{\square}{\square}$

c 25 out of the 75 kids in Year 6 ride their bikes to school. What fraction does this represent? $\frac{\square}{\square}$

d Out of the 26 students in 6F, 14 rate Maths as their favourite subject. What fraction is this? $\frac{\square}{\square}$

e What fraction did not choose Maths as their favourite subject? $\frac{\square}{\square}$

6 **Colour and match the fractions on the bottom row with their simplest form:**

$\frac{1}{2}$	$\frac{2}{3}$	$\frac{3}{5}$	$\frac{1}{9}$	$\frac{1}{4}$	$\frac{3}{4}$
$\frac{15}{20}$	$\frac{25}{100}$	$\frac{9}{81}$	$\frac{60}{100}$	$\frac{12}{18}$	$\frac{40}{80}$

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Fractions – comparing and ordering fractions

Comparing and ordering fractions with like denominators is a simple process:

When there are different denominators we need to rename the fractions so they have the same denominators. This lets us compare apples with apples.

Which is larger? $\frac{3}{4}$ or $\frac{5}{8}$

We know that $\frac{3}{4}$ is equivalent to $\frac{6}{8}$ so $\frac{3}{4}$ is larger than $\frac{5}{8}$

1 **Order these fractions:**

$1\frac{1}{2}$ $\frac{5}{4}$ $\frac{3}{4}$ $\frac{2}{4}$ $1\frac{3}{4}$ $\frac{1}{4}$ $\frac{4}{4}$

2 **Rename a fraction in each group so that you can compare them more easily. Circle the larger fraction:**

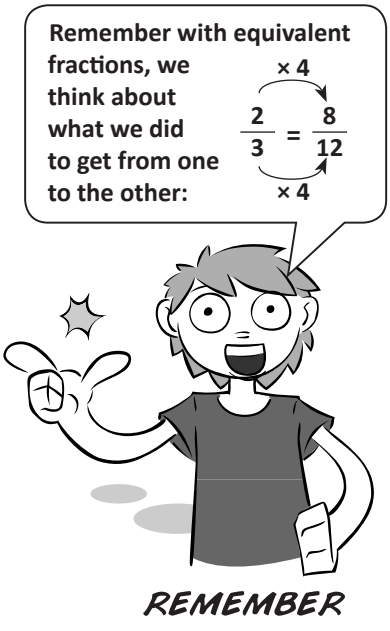
a $\frac{1}{2}$ $\frac{2}{8}$

b $\frac{4}{8}$ $\frac{3}{4}$

c $\frac{2}{6}$ $\frac{1}{2}$

d $\frac{10}{12}$ $\frac{3}{4}$

3 **Write or draw a fraction on the left that would result in the scale looking like this:**



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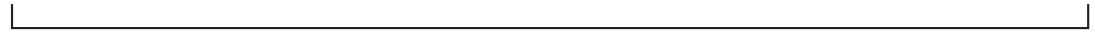
Fractions – comparing and ordering fractions

4 **Find a partner to play this game with:**

Name a fraction between 0 and 1 and place it on the number line. Your partner then has to name and place a fraction that fits between that fraction and 1. Then you have to find one that fits between their fraction and 1 and so on. The game continues until one player cannot think of a fraction, or can't fit one in.

You can challenge a fraction placement. If you are right, your partner has to remove their fraction. If you are wrong, they get to do the 'told you so' dance.



5 **These fractions are all out of order. Cut them out and put them in order from smallest to largest. Place any equivalent fractions on top of each other. There is a space for you to rename the fractions on each of the cards if this will help. Share your thinking with a partner.**

Have they ordered them the same way?

$\frac{1}{2} = \frac{\square}{16}$	$\frac{6}{8} = \frac{\square}{16}$	$\frac{1}{4} = \frac{\square}{16}$	$\frac{12}{16} = \frac{\square}{16}$	$\frac{13}{16} = \frac{\square}{16}$	$\frac{15}{16} = \frac{\square}{16}$
$\frac{10}{8} = \frac{\square}{16}$	$\frac{5}{8} = \frac{\square}{16}$	$\frac{10}{16} = \frac{\square}{16}$	$\frac{7}{8} = \frac{\square}{16}$	$\frac{2}{8} = \frac{\square}{16}$	$\frac{5}{16} = \frac{\square}{16}$

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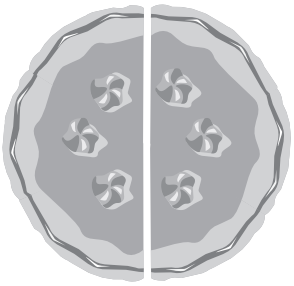
Fractions – renaming and ordering fractions

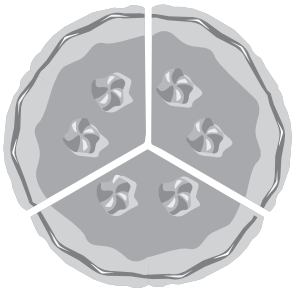
Sometimes we have to order and compare fractions with unrelated denominators such as $\frac{1}{4}$, $\frac{1}{6}$ and $\frac{1}{5}$.

To do this, we have to find one common denominator we can convert all the fractions to.

1 **You have 2 cakes for a class party. One has been cut into halves and one into thirds. The problem is that you want each slice to be a fair fraction of the cakes.**

a Continue cutting the cakes so that each cake has the same number of fair slices:

$\frac{1}{2}$ 

$\frac{1}{3}$ 

b If you had one of these new slices, what fraction of the cake would you receive? $\frac{\square}{\square}$

That is an example of how we rename fractions. We find a way to re-divide the wholes so that they have the **same number of parts**. To do this efficiently we find the smallest shared multiple. This is then called the **Lowest Common Denominator (LCD)**:

$\frac{1}{2}$ The multiples of 2 are 2, 4, **6**, 8, …

$\frac{1}{3}$ The multiples of 3 are 3, **6**, 9, 12, 15, …

6 is the LCD so we convert both fractions to sixths:

$\frac{1}{2} \overset{\times 3}{=} \frac{3}{6}$ $\qquad$ $\frac{1}{3} \overset{\times 2}{=} \frac{2}{6}$

2 **Rename these fractions by first finding the shared LCD and then converting the fractions. Use the multiplication table on the right to help you find the LCD:**

a $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{3}$ $\qquad$ $\frac{\square}{12}$ $\frac{\square}{\square}$ $\frac{\square}{\square}$

b $\frac{3}{6}$ $\frac{1}{2}$ $\frac{1}{3}$ $\qquad$ $\frac{\square}{\square}$ $\frac{\square}{\square}$ $\frac{\square}{\square}$

c $\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{6}$ $\qquad$ $\frac{\square}{\square}$ $\frac{\square}{\square}$ $\frac{\square}{\square}$

× 2	× 3	× 4	× 5	× 6
2	3	4	5	6
4	6	8	10	12
6	9	12	15	18
8	12	16	20	24
10	15	20	25	30
12	18	24	30	36
14	21	28	35	42
16	24	32	40	48
18	27	36	45	54

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Fractions – renaming and ordering fractions

3 **Look at each group of fractions. Predict which you think is the largest and circle your prediction. Now, rename the fractions in the work space below so that each fraction in the group has the same denominator. Use a different colour to circle the largest fraction. Are there any surprises?**

a $\frac{1}{2}$ $\frac{2}{3}$ $\frac{3}{9}$ **b** $\frac{2}{5}$ $\frac{1}{2}$ $\frac{1}{3}$ **c** $\frac{3}{4}$ $\frac{2}{3}$ $\frac{4}{8}$ **d** $\frac{3}{4}$ $\frac{3}{6}$ $\frac{3}{8}$

4 **This time, rename the fractions and circle the largest. Underline the smallest.**

a $\frac{3}{8}$ $\frac{2}{4}$ $\frac{5}{6}$ **b** $\frac{4}{7}$ $\frac{1}{2}$ $\frac{11}{14}$ **c** $\frac{1}{3}$ $\frac{5}{8}$ $\frac{4}{6}$ **d** $\frac{3}{4}$ $\frac{2}{3}$ $\frac{1}{2}$

5 **For each fraction write a larger fraction below. The new fraction must have a different denominator. It can have a different numerator.**

$\frac{1}{2}$ $\frac{1}{3}$ $\frac{2}{3}$ $\frac{4}{5}$ $\frac{9}{15}$

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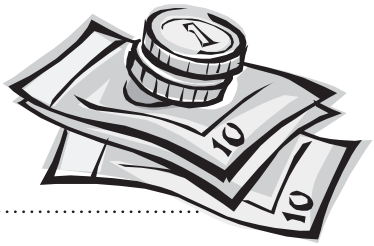
Spend and save — solve

Getting ready

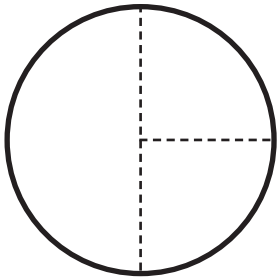
In this activity you will solve money problems. Working backwards is a useful maths working strategy to use here.

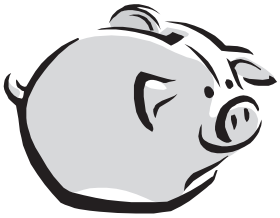


What to do

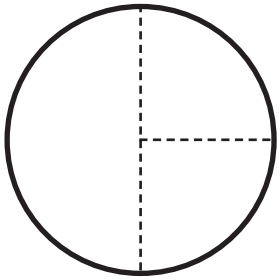
Use the fraction pies to help you solve the following problems:

Sarah's gran gave her some money for her birthday. Sarah saved $\frac{1}{2}$ of the money and spent $\frac{1}{4}$ of the money on a book. That left her with $15 in her purse. How much money did her Gran give her?

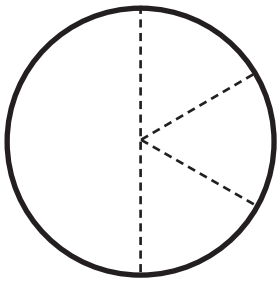




Martha opened her piggy bank and decided to spend it this way: $\frac{1}{2}$ on magazines; $\frac{1}{4}$ on snacks; $\frac{1}{4}$ on a necklace. The necklace cost $12. How much money did she have in her piggy bank?



Ali went to the show. He spent $\frac{1}{2}$ of his money on rides and $\frac{1}{3}$ of what was left on a dagwood dog, some chips and some fairy floss. That left him with $28 to spend on show bags. How much money did he have to begin with?



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Trick or treat! apply

Getting ready

Sam and his mates decide to go trick or treating one Halloween. They then divvy up the loot.

Total
50 mini chocolate bars
18 gob stoppers
16 Chuppa Chups
12 Wizz Fizzes
4 all day suckers
2 Easter eggs
1 turnip

What to do

Use the chart on the right to work out the answers to the problems below:

a In the opening round, Sam gets $\frac{2}{5}$ of the mini chocolate bars and $\frac{1}{4}$ of the Chuppa Chups. How many of each does he get?

b George wanted all the gob stoppers. In a tense negotiation with Sam, he managed to score $\frac{2}{3}$ of them. How many did he get? How many did he miss out on?

c To get his share of the gobstoppers, Sam has to trade off $\frac{1}{2}$ of the Chuppa Chups he received in Question **a**. How many does he lose?

d Mara gets all the Wizz Fizzes, $\frac{1}{2}$ the all day suckers, and the remaining $\frac{3}{5}$ of the chocolate bars. In total, how many items does she get?

e Here is a fraction sentence that shows how the gob stoppers were shared: $\frac{1}{3} + \frac{2}{3} = \frac{3}{3}$ or 1 whole. Write the fraction sentence that shows how the chocolate bars were shared.

f Mara decides to give $\frac{1}{4}$ of her Wizz Fizzes to George. Write the fraction sentence to show how many she has left. Now, write the sentence using whole numbers.

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