Released January 2018

Years 5/6

Small Steps Guidance and Examples

Block 1 – Fractions

White Rose Maths

Year 5/6 – Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number – Place Value			Number – Addition and Subtraction		Number – Multiplication and Division			Statistics		Measurement: Perimeter, Area and Volume	
Spring	Number – Fractions					Number- Decimals and Percentages				Year 5: Multiplication and Division Year 6: Algebra and Ratio		
Summer	Measurement: Converting Units		Geometry: Position and Direction	Geometry: Properties of Shape			Investigations					Consolidation

Overview

Small Steps

Year 5	Year 6
Equivalent fractions	Simplify fractions
Improper fractions to mixed numbers	
Mixed numbers to improper fractions	
Number sequences	Fractions on a number line
Compare and order fractions less than 1	Compare and order (denominator)
Compare and order fractions greater than 1	Compare and order (numerator)
Add and subtract fractions	Add & subtract fractions (1)
Add fractions within 1	Add & subtract fractions (2)
Add 3 or more fractions	Adding fractions
Add fractions	
Add mixed numbers	
Subtract fractions	Subtracting fractions
Subtract mixed numbers	
Subtract – breaking the whole	

Overview

Small Steps

	Year 5	Year 6
1	Subtract 2 mixed numbers	Mixed addition and subtraction
2	Multiply unit fractions by an integer	Multiply fractions by integers
3	Multiply non-unit fractions by an integer	Multiply fractions by fractions
4	Multiply mixed numbers by integers	
5		Divide fractions by integers (1)
6		Divide fractions by integers (2)
7		Four rules with fractions
8	Fraction of an amount	Fraction of an amount
9		Finding the whole
10	Using fractions as operators	

Equivalent Fractions

Notes and Guidance

Children recap on learning from year 4. They explore equivalent fractions using models and concrete representations.

They use models to make the link to multiplication and division. Children will then be able to apply the abstract method to find equivalent fractions.
It is important children have the conceptual understanding before moving in to just using an abstract method.

Mathematical Talk

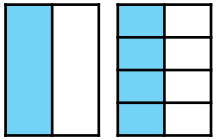
What equivalent fractions can we find by folding the paper? How can we record these?

What is the same and what is different about the numerators and denominators in the equivalent fractions?

How does multiplication and division help us find equivalent fractions? Where can we see this in our model?

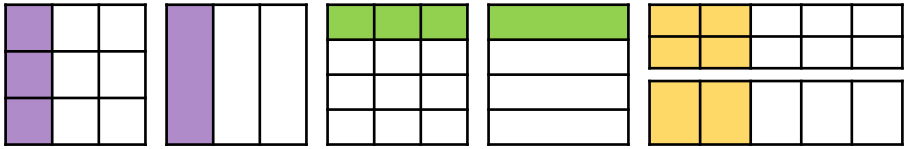
Varied Fluency

1 Take two pieces of paper the same size.
Fold on piece into two equal pieces.
Fold the other into eight equal pieces.
What equivalent fractions can you find?

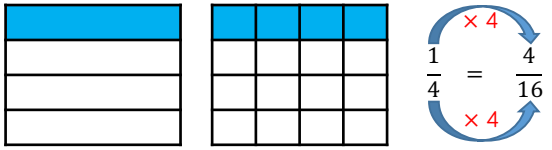


$\frac{1}{2} = \frac{4}{8}$

Use the models to write equivalent fractions.



2 Emma uses the models and her multiplication and division skills to find equivalent fractions.



Use this method to find equivalent fractions to $\frac{2}{4}$, $\frac{3}{4}$ and $\frac{4}{4}$ where the denominator is 16

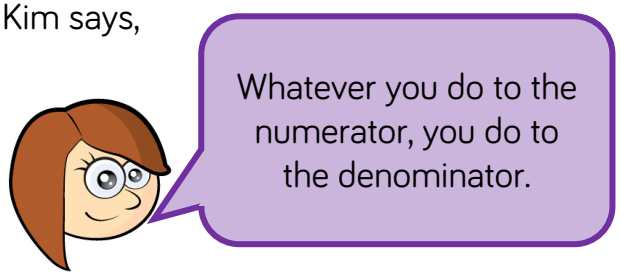
3 Emma uses the same approach to find equivalent fractions for these fractions. How will her method change?

$\frac{4}{12} = \frac{\square}{3}$ $\quad$ $\frac{6}{12} = \frac{\square}{4}$ $\quad$ $\frac{6}{12} = \frac{\square}{2}$

Equivalent Fractions

Reasoning and Problem Solving

Kim says,



Here are the equivalent fractions she has found for $\frac{4}{8}$:

$\frac{4}{8} = \frac{8}{16}$ $\quad \frac{4}{8} = \frac{6}{10}$

$\frac{4}{8} = \frac{2}{4}$ $\quad \frac{4}{8} = \frac{1}{5}$

Does Kim's method work? Explain why.

Kim's method doesn't always work. It works when multiplying or dividing both the numerator or denominator but not when adding or subtracting the same thing to both.

Martin thinks you can only simplify even numbered fractions because you keep on halving the numerator and denominator until you get an odd number.

Do you agree?
Explain your answer.

Martin is wrong.

For example $\frac{3}{9}$ can be simplified to $\frac{1}{3}$ and these are all odd numbers.

Here are some fraction cards. All of the fractions are equivalent.

$\frac{4}{A}$ $\quad \frac{B}{C}$ $\quad \frac{20}{50}$

A + B = 16
Calculate the value of C.

A = 10
B = 6
C = 15

Simplify Fractions

Notes and Guidance

Children build on their knowledge of factors to help them simplify fractions.

They must choose which method is most efficient.

Is it identifying if the denominator is a multiple of the numerator, or is it finding a highest common factor?

Mathematical Talk

In order to make a simpler fraction, which direction do you move on the fraction wall? Up or down?

Is the most efficient method dividing by two? Explain your reasoning.

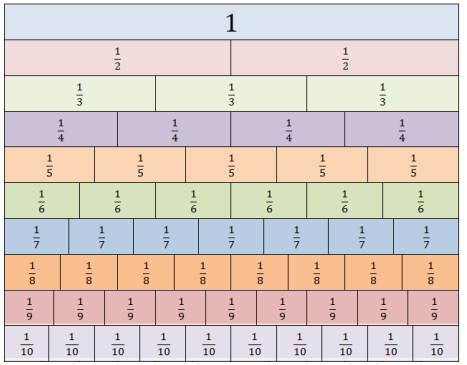
What is the highest common factor of the numerator and the denominator? How does this help you when simplifying?

Varied Fluency

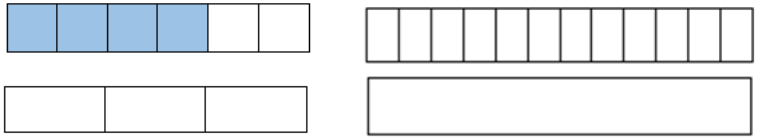
1 Use the fraction wall to simplify: $\frac{2}{8}$, $\frac{3}{9}$ and $\frac{4}{10}$

Which direction did you move on the fraction wall?

What have the numerator and denominator been divided by?



2 Use the bar models to simplify the fractions.
Make sure your bar model has fewer equal parts than the original fraction.



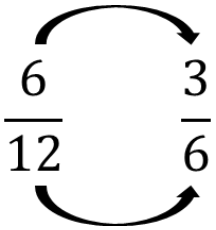
$\frac{4}{6} = \frac{\square}{3}$

$\frac{8}{12} = \frac{\square}{\square}$

Simplify Fractions

Reasoning and Problem Solving

Sam has simplified $\frac{6}{12}$



What method has he used?

Is this the most efficient method?
Explain your answer.

This is not the best method because it isn't in the simplest form. He should have noticed that 12 is a multiple of 6 and divided by 6

Hassan thinks that $\frac{2}{5}$ in its simplest terms is $\frac{1}{2.5}$

Do you agree? Convince me.

No because $\frac{2}{5}$ is simplified as it has two prime numbers and you don't have decimal numbers in a fraction.

Always, sometimes, never.

To simplify a fraction you divide by 2 until you can't divide by 2 anymore.

It is sometimes true.

This works for fractions like $\frac{4}{8}$ but it doesn't work for fraction like $\frac{6}{12}$ because you can't divide by 2 when you get to $\frac{3}{6}$ so you have to find another common factor.

Improper to Mixed Numbers

Notes and Guidance

In this step, children convert from improper fractions to mixed numbers for the first time. An improper fraction is a fraction where the numerator is larger than the denominator. A mixed number is a whole number alongside a fraction.

It is important for children to see this process represented visually to allow them to make the connections between the concept and what happens in the abstract.

Mathematical Talk

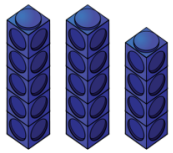
Why are we grouping the cubes into 5s?

How many fifths are there in a whole?

What do you notice about the improper fraction and the mixed number?

Varied Fluency

1 Claire converts the improper fraction $\frac{14}{5}$ into a mixed number using cubes. She groups the cubes into 5s, then has 4 left over.

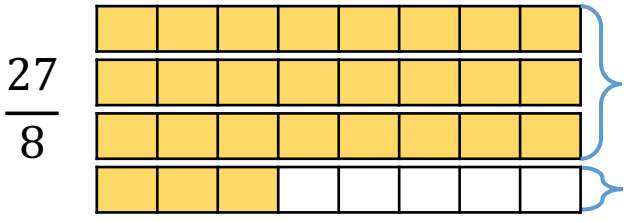


$\frac{5}{5}$ is the same as ☐ $\frac{10}{5}$ is the same as ☐

$\frac{14}{5}$ as a mixed number is ☐ ☐/☐

Use Claire's method to convert $\frac{19}{3}$, $\frac{19}{4}$, $\frac{19}{5}$ and $\frac{19}{6}$

2 Steve converts the improper fraction $\frac{27}{8}$ into a mixed number using bar models.

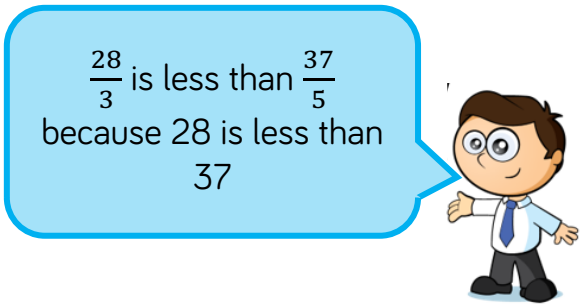


Use Steve's method to convert $\frac{38}{8}$, $\frac{27}{6}$, $\frac{47}{7}$ and $\frac{32}{4}$

Improper to Mixed Numbers

Reasoning and Problem Solving

William says,



Do you agree?
Explain why.

William is incorrect because $\frac{28}{3}$ equals $9\frac{1}{3}$ and $\frac{37}{5}$ equals $7\frac{2}{5}$

Spot the mistake

- $\frac{27}{5} = 5\frac{1}{5}$
- $\frac{27}{3} = 8$
- $\frac{27}{4} = 5\frac{7}{4}$
- $\frac{27}{10} = 20\frac{7}{10}$

Can you find the correct answers?

Answers should be:

- $5\frac{2}{5}$ (incorrect number of fifths)
- 9 (incorrect whole)
- $6\frac{3}{4}$ (still have an improper fraction)
- $2\frac{7}{10}$ (incorrect number of wholes)

Mixed Numbers to Improper

Notes and Guidance

Children now convert from mixed numbers to improper fractions using concrete and pictorial methods to understand the abstract method.

Ensure children always write their working alongside the concrete and pictorial representations so they can see the clear links.

Mathematical Talk

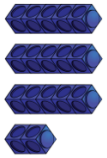
How many quarters/halves/eighths are there in a whole?

What do you notice about the whole number and the denominator?

What happens to the whole number and the numerator? Why?

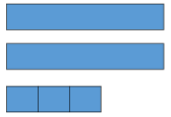
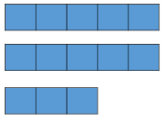
Varied Fluency

1 Beth uses cubes to help her convert from mixed numbers to improper fractions.

Step 1: Start with mixed number	Step 2: Build the mixed number using cubes. Think carefully about how many parts make a whole.	Step 3: Count the number of cubes to find the numerator of the improper fraction
$3\frac{2}{5}$		$3\frac{2}{5} = \frac{17}{5}$

Use Beth's method to convert $2\frac{2}{3}$, $2\frac{2}{4}$, $2\frac{2}{5}$ and $2\frac{2}{6}$

2 Sam uses bar models to convert a mixed number into an improper fraction.

Step 1: Draw representation of mixed number.	Step 2: Split representation into equal parts.	Step 3: Count the number of equal parts to find the numerator of the improper fraction
		$2\frac{3}{5} = \frac{13}{5}$

Use Sam's method to convert $2\frac{1}{6}$, $3\frac{2}{3}$, $1\frac{4}{5}$ and $7\frac{5}{12}$

Mixed Numbers to Improper

Reasoning and Problem Solving

Three children have converted $3\frac{2}{5}$ into an improper fraction.

Child A

$$3\frac{2}{5} = \frac{32}{5}$$

Child B

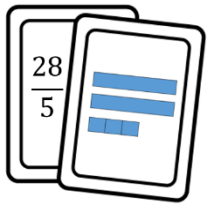
$$3\frac{2}{5} = \frac{17}{15}$$

Child C

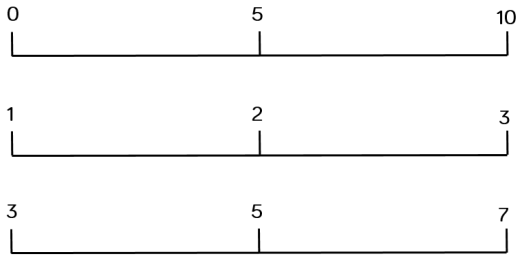
$$3\frac{2}{5} = \frac{7}{5}$$

Child A has just put the 3 on the numerator
Child B has multiplied both the numerator and the denominator by 3
Child C has only used 1 whole not all 3 wholes.

You will need: Mixed number and improper fraction representation cards.



Work with your partner and take it in turns to take a card and reason about where your card may go.
Avoid converting straight away and try to reason first.



Teacher notes:

Create mixed and improper fraction cards based on any areas of misconceptions observed during any previous learning.

Number Sequences

Notes and Guidance

Children will count up and down in a given fraction. They will continue to use visual representations to help them explore number sequences.

They will also find missing fractions in a sequence and determine whether the sequence is increasing or decreasing and by how much.

Mathematical Talk

What other start numbers could we begin with?
Will your sequence increase or decrease?
How much will it go up or down by each time?

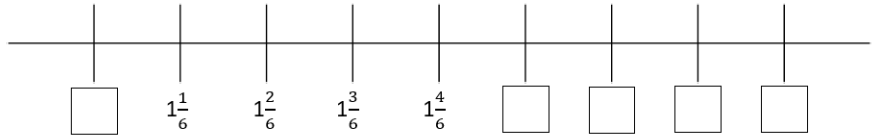
If my sequence is decreasing by ___ and the ___ number is worth ____, what numbers will be in my sequence?

Varied Fluency

1 Use the counting stick to count up and down in these fractions.

- Start at 0 and count up in steps of $\frac{1}{4}$
- Start at 2 and count down in steps of $\frac{1}{3}$
- Start at 1 and count up in steps of $\frac{2}{3}$

2 Complete the missing values on the number line.



3 Find the missing fractions in the sequences.

$\frac{3}{4}, \square, 1\frac{3}{4}, 2\frac{1}{4}$

$\square, 3\frac{1}{3}, \square, 2\frac{2}{3}$

$\square, 5\frac{1}{2}, 5\frac{7}{10}, 5\frac{9}{10}$

$\frac{3}{5}, \square, \square, 3$

Number Sequences

Reasoning and Problem Solving

Three children are counting in fractions.

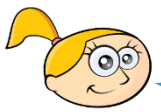
Chantelle

$\frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{4}{4}, \frac{5}{4}, \frac{6}{4}, \frac{7}{4}$

Aidan

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

Ellie



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

Who is counting correctly?

They are all correct, they are all counting in quarter. Aidan has simplified all answers and Ellie has converted improper fractions mixed numbers.

Jasmine and Dayle are counting in fractions.
Jasmine counts up in thirds and starts at 0
Dayle counts down in sixths and starts at 5

How many numbers do they each say before they say the same number?

Jasmine will says 10 numbers and Dayle will say 13 numbers and they will both have said 3

Fractions on a Number Line

Notes and Guidance

Children use their knowledge of equivalent fractions and ordering fractions to place fractions on a number line.

They can draw their own divisions to help them place the fractions more accurately.

Mathematical Talk

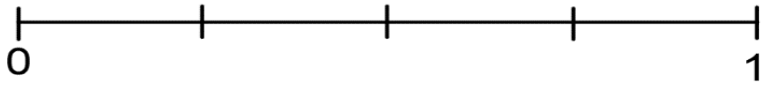
How are the number lines similar and different?

Are there any other fractions we can place on the number line? Which fractions can't be placed on the number line?

Which method have you used to help you place improper fractions on a number line?

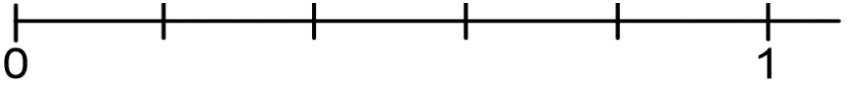
Varied Fluency

1 On the number line place $\frac{2}{8}$, $\frac{4}{8}$, $\frac{1}{8}$, $\frac{4}{4}$, $\frac{7}{8}$, $\frac{3}{16}$



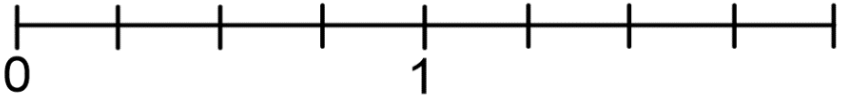
Which other fractions, with different denominators can be placed on the number line?

2 On the number line place: $\frac{2}{5}$, $\frac{3}{10}$, $\frac{6}{15}$, $\frac{10}{15}$, $\frac{4}{5}$



3 What other fractions can you place on the number line?

On the number line place: $\frac{10}{20}$, $\frac{1}{4}$, $\frac{6}{4}$, $1\frac{3}{8}$, $\frac{15}{8}$, $1\frac{7}{8}$



Fractions on a Number Line

Reasoning and Problem Solving

What would you split your number line into to plot the following fractions?

$$\frac{1}{3}, \frac{11}{12}, \frac{5}{6}$$

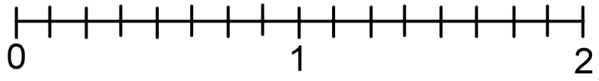
Explain your answer.

Is this the only answer?

You can split the number line into twelfths because you would be able to plot all three fractions on this.

You could also split it into any multiple of 12

How many ways can you show a difference of one quarter on the number line?



Various answers available.

Some examples:

$\frac{1}{4}$ and $\frac{2}{4}$

$\frac{3}{8}$ and $\frac{5}{8}$

$\frac{7}{8}$ and $1\frac{1}{8}$

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

Compare & Order (Less than 1)

Notes and Guidance

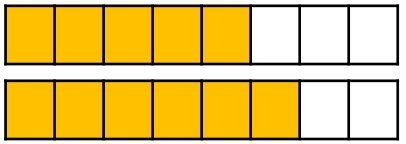
Children build on their equivalent fraction knowledge to compare and order fractions less than 1 where the denominators are multiples of the same number.
It is important that children are able to draw models so that they can directly compare them.
Children need to find the common denominator in this step. They may also investigate finding a common numerator.

Mathematical Talk

How does a bar model help us to visualise the fractions?
Should both of our bars be the same size? Why? What does this show us?
If the numerators are the same, how can we compare our fractions?
If the denominators are the same, how can we compare our fractions?
Do we always have to find a common denominator? Can we find a common numerator?

Varied Fluency

1 Use bar models to compare $\frac{5}{8}$ and $\frac{3}{4}$



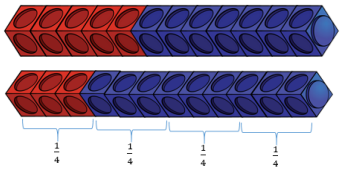
$\square > \square$

$\square < \square$

Use this method to help you compare:

$\frac{5}{6}$ and $\frac{2}{3}$ $\quad$ $\frac{2}{3}$ and $\frac{5}{9}$ $\quad$ $\frac{7}{16}$ and $\frac{3}{8}$

2 Use cubes to help you compare $\frac{1}{4}$ and $\frac{5}{12}$



$\square > \square$

$\square < \square$

Use this method to help you compare:

$\frac{6}{7}$ and $\frac{15}{21}$ $\quad$ $\frac{4}{9}$ and $\frac{11}{27}$ $\quad$ $\frac{9}{16}$ and $\frac{7}{8}$

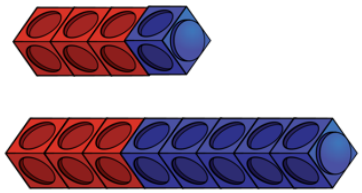
3 Order the fractions from greatest to smallest:

$\frac{3}{12}, \frac{3}{4}$ and $\frac{3}{16}$ $\quad$ $\frac{2}{3}, \frac{5}{6}$ and $\frac{7}{12}$ $\quad$ $\frac{4}{7}, \frac{13}{14}$ and $\frac{19}{28}$

Compare & Order (Less than 1)

Reasoning and Problem Solving

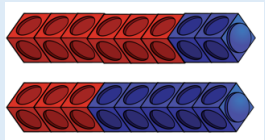
Ash makes $\frac{3}{4}$ and $\frac{3}{8}$ out of cubes.



He thinks that $\frac{3}{8}$ is equal to $\frac{3}{4}$

Do you agree?
Explain your answer.

Possible answer: I disagree with Ash because the two wholes are not equal. He needs to convert $\frac{3}{4}$ to $\frac{6}{8}$ in order to compare the fractions. If he does this he will see that $\frac{3}{4}$ is biggest.



Always, sometimes, never

If one denominator is a multiple of the other you can simplify the fraction with the larger denominator to make the denominators the same.

E.g. $\frac{1}{4}$ and $\frac{9}{12}$ can be simplified to $\frac{1}{4}$ and $\frac{3}{4}$

Prove it.

Sometimes

This can happen as long as the numerators are multiples of the same number too. It cannot work for some fractions e.g. $\frac{8}{15}$ and $\frac{3}{5}$

15 is a multiple of 5 but 8 is not so it does not work for this case.

Compare & Order (denominator)

Notes and Guidance

Children build on their equivalent fraction and common multiple knowledge to compare and order fractions where the denominators are not always multiples of the same number.

Mathematical Talk

What has happened to the original fractions?

What do you notice about the original denominators and the new denominator?
Explain what has happened.

What do you notice?
How did you find a common denominator?
What else could the common denominator be?

Varied Fluency

1 Use the bar models to show $\frac{1}{4}$ and $\frac{2}{3}$ then complete the sentences.

□ is larger than □

□ is smaller than □

□ < □

2 Complete the circles using <, > or =

$\frac{3}{5}$ ◯ $\frac{4}{7}$ $\frac{2}{6}$ ◯ $\frac{1}{4}$ $2\frac{1}{5}$ ◯ $2\frac{3}{8}$

$\frac{7}{8}$ ◯ $\frac{4}{6}$ ◯ $\frac{3}{4}$

3 Jen read $\frac{3}{4}$ of her book, Emma read $\frac{3}{10}$ of her book and Amy had read $\frac{4}{5}$ of her book.
Put them in order starting with the person who read the most of their book.

Compare & Order (denominator)

Reasoning and Problem Solving

Use the digit cards to complete the statements below:

5 6 3 4

$\frac{\square}{\square} > \frac{\square}{\square}$ $\frac{\square}{4} < \frac{6}{\square}$

Find three examples of ways you could complete the statement:

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

Can one of your ways include an improper fraction?

Multiple answers.

E.g. $\frac{4}{6} > \frac{3}{5}$ for the first one, and $\frac{3}{5} < \frac{6}{4}$ for the second one.

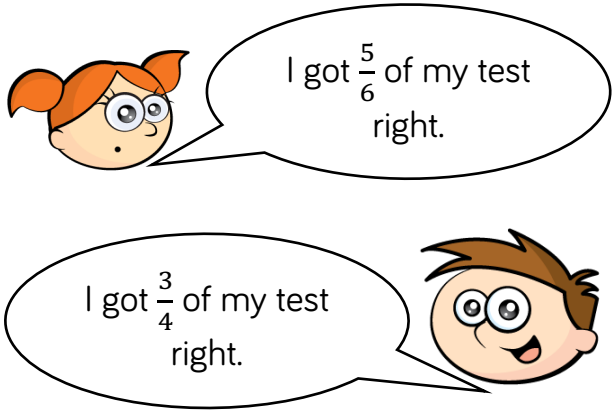
$\frac{3}{5} < \frac{6}{4}$

$\frac{3}{4} < \frac{6}{5}$

$\frac{4}{5} < \frac{6}{3}$

More answers available.

Ellie and Josh sat the same maths test.



Who did better on the test?

Explain how you know.

Ellie did better because $\frac{5}{6}$ is greater than $\frac{3}{4}$

Compare & Order (More than 1)

Notes and Guidance

Children use their knowledge of ordering fractions less than 1 to help them compare and order fractions greater than 1

They use their knowledge of common denominators to help them.

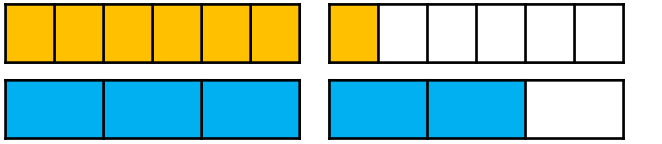
Children will compare both improper fractions and mixed numbers during this step.

Mathematical Talk

How can we represent the fractions?
How does the bar help us see which fraction is the greatest?
Can we use our knowledge of multiples to help us?
Can you predict which fractions will be greatest? Explain how you know.
When we are comparing mixed numbers what can we do to the bars to help us see each fractions?

Varied Fluency

1 Use bar models to compare $\frac{7}{6}$ and $\frac{5}{3}$



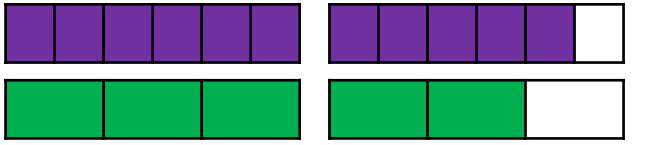
$\square > \square$

$\square < \square$

Use this method to help you compare:

$\frac{7}{2}$ and $\frac{9}{4}$ $\frac{11}{6}$ and $\frac{13}{3}$ $\frac{9}{4}$ and $\frac{17}{8}$

2 Use a bar model to compare $1\frac{2}{3}$ and $1\frac{5}{6}$



$\square > \square$

$\square < \square$

Use this method to help you compare:

$1\frac{3}{4}$ and $1\frac{3}{8}$ $1\frac{5}{8}$ and $1\frac{1}{2}$ $2\frac{4}{7}$ and $2\frac{9}{14}$

3 Order the fractions from greatest to smallest:

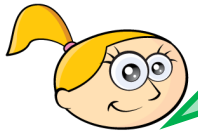
$\frac{8}{5}$, $\frac{11}{10}$ and $\frac{17}{20}$ $1\frac{2}{3}$, $1\frac{7}{24}$ and $1\frac{5}{12}$ $1\frac{3}{8}$, $1\frac{11}{16}$ and $\frac{19}{28}$

Compare & Order (More than 1)

Reasoning and Problem Solving

Lucy and Sinead both have two identical pizzas each.

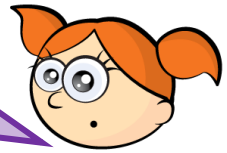
Lucy says,



I have cut each pizza into 6 equal pieces and eaten 8

Sinead says,

I have cut each pizza into 9 equal pieces and eaten 15



Who ate the most pizza?

Use a drawing to support your answer.

Sinead ate the most pizza because $\frac{15}{9}$ is greater than $\frac{8}{6}$

Lottie looks at the fractions $1\frac{7}{16}$ and $1\frac{3}{4}$

She says,

$1\frac{7}{16}$ is greater than $1\frac{3}{4}$ because the numerator is larger.

Do you agree?

Explain why using a model.

Possible answer:

I do not agree because $1\frac{3}{4}$ is equivalent to $1\frac{12}{16}$ and this is greater than $1\frac{7}{16}$

Compare & Order (numerator)

Notes and Guidance

To build on finding common denominators, children explore how finding a common numerator can be effective too.

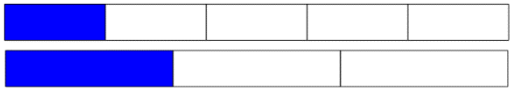
It's important foe children to develop number sense and discover which is the most effective strategy for a range of questions.

Mathematical Talk

What's the same and what's different about the fractions on the bar model? Can we create a rule? How is this different to when the denominators are the same?
Can you find a common numerator to help you compare? How will you do this?
Why is finding a common numerator the most efficient method? What do you notice about all the denominators? How can we find a common numerator?

Varied Fluency

1 Compare the fractions.



One third is …….. one fifth. $\frac{\square}{\square} \bigcirc \frac{\square}{\square}$

What is the rule when comparing fractions with the same numerator?

2 What fraction could go in the empty box?

3 Complete the circles using <, > or =

$\frac{8}{11} \bigcirc \frac{8}{19}$ $1\frac{2}{7} \bigcirc 1\frac{4}{5}$

2 fifths ◯ 4 sevenths

Compare & Order (numerator)

Reasoning and Problem Solving

Bob is comparing the fractions $\frac{3}{7}$ and $\frac{6}{11}$

He wants to find a common denominator.

Explain whether you think this is the most effective strategy.

This is not the most effective strategy because both denominators are prime. He could find a common numerator by changing $\frac{3}{7}$ into $\frac{6}{14}$ and comparing them by using the rule 'when the numerator is the same, the smaller the denominator, the bigger the fraction'

$\frac{6}{11}$ is bigger.

Here are two fractions of two pieces of wood.

$\frac{5}{6}$

$\frac{3}{4}$

Which piece of wood is the longest?

Explain your answer.

Can you explain your method?

The second piece is longer because $\frac{1}{4}$ is bigger than $\frac{1}{6}$ so if the missing pieces were added on the second piece would be longer.

Could discuss why $\frac{3}{4}$ is bigger in this compared to previous small step.

Add & Subtract Fractions

Notes and Guidance

Children recap their year 4 understanding and add and subtract fractions with the same denominator.

They use bar models to support understanding of adding and subtracting fractions.

Mathematical Talk

How many equal parts do I need to split my bar into?

Can you convert the improper fraction into a mixed number?

How can a bar model help you balance both sides of the equals sign?

Varied Fluency

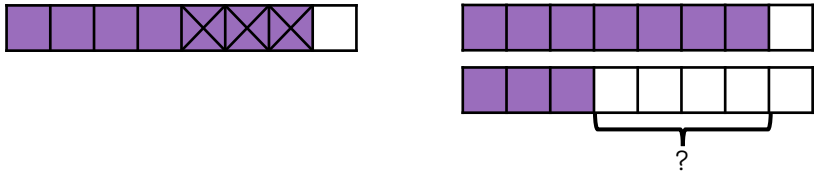
1 Here is a bar model to calculate $\frac{3}{5} + \frac{4}{5}$

$\frac{3}{5} + \frac{4}{5} = \frac{7}{5} = 1\frac{2}{5}$

Use a bar model to solve the calculations:

$\frac{3}{8} + \frac{3}{8}$ $\frac{5}{6} + \frac{1}{6}$ $\frac{5}{3} + \frac{5}{3}$

2 Here are two bar models to calculate $\frac{7}{8} - \frac{3}{8}$



What is the difference between the two methods?

Use your preferred method to calculate:

$\frac{5}{8} - \frac{1}{8}$ $\frac{9}{7} - \frac{4}{7}$ $\frac{5}{3} - \frac{5}{3}$

3 Calculate:

$\frac{3}{7} + \frac{5}{7} = \frac{\square}{\square} + \frac{4}{7}$ $\frac{9}{5} - \frac{5}{5} = \frac{6}{5} - \frac{\square}{\square}$ $\frac{2}{3} + \frac{\square}{\square} = \frac{11}{3} - \frac{4}{3}$

Add & Subtract Fractions

Reasoning and Problem Solving

How many different ways can you balance the equation?

$$\frac{5}{9} + \frac{\square}{9} = \frac{8}{9} + \frac{\square}{9}$$

Possible answers:

$$\frac{5}{9} + \frac{3}{9} = \frac{8}{9} + \frac{0}{9}$$

$$\frac{5}{9} + \frac{4}{9} = \frac{8}{9} + \frac{1}{9}$$

$$\frac{5}{9} + \frac{5}{9} = \frac{8}{9} + \frac{2}{9}$$

Any combination of fractions where the numerators add up to the same total on each side of the equals sign.

A chocolate bar has 12 equal pieces.

Sami eats $\frac{5}{12}$ more of the bar than Hafsah.

There is one twelfth of the bar remaining.

What fraction of the bar does Hafsah eat?

Sami eats $\frac{8}{12}$ of the chocolate bar and Hafsah eats $\frac{3}{12}$ of the chocolate bar.

Add & Subtract Fractions (1)

Notes and Guidance

Building on their skills of finding common denominators, children will add fractions when the answer is less than 1.

They will work with fractions with different denominators where one is a multiple of the other and where they are not.

It is important that children find the lowest common denominator not just a common denominator.

Mathematical Talk

What must we do if our denominator is different?
Could your answered be simplified?

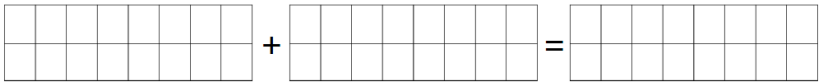
How will you make 1 whole one?

Are there any other ways? What do you notice about the denominators?

Explain your method.

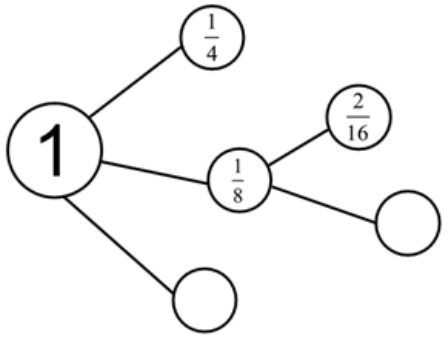
Varied Fluency

1 Shade in the diagram to show that $\frac{5}{8} + \frac{3}{16} = \frac{13}{16}$



Draw your own diagram to show that $\frac{1}{3} + \frac{2}{9} = \frac{5}{9}$

2 Complete the part whole model.



3 Emma uses $\frac{1}{3}$ of her tin of paint on Friday, $\frac{1}{21}$ on Saturday and on Sunday she uses $\frac{2}{7}$.
How much paint does she have left?

Add & Subtract Fractions (1)

Reasoning and Problem Solving

Can you complete the calculation using the same digit?

$$\frac{\square}{5} + \frac{1}{\square} = \frac{9}{10}$$

$\frac{2}{5} + \frac{1}{2} = \frac{9}{10}$

Shelden subtracted $\frac{3}{5}$ from a fraction and his answer was $\frac{8}{45}$. What was the original question?

$\frac{35}{45} - \frac{27}{45} = \frac{8}{45}$

So the original question would have been

$\frac{7}{9} - \frac{3}{5} = \frac{8}{45}$

Amy answered the following calculation:

$$\frac{3}{6} + \frac{1}{15} = \frac{4}{21}$$

Do you agree with her? Explain your answer.

If you don't agree with Amy, what should the answer be?

Amy is wrong because she has just added the numerators and the denominators rather than finding a common denominator.
It should be

$\frac{15}{30} + \frac{2}{30} = \frac{17}{30}$

Add Fractions within 1

Notes and Guidance

Children add fractions with different denominators for the first time. The denominators are multiples of one another.

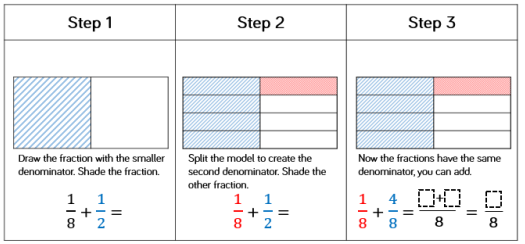
It is important that children see this represented visually so they can make connections with the abstract.

Mathematical Talk

How can we convert ___ into ___?
How can we convert thirds into fifteenths?
What do you think the common denominator might be? Why?
Could it be anything else?
What do you notice about the denominators?
Can you simplify your answer?

Varied Fluency

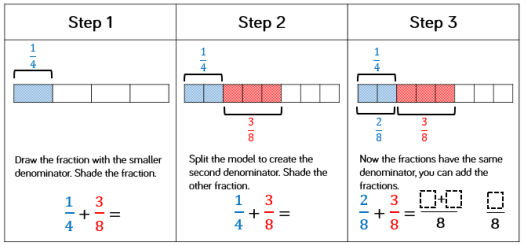
1



Use the area model to solve :

$\frac{1}{4}+\frac{3}{8}$ $\frac{2}{3}+\frac{1}{6}$ $\frac{7}{10}+\frac{1}{5}$

2



Use the bar model to solve:

$\frac{1}{6}+\frac{5}{12}$ $\frac{2}{9}+\frac{1}{3}$ $\frac{1}{3}+\frac{4}{15}$

3 Use your preferred method to solve:

$\frac{2}{3}+\frac{3}{15}$ $\frac{7}{12}+\frac{1}{4}$ $\frac{4}{7}+\frac{7}{21}$ $\frac{5}{14}+\frac{2}{7}$

Add Fractions within 1

Reasoning and Problem Solving

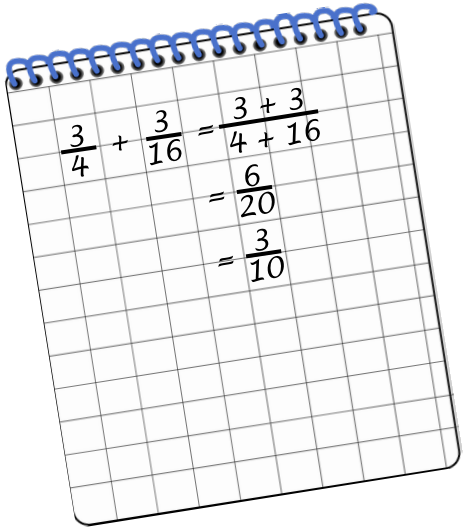
$$\frac{5}{16} + \frac{\square}{8} = \frac{15}{16}$$

5

$$\frac{\square}{20} + \frac{7}{10} = \frac{17}{20}$$

3

Mary-Kate solved this calculation:



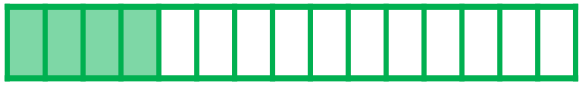
Can you spot and explain her mistake?

Mary-Kate is wrong because she has just added the numerators and the denominators. When adding fractions you need to find a common denominator.

Two children are solving $\frac{1}{3} + \frac{4}{15}$

Emma starts by drawing this model:

Kate starts by drawing this model:



Can you explain each person's method and how they would complete the question?
Which method do you prefer and why?

Emma has split her bar into thirds shaded one, she then needs to split each third into 5 equal pieces and shade a further 4
Amy has started with fifteenths and shaded in 4 pieces, she then needs to shade in another 5 pieces as $\frac{1}{3} = \frac{5}{15}$
They will both get an answer of $\frac{9}{15}$ which simplifies to $\frac{3}{5}$

Add & Subtract Fractions (2)

Notes and Guidance

During this small step, children are to build on their knowledge of adding fractions that total <1, finding common denominators and applying it to mixed numbers.

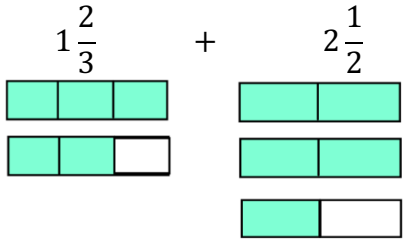
At this stage, children may choose to deal with the whole numbers and fractions separately, or convert the mixed numbers to improper fractions. Can they prove and explain why both methods work in this case? When might it not work?

Mathematical Talk

What do you notice about your answer? Can you convert it back into a mixed number?
How might we approach this question? Do we need to convert the mixed number into an improper fraction? Explain why.
Which is the most efficient method?
Could you show me how you might use a number line to answer this question? Can you explain how you might solve this mentally?

Varied Fluency

1 Can you split the bar models so each fraction has the same denominator?

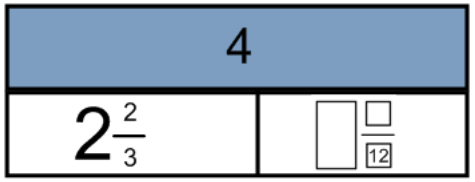


How can you use this information to solve the original calculation?

2 Complete the calculation.

$\square\frac{\square}{\square} = 3\frac{1}{2} + 1\frac{1}{4}$

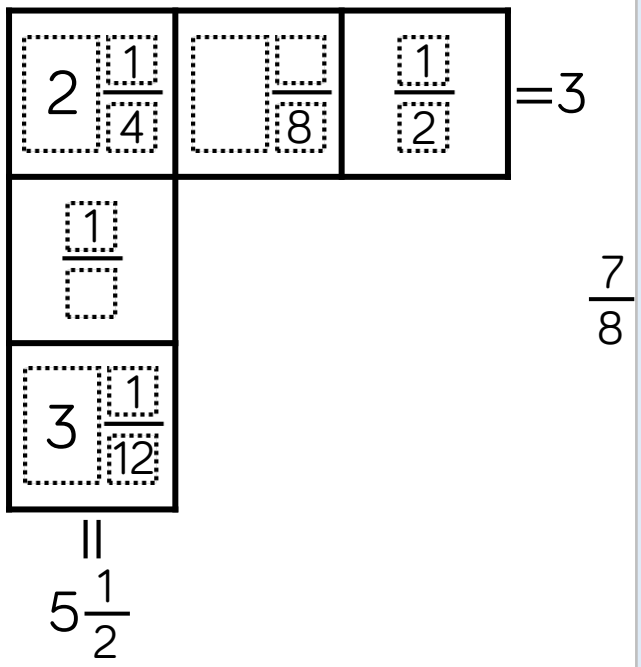
3 Complete the bar model.



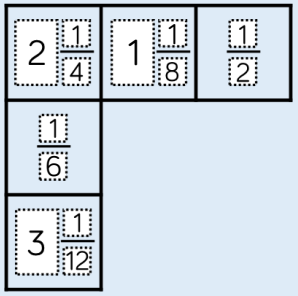
Add & Subtract Fractions (2)

Reasoning and Problem Solving

Fill in the blank boxes.



Solution:



$a = d - 7$

$c + c = 2$

$3 \times 4 = d$

$b = a - 3$

Use this information to complete the following calculation and find the value of e.

$$a\frac{c}{b} - 3\frac{c}{d} = e\frac{a}{d}$$

$5\frac{1}{2} - 3\frac{1}{12} = 2\frac{5}{12}$

$e = 2$

Add 3 or More Fractions

Notes and Guidance

Children use their knowledge of adding fractions that are multiples of one another to add more than 2 fractions.

They will use an area model and bar models to continue to explore how to add fractions where the denominators are multiples of one another.

Mathematical Talk

How can we split our model?

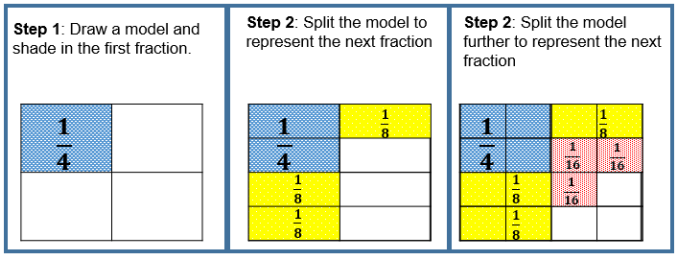
What do you notice about the denominators?

What is that same and what is different about the area model and the bar model?

How do the models show the common denominator?

Varied Fluency

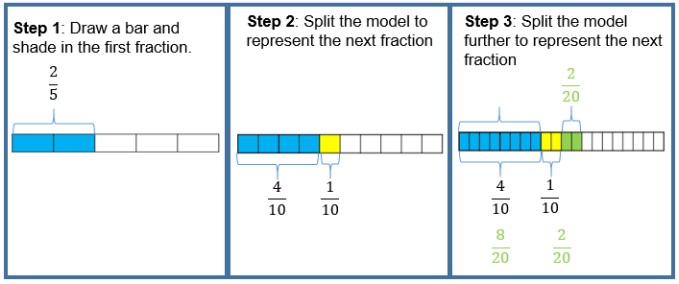
1



Use the area model to solve :

$\frac{1}{3}+\frac{1}{6}+\frac{1}{12}$ $\frac{1}{4}+\frac{3}{8}+\frac{5}{16}$

2



Use the bar model to solve:

$\frac{3}{28}+\frac{3}{14}+\frac{1}{7}$ $\frac{2}{3}+\frac{1}{6}+\frac{1}{12}$

3 Use your preferred method to solve:

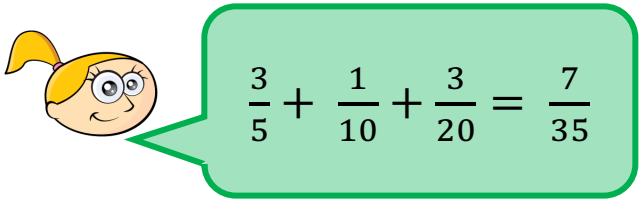
$\frac{3}{4}+\frac{1}{8}+\frac{1}{16}+\frac{1}{4}$ $\frac{1}{6}+\frac{5}{24}+\frac{3}{12}$ $\frac{7}{36}+\frac{5}{18}+\frac{2}{9}$

Add 3 or More Fractions

Reasoning and Problem Solving

Zoe is attempting to answer:

$$\frac{3}{5}+\frac{1}{10}+\frac{3}{20}$$



Do you agree with Zoe?
Explain why.

Possible answer:
Zoe is wrong because she has added the numerators and denominators together and hasn't found a common denominator.

Sam has added 3 fractions together to get an answer of $\frac{17}{18}$

What 3 fractions could he have added?

Can you find more than one answer?

Children use their knowledge of multiples to find different possible answers.
Some may include:

$$\frac{1}{9}+\frac{5}{9}+\frac{5}{18}$$

$$\frac{1}{6}+\frac{5}{9}+\frac{2}{9}$$

$$\frac{1}{18}+\frac{1}{6}+\frac{13}{18}$$

$$\frac{1}{3}+\frac{1}{6}+\frac{4}{9}$$

Etc.

Adding Fractions

Notes and Guidance

To build on knowledge of adding fractions, children now add fractions that give a total great than one.

It is important that children are exposed to a range of examples e.g. adding improper fractions and mixed numbers.

Mathematical Talk

How can we represent $\frac{2}{5}$ and $\frac{4}{5}$ on the number line?

When adding two fractions with sixths, how will we split our number line?

What do you notice is happening when you add fractions with the same denominator?

What can we do if our denominators are different?

Varied Fluency

1 Use the number line to solve $\frac{2}{5} + \frac{4}{5}$

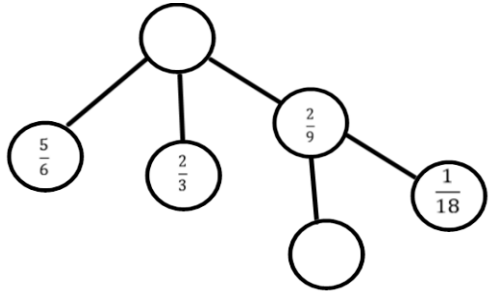
Use a number line to solve

- 3 sixths plus 5 sixths
- $\frac{11}{7} + \frac{5}{7}$

2 Find the sum of:

$\frac{13}{4}$ and $\frac{5}{6}$ $\frac{26}{7}$ and $\frac{2}{3}$

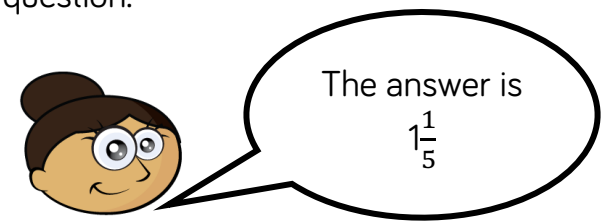
3 Complete the part whole model.



Adding Fractions

Reasoning and Problem Solving

Amanda has worked out the answer to a question.



What could the question have been?

Lots of answers available.

Possible answers:

$\frac{4}{5} + \frac{2}{5}$

$\frac{4}{10} + \frac{16}{20}$

Etc.

Fill in the boxes to make the calculation correct.

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

$1\frac{1}{10} = \frac{3}{5} + \frac{5}{10}$

Add Fractions

Notes and Guidance

Children continue to represent adding fractions using the area model and the bar model to explore adding two or more fractions that are greater than 1

Children can record their totals as an improper fraction but will then convert this to a mixed number using their prior knowledge.

Mathematical Talk

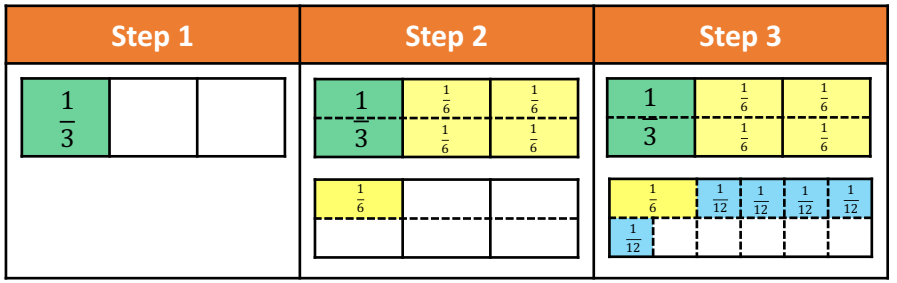
Do I need to count all the sections to find the total? Can you see a whole?

Can we see common equivalent fractions that we already know without converting them?

What is the best way to solve ____ ? Explain why.

Varied Fluency

1



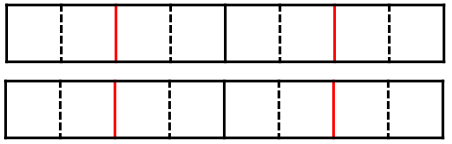
$\frac{1}{3} + \frac{5}{6} + \frac{5}{12} = 1\frac{7}{12}$

Use the area model to help you add the fractions. Give your answer as a mixed number.

$\frac{1}{4} + \frac{2}{3} + \frac{5}{12}$ $\frac{1}{4} + \frac{7}{8} + \frac{3}{16}$

2 Use the bar model to add the fractions. Record your answer as a mixed number.

$\frac{3}{4} + \frac{3}{8} + \frac{1}{2} =$



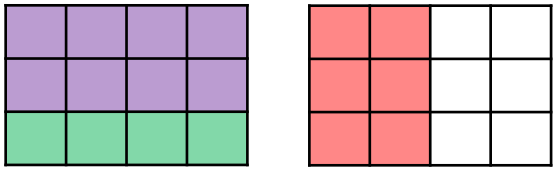
Draw your own models to solve:

$\frac{5}{12} + \frac{1}{6} + \frac{1}{2}$ $\frac{11}{20} + \frac{3}{5} + \frac{1}{10}$ $\frac{3}{4} + \frac{5}{12} + \frac{1}{2}$

Add Fractions

Reasoning and Problem Solving

Gemma is adding three fractions. She uses the model to help her.



What could her three fractions be?

Can you record a number story to represent your calculation?

Possible answer:

$\frac{2}{3} + \frac{4}{12} + \frac{1}{2} = 1\frac{1}{2}$

Other equivalent fractions may be used.

Example story:
Some children are eating pizzas. Jez eats two thirds, Albi eats four twelfths and Dwain it's half a pizza. How much pizza did they eat altogether?

The sum of three fractions is $2\frac{1}{8}$

The fractions have different denominators.

All of the fractions are greater than or equal to a half.

None of the fractions are improper fractions.

All of the denominators are factors of 8

What could the fractions be?

$\frac{1}{2} + \frac{3}{4} + \frac{7}{8}$

Children could be given less clues and explore other possible solutions.

Add Mixed Numbers

Notes and Guidance

Children move on to adding two fractions where one or both are mixed numbers or an improper fraction.

They will use a method of adding the wholes and then adding the parts. Children will record their answer in its simplest form.

Children can still draw models to represent adding fractions.

Mathematical Talk

How can we partition this mixed number into whole numbers and fractions?

What will the wholes total? Can I add the fractions straight away?

What will these mixed numbers be as improper fractions?

If I have an improper fraction in the question, should I change it to a mixed number first? Why?

Varied Fluency

1 $1\frac{1}{3} + 2\frac{1}{6} = 3 + \frac{3}{6} = 3\frac{3}{6}$ or $3\frac{1}{2}$

$1 + 2 = 3$

$\frac{1}{3} + \frac{1}{6} = \frac{2}{6} + \frac{1}{6} = \frac{3}{6}$

Add the fractions by adding the whole first and then the fractions. Give your answer in its simplest form.

$3\frac{1}{4} + 2\frac{3}{8}$ $4\frac{1}{9} + 3\frac{2}{3}$ $2\frac{5}{6} + 2\frac{1}{3}$

2 $1\frac{3}{4} + 2\frac{1}{8} = \frac{7}{4} + \frac{17}{8} = \frac{14}{8} + \frac{17}{8} = \frac{31}{8} = 3\frac{7}{8}$

Add the fractions by converting them to improper fractions.

$1\frac{1}{4} + 2\frac{5}{6}$ $2\frac{1}{9} + 1\frac{1}{3}$ $2\frac{1}{6} + 2\frac{2}{3}$

3 Use your preferred method to add the fractions.

$4\frac{7}{9} + 2\frac{1}{3}$ $\frac{19}{6} + 1\frac{1}{3}$ $\frac{17}{3} + 2\frac{1}{6}$

Add Mixed Numbers

Reasoning and Problem Solving

Joshua and Miriam have some juice.

Joshua drinks $2\frac{1}{4}$ litres and Miriam drinks $2\frac{5}{12}$ litres.

How much do they drink altogether?

Which method would you use and why?

$4\frac{2}{3}$

Encourage children to justify which method they prefer and why. Ensure children discuss which method is more or less efficient.

Fill in the missing numbers.

$$4\frac{5}{6} + \square\frac{\square}{\square} = 10\frac{1}{3}$$

$5\frac{3}{6}$ *or* $5\frac{1}{2}$

Subtract Fractions

Notes and Guidance

Children subtract fractions with different denominators for the first time, where one denominator is a multiple of the other.

It is important that children see this represented visually so they can make connections with the abstract.

It is important that subtraction is explored as take away and finding the difference.

Mathematical Talk

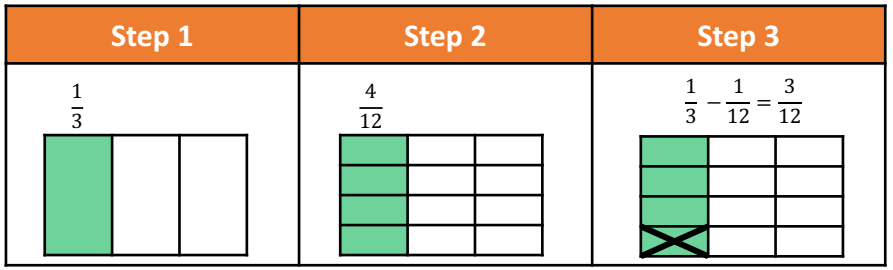
What could the common denominator be?

Can you draw an area model to help you solve the problem?

Is it easier to us a take away bar model or a bar model to find the difference?

Varied Fluency

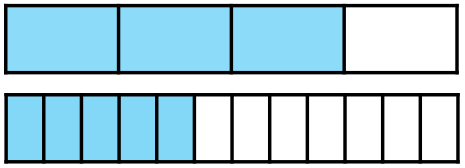
1



Use an area model to help you solve $\frac{5}{6} - \frac{1}{3}$ and $\frac{7}{8} - \frac{5}{16}$

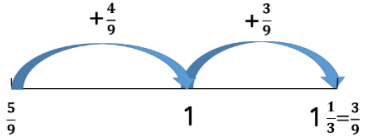
2

Tom and Hamish both have the same sized chocolate bar. Tom has $\frac{4}{3}$ of the chocolate bar left, Hamish has $\frac{5}{12}$ of the chocolate bar left. How much more does Tom have?



3

Josh uses a number line to find the difference between $\frac{5}{9}$ and $1\frac{1}{3}$



Use this method to find the difference between:

$\frac{3}{4}$ and $\frac{5}{12}$ $\quad 1\frac{4}{15}$ and $\frac{3}{5}$ $\quad 2\frac{2}{9}$ and $1\frac{1}{3}$

Subtract Fractions

Reasoning and Problem Solving

Which is the odd one out?

A $3\frac{1}{4} - \frac{3}{8}$

B $3\frac{1}{3} - \frac{2}{9}$

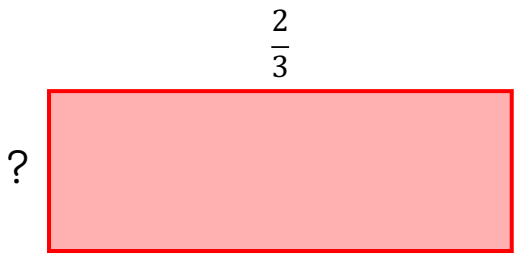
C $3\frac{2}{7} - \frac{1}{3}$

Explain why.

Possible answer:

C is the odd one out because the denominators aren't multiples of each other.

The perimeter of the rectangle is $1\frac{7}{9}$



Work out the missing length.

The missing length is $\frac{2}{9}$

Subtracting Fractions

Notes and Guidance

Children are building on their knowledge of subtracting fractions.
This small step encourages children to use one of their wholes to create a new mixed number fraction so they can complete the calculation.
It is vital that the children know that fractions such as $3\frac{1}{4}$ and $2\frac{5}{4}$ are the same

Mathematical Talk

Which fraction is greatest? How do you know? We must look at the whole numbers to help us.

Have we still got the same fraction? How do you know?

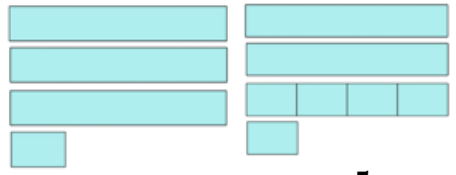
What are the five wholes made up of? How do you know? Can you use one of these wholes to help you complete the calculation?

What calculation will we complete to solve the problem?

Varied Fluency

1 Calculate $3\frac{1}{4} - 1\frac{3}{4}$

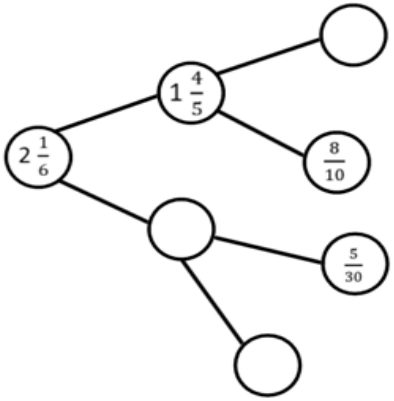
$3\frac{\mathbf{1}}{\mathbf{4}}$ can become $2\frac{\mathbf{5}}{\mathbf{4}}$



How can you use the equivalent fraction of $2\frac{\mathbf{5}}{\mathbf{4}}$ to complete the calculation?

2 Tina has $3\frac{2}{3}$ bags left of bird feed. She uses $1\frac{4}{6}$.
How much will she have left?

3 Complete the part whole model.



Subtracting Fractions

Reasoning and Problem Solving

Tina has 5 bags of sweets.

On Monday she eats $\frac{2}{3}$ of a pack and gives $\frac{4}{5}$ of a pack to her friend.

On Tuesday she eats $1\frac{1}{3}$ packets and gives $\frac{2}{5}$ of a packet to her friend.

What fraction of her sweets does she have left?

$\frac{2}{3} + \frac{4}{5} = 1\frac{7}{15}$

$5 - 1\frac{7}{15} = 3\frac{8}{15}$

$1\frac{1}{3} + \frac{2}{5} = 1\frac{11}{15}$

$3\frac{8}{15} - 1\frac{11}{15} = 1\frac{12}{15}$

Tina has $1\frac{12}{15}$ of her sweets left.

Fill in the boxes to make the calculation correct.

$$1\frac{\square}{2} = 3\frac{1}{\square} - 1\frac{\square}{10}$$

$1\frac{1}{2} = 3\frac{1}{5} - 1\frac{7}{10}$

Subtract Mixed Numbers (1)

Notes and Guidance

Children apply their understanding of subtracting fractions where one denominator is a multiple of the other to subtract proper fractions from mixed numbers.

They continue to use models and number lines to support their understanding.

Mathematical Talk

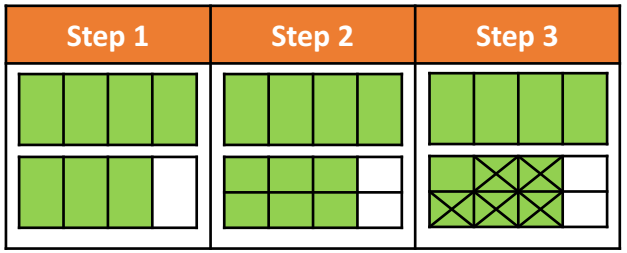
Which fraction is greatest? How do you know?

If the denominators are different, what can we do?

Can you simplify your answer?

Varied Fluency

1



$1\frac{3}{4} - \frac{5}{8} = 1\frac{1}{8}$

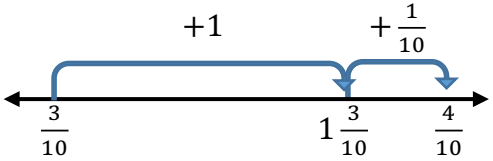
Use an area model to help you solve:

$2\frac{3}{5} - \frac{3}{10}$ $1\frac{2}{3} - \frac{1}{6}$ $1\frac{5}{6} - \frac{7}{12}$

2

$1\frac{2}{5} - \frac{3}{10} = 1\frac{1}{10}$

$1\frac{2}{5} = 1\frac{4}{10}$



Use a number line to solve:

$3\frac{5}{6} - \frac{1}{12}$ $5\frac{5}{7} - \frac{3}{14}$ $2\frac{7}{9} - \frac{11}{18}$

3 Solve:

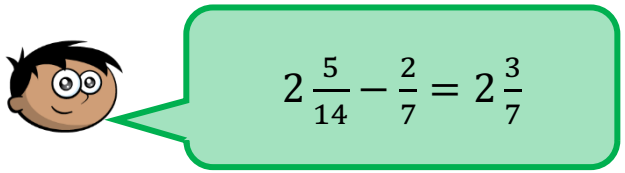
$1\frac{2}{3} - \frac{5}{6}$ $1\frac{3}{4} - \frac{5}{8}$ $2\frac{3}{8} - \frac{11}{16}$

Subtract Mixed Numbers (1)

Reasoning and Problem Solving

Tom is attempting to solve $2\frac{5}{14} - \frac{2}{7}$

Here is his working out:

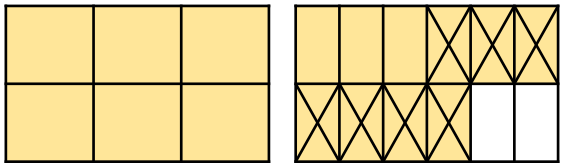


Do you agree with Tom?
Explain your answer.

Possible answer:

Tom is wrong because he hasn't found a common denominator when subtracting the fractions he has just subtracted the numerators and the denominators.

Here is Martha's area model.
What is the calculation?



Can you find more than one answer?
Why is there more than one answer?

The calculation could be $1\frac{5}{6} - \frac{7}{12}$ or $1\frac{10}{12} - \frac{7}{12}$

There is more than one answer because five sixths and ten twelfths are equivalent. Children should be encouraged to write the question as $1\frac{5}{6} - \frac{7}{12}$ so that all fractions are in their simplest form.

Subtract Mixed Numbers (2)

Notes and Guidance

Children use their knowledge of fractions to subtract two fractions where one is a mixed number and you need to break one of the wholes up.

They use the method of flexible partitioning to create a new mixed number so they can complete the calculation.

Mathematical Talk

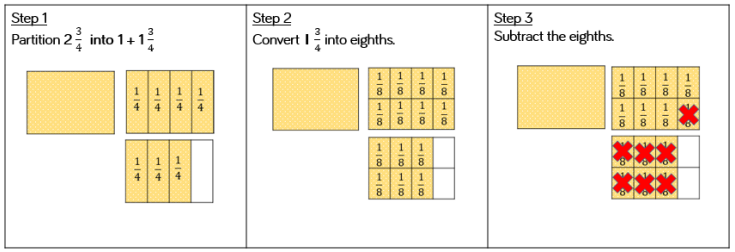
Is flexible partitioning easier than converting the mixed number to an improper fraction?

Do we always have to partition the mixed number?

When can we subtract a fraction without partitioning the mixed number in a different way?

Varied Fluency

1 We can work out $2\frac{3}{4} - \frac{7}{8}$ using this method.



Use this method to calculate:

$3\frac{1}{3} - \frac{5}{6}$ $4\frac{1}{5} - \frac{7}{10}$ $5\frac{2}{3} - \frac{4}{9}$

2 Use flexible partitioning to solve $7\frac{1}{3} - \frac{5}{6}$

$$7\frac{1}{3} - \frac{5}{6} = 6 + 1\frac{1}{3} - \frac{5}{6} = 6 + 1\frac{2}{6} - \frac{5}{6} = 6\frac{3}{6} = 6\frac{1}{2}$$

Use this method to calculate:

$4\frac{2}{3} - \frac{5}{6}$ $4\frac{1}{5} - \frac{7}{15}$ $5\frac{1}{4} - \frac{7}{8}$

3 Mr Brown has $3\frac{1}{4}$ bags of flour. He uses $\frac{7}{8}$ of a bag. How much flour does he have left?

Subtract Mixed Numbers (2)

Reasoning and Problem Solving

Place 2, 3 and 4 in the boxes to make the calculation correct.

$$27\frac{1}{\square} - \frac{\square}{6} = 26\frac{\square}{3}$$

$27\frac{1}{3} - \frac{4}{6} = 26\frac{2}{3}$

3 children are working out $6\frac{2}{3} - \frac{5}{6}$

They partition the mixed number in the following ways to help them.

Lucy $5 + 1\frac{2}{3} - \frac{5}{6}$

Mary $5 + 1\frac{4}{6} - \frac{5}{6}$

Sam $5 + \frac{10}{6} - \frac{5}{6}$

Whose method is correct?
Explain why.

All three children are correct.

$1\frac{2}{3}$, $1\frac{4}{6}$ and $\frac{10}{6}$ are all equivalent therefore all three methods will help children to correctly calculate the answer.

Subtract 2 Mixed Numbers

Notes and Guidance

Children use different strategies to subtract two mixed numbers.

Building on learning in previous steps, they look at partitioning the mixed numbers into wholes and parts and build on their understanding of flexible partitioning to subtract two mixed numbers when an exchange is involved.

Mathematical Talk

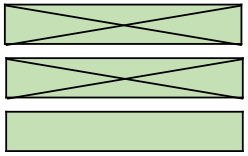
Why is subtracting the wholes and parts separately easier with some fractions than others?

Can you show the subtraction as a difference as well as a take away on the bar model?

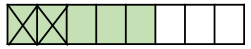
Does making the whole numbers larger make the subtraction any more difficult? Explain why.

Varied Fluency

1 Here is a bar model to calculate $3\frac{5}{8} - 2\frac{1}{4}$



$3 - 2 = 1$



$\frac{5}{8} - \frac{1}{4} = \frac{5}{8} - \frac{2}{8} = \frac{3}{8}$

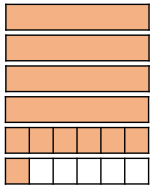
$3\frac{5}{8} - 2\frac{1}{4} = 1\frac{3}{8}$

Use this method to calculate:

$3\frac{7}{8} - 2\frac{3}{4}$ $5\frac{5}{6} - 2\frac{1}{3}$ $3\frac{8}{9} - 2\frac{5}{27}$

Why does this method not work effectively for $5\frac{1}{6} - 2\frac{1}{3}$?

2 Here is a method to calculate $5\frac{1}{6} - 2\frac{1}{3}$



$5\frac{1}{6} - 2\frac{1}{3} = 4\frac{7}{6} - 2\frac{1}{3} = 4\frac{7}{6} - 2\frac{2}{6} = 2\frac{5}{6}$

Use this method to calculate:

$3\frac{1}{4} - 2\frac{5}{8}$ $5\frac{1}{3} - 2\frac{7}{12}$ $27\frac{1}{3} - 14\frac{7}{15}$

Subtract 2 Mixed Numbers

Reasoning and Problem Solving

There are three types of chocolate in a chocolate box: milk chocolate, dark chocolate and white chocolate.

The total mass of the chocolate is 7 kg.

The mass of milk chocolate is $3\frac{3}{4}$ kg and the mass of dark chocolate is $1\frac{7}{16}$ kg.

What is the mass of white chocolate?

$3\frac{3}{4} + 1\frac{7}{16} = 5\frac{3}{16}$

$7 - 5\frac{3}{16} = 1\frac{13}{16}$

The mass of white chocolate is $1\frac{13}{16}$ kg.

Rachel has $135\frac{2}{5}$ cm of ribbon.

Kyra has $2\frac{11}{15}$ cm less ribbon than Rachel.

How much ribbon do they have altogether?

Kyra has $132\frac{10}{15}$ cm of ribbon.

Children should simplify this to $132\frac{2}{3}$ cm.

Altogether they have $268\frac{1}{15}$ cm of ribbon.

Mixed Addition and Subtraction

Notes and Guidance

Children are given the opportunity to consolidate adding and subtracting fractions.

The examples provided encourage the use of the bar model, part whole models and word problems which include mixed number and improper fractions.

Mathematical Talk

What other calculations could you write using the bar model?

Can you draw a bar model to show the second calculation? Where would the '?' go?

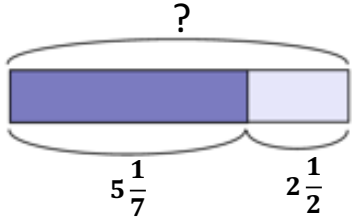
Explain how you know the fraction can be simplified?

How many different ways can you show $6\frac{7}{30}$?

How might these different representations help you solve the calculation?

Varied Fluency

1 Complete the bar model and use it to answer the following calculations



$2\frac{1}{2} + 5\frac{1}{7} = \square$

$\square - 2\frac{1}{2} = 5\frac{1}{7}$

Can you rewrite the calculations as improper fractions?

2 Fill in the blank. Give your answer in the simplest form:

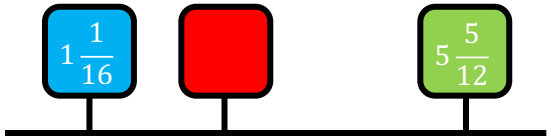
$$\frac{4}{15} + \frac{1}{5} + \square = 1$$

3 Lizzie and Marie each had an ice cream sundae. Lizzie only ate $\frac{3}{4}$ of hers and Marie left $\frac{2}{5}$ of her sundae. How much ice cream was left over? Who ate the largest fraction of their sundae? By how much?

Mixed Addition and Subtraction

Reasoning and Problem Solving

Fill in the blank boxes.



The green box is $3\frac{2}{3}$ more than the red box.

The red box is $\frac{\square}{\square}$

The red box is $\frac{\square}{\square}$ greater than the blue box.

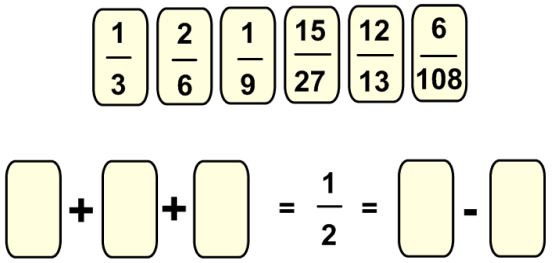
$5\frac{5}{12} - 3\frac{2}{3} = 1\frac{9}{12}$

The red box is $1\frac{3}{4}$

$1\frac{3}{4} - 1\frac{1}{16} = \frac{11}{16}$

The red box is $\frac{11}{16}$ greater than the blue box.

Fill in the boxes to make the calculation correct.



$\frac{1}{3} + \frac{1}{9} + \frac{6}{108}$

$= \frac{1}{2}$

$= \frac{15}{27} - \frac{6}{108}$

Multiply by an Integer (1)

Notes and Guidance

Children are introduced to multiplying fractions by a whole number for the first time. They link this to repeated addition and see that the denominator remains the same, whilst the numerator is multiplied by the integer.

This is shown clearly through the range of models to build the children's conceptual understanding of multiplying fractions.

Mathematical Talk

How is multiplying fractions similar to adding fractions?

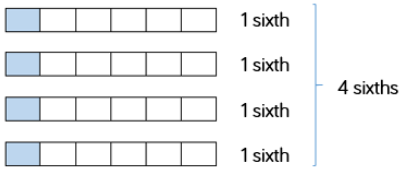
Which bar model do you find the most useful?

Which bar model helps us to convert from an improper fraction to a mixed number most effectively?

Varied Fluency

1 Work out $\frac{1}{6} \times 4$ by counting in sixths.

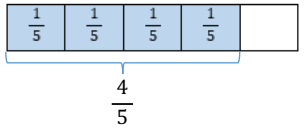
$\frac{1}{6} \times 4 = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{4}{6} = \frac{2}{3}$



Use this method to work out:

$\frac{1}{3} \times 2$ $\frac{1}{5} \times 3$ $\frac{1}{10} \times 6$

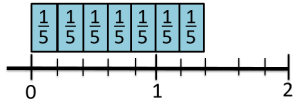
2 We can use a single bar model to work out $\frac{1}{5} \times 4$



Use this method to work out:

$\frac{1}{4} \times 3$ $\frac{1}{8} \times 6$ $\frac{1}{10} \times 8$

3 We can use a number line and repeated addition to work out $\frac{1}{5} \times 7 = \frac{7}{5} = 1\frac{2}{5}$



Use this method to work out:

$\frac{1}{3} \times 3$ $\frac{1}{7} \times 6$ $\frac{1}{12} \times 8$

Multiply by an Integer (1)

Reasoning and Problem Solving

Ranjit is multiplying fractions by a whole number.

$\frac{1}{5} \times 5 = \frac{5}{25}$

Can you explain his mistake?

Possible answer:
Ranjit has multiplied the numerator and the denominator rather than recognising that he has five lots of one fifth.
He has found an equivalent fraction.

Always, sometimes, never.

When you multiply a unit fraction by the same number as it's denominator the answer will be one whole.

Always because your numerator will be the same as your denominator which means that it is a whole.
E.g. $\frac{1}{3} \times 3 = \frac{3}{3} = 1$

I am thinking of a unit fraction.

When I multiply it by 4 it will be equivalent to $\frac{1}{2}$

When I multiply it by 2 it will be equivalent to $\frac{1}{4}$

What is my fraction?

What do I need to multiply it by so that my answer is equivalent to $\frac{3}{4}$

Can you create your own version of this problem?

$\frac{1}{8}$ because
$4 \times \frac{1}{8} = \frac{4}{8} = \frac{1}{2}$
and
$2 \times \frac{1}{8} = \frac{2}{8} = \frac{1}{4}$

6 because
$6 \times \frac{1}{8} = \frac{6}{8} = \frac{3}{4}$

Multiply Fractions by Integers

Notes and Guidance

Children will use their understanding of fractions to multiply whole numbers and fractions together.

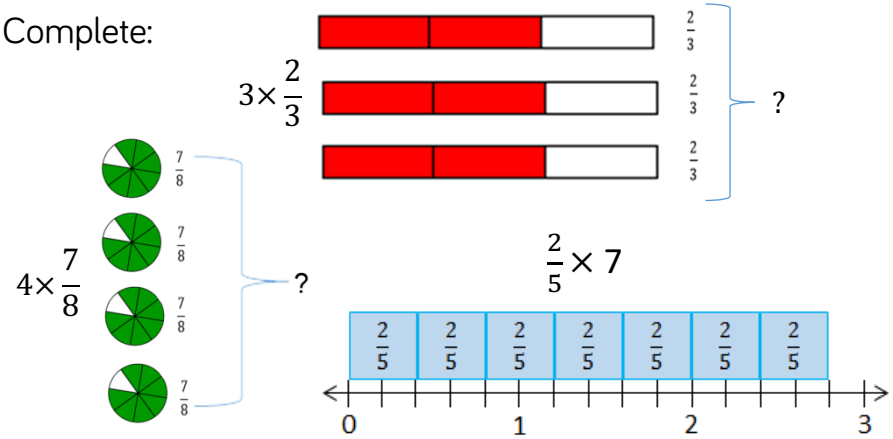
It is important that they experience varied representations of fractions. They must also be able to multiply whole numbers and mixed numbers.

Mathematical Talk

How could you represent this fraction?
What is the denominator? How do you know?
How many whole pieces do we have?
What is multiplying fractions similar to? (repeated addition)
Why have you chosen to represent the fraction in this way?
How many wholes are there?
How many parts are there?

Varied Fluency

1 Complete:



2 Sally and 3 of her friends have $1\frac{2}{3}$ of a chocolate bar each.
How much chocolate do they have altogether?

3 Complete and then order:

- $6 \times \frac{5}{7}$ $\quad \frac{5}{6} \times 5$ $\quad 4 \times \frac{7}{8}$
- $4 \times 2\frac{3}{5}$ $\quad 3\frac{4}{9} \times 3$ $\quad 5 \times 2\frac{3}{7}$

Multiply Fractions by Integers

Reasoning and Problem Solving

There are 9 lamp posts on a road. There is $4\frac{3}{8}$ of a metre between each lamp post.

What is the distance between the first and last lamp post?

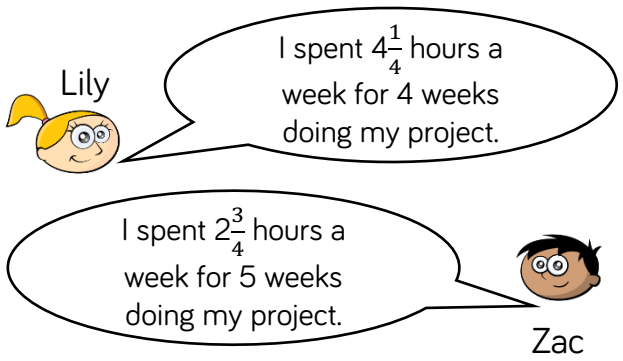
$8 \times 4\frac{3}{8} = 8 \times \frac{35}{8}$

$= \frac{280}{8} = 35$

The distance between the first and last lamp post is 35 metres.

Children may think they need to multiply by 9, encourage them to draw a picture to see otherwise.

Lily and Zac both work on a homework project.



Who spent the most time on their project?

Explain your reasoning.

$4 \times 4\frac{1}{4} = \frac{68}{4}$

$= 17$ hours

$5 \times 2\frac{3}{4} = \frac{55}{4}$

$= 13\frac{3}{4}$ hours

Lily spent longer on her project than Zac did by $3\frac{1}{4}$ hours.

Multiply by an Integer (2)

Notes and Guidance

Children apply prior knowledge of multiply a fraction by a while number to multiplying a non-unit fraction by a whole number.

They use similar models and discuss which method will be the most efficient depending on the questions asked.

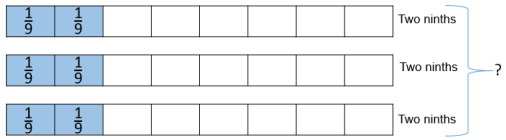
Mathematical Talk

Can you show me 3 lots of $\frac{3}{10}$ on a bar model?
How many tenths do we have altogether?

How does repeated addition help us with this multiplication?
How does a number line help us see the multiplication?

Varied Fluency

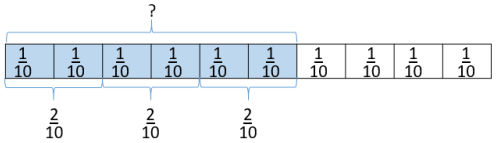
1 Count the number of ninths to work $3 \times \frac{2}{9}$



Use this method to work out:

$\frac{3}{8} \times 2$ $\frac{5}{16} \times 3$ $4 \times \frac{2}{11}$

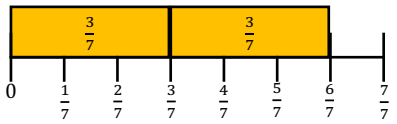
2 Use the model to help you solve $3 \times \frac{3}{10}$



Use this method to work out:

$\frac{2}{7} \times 3$ $\frac{3}{16} \times 4$ $2 \times \frac{5}{12}$

3 Use the number line to help you solve $2 \times \frac{3}{7}$



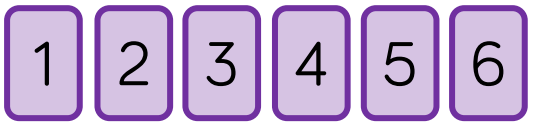
Use this method to work out:

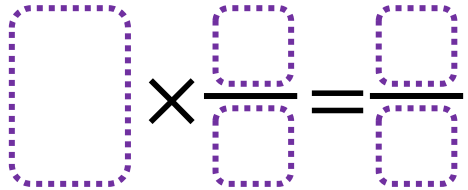
$\frac{3}{10} \times 3$ $\frac{2}{7} \times 2$ $4 \times \frac{3}{20}$

Multiply by an Integer (2)

Reasoning and Problem Solving

Use the digit cards to complete the multiplication.





Possible answer:
Ranjit has multiplied the numerator and the denominator rather than recognising that he has five lots of one fifth.
He has found an equivalent fraction.

Always because your numerator will be the same as your denominator which means that it is a whole.
E.g. $\frac{1}{3} \times 3 = \frac{3}{3} = 1$

Denise has calculated $4 \times \frac{3}{14}$

From the picture I can see that $4 \times \frac{3}{14} = \frac{12}{56}$

Do you agree?

Explain why.

Possible answer:

I disagree. Denise has shaded 12 fourteenths. She has counted all of the boxes to give her the denominator when she shouldn't have. The answer should be $\frac{12}{14}$ or $\frac{6}{7}$

Multiply Fractions by Fractions

Notes and Guidance

Children will use their understanding of multiplying fractions by whole numbers and find the link between this and multiplying fractions by fractions.

It is important that children see the link between multiplying fractions by whole numbers and fractions by fractions.

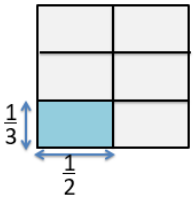
Mathematical Talk

Using a piece of paper/drawing:
Show me a whole, show me thirds, now split each third in half.
Shade one section
What fraction do you have?
What do you notice about the numerators and denominators when they are multiplied?
(multiply numerators together and multiply denominators together)

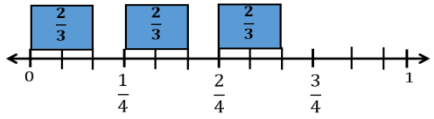
Varied Fluency

1 Calculate:

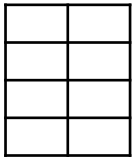
$\frac{1}{3} \times \frac{1}{2}$



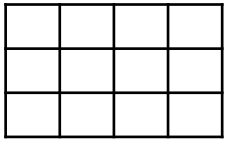
$\frac{2}{3}$ of $\frac{3}{4}$



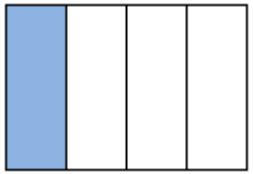
$\frac{1}{4} \times \frac{1}{2}$



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



2 Use the diagram below to work out $\frac{1}{3} \times \frac{1}{4}$



3 Work out:

$\frac{1}{4} \times \frac{1}{2}$

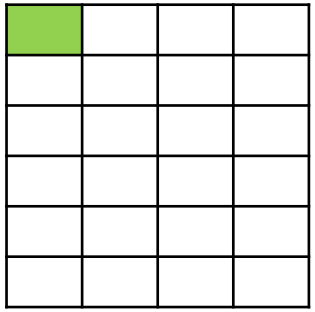
$\square \times \frac{1}{2} = 1$

Multiply Fractions by Fractions

Reasoning and Problem Solving

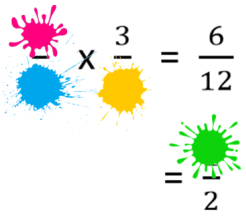
The shaded square in the grid below is the answer to a multiplying fractions question.

What was the question?



$\frac{1}{6} \times \frac{1}{4}$

How many ways can you answer the following?

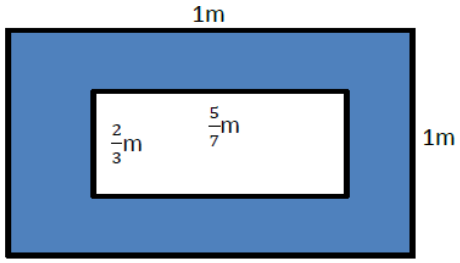


Possible answers:

$\frac{2}{3} \times \frac{3}{4} = \frac{6}{12} = \frac{1}{2}$

$\frac{2}{2} \times \frac{3}{6} = \frac{6}{12} = \frac{1}{2}$

Find the area of the shaded part of the shape.



$1 \times 1 = 1$

$\frac{2}{3} \times \frac{5}{7} = \frac{10}{21}$

$1 - \frac{10}{21} = \frac{11}{21}$

The shaded area is $\frac{11}{21}$m²

Multiply by an Integer (3)

Notes and Guidance

Children use their knowledge of fractions to multiply a mixed number by a whole number.

They use the method of multiplying the whole and part separately and also the method of converting to an improper fraction then multiplying.

It is important that they see varied representations of fractions.

Mathematical Talk

How could you represent this mixed number?
What is the denominator? How do you know?
How many wholes are there? How many parts are there?
What is multiplying fractions similar to? (repeated addition)
What representation could you use to convert a mixed number to an improper fraction?

Varied Fluency

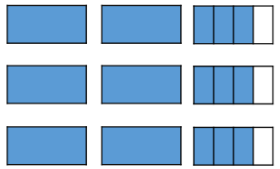
1 Use repeated addition to work out $2\frac{2}{3} \times 4$

$$2\frac{2}{3} \times 4 = 2\frac{2}{3} + 2\frac{2}{3} + 2\frac{2}{3} + 2\frac{2}{3} = 8\frac{8}{3} = 10\frac{2}{3}$$

Use this method to solve

$2\frac{1}{6} \times 3$ $\quad 1\frac{3}{7} \times 2$ $\quad 3\frac{1}{3} \times 4$

2 Partition your fraction to help you solve $2\frac{3}{4} \times 3$



- $2 \times 3 = 6$
- $\frac{3}{4} \times 3 = \frac{9}{4} = 1\frac{3}{4}$
- $6 + 1\frac{3}{4} = 7\frac{3}{4}$

Use this method to answer

$2\frac{5}{6} \times 3$ $\quad 3\frac{4}{7} \times 2$ $\quad 2\frac{1}{3} \times 5$

3

$$1\frac{5}{6} \times 3 = \frac{11}{6} \times 3 = \frac{33}{6} = 5\frac{3}{6} = 5\frac{1}{2}$$

Convert to an improper fraction to work out

$3\frac{2}{7} \times 4$ $\quad 2\frac{4}{9} \times 2$ $\quad 4 \times 3\frac{3}{5}$

Multiply by an Integer (3)

Reasoning and Problem Solving

Jack runs $2\frac{2}{3}$ miles three times per week.

Josh runs $3\frac{3}{4}$ miles twice a week.

Who runs the furthest during the week?

Explain your answer.

Jack runs
$2\frac{2}{3} \times 3 = 8$ miles

Josh runs
$3\frac{3}{4} \times 2 = 7\frac{1}{2}$ miles

Jack runs further by half a mile.

Work out the missing numbers.

$$2\frac{\square}{8} \times \square = 7\frac{7}{8}$$

Explain how you worked it out.

Possible answer:

$2\frac{5}{8} \times 3 = 7\frac{7}{8}$

I knew that the multiplier could not be 4 because that would give an answer of at least 8. So the multiplier had to be 3. That meant that the missing numerator had to give a product of 15. I knew that 5 multiplied by 3 would give 15

Divide Fractions by Integers (1)

Notes and Guidance

Children will use their understanding of fractions to divide fractions by whole numbers, where the numerator is directly divisible by the divisor.

It is important that they experience varied representations of fractions in different contexts.

Mathematical Talk

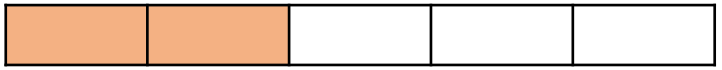
How could you represent this fraction?
How many parts of the whole are there? How do you know?

How do you know how many parts to shade?
Is the numerator divisible by the whole number?

Why doesn't the denominator change?
Why have you chosen to represent the fraction in this way?

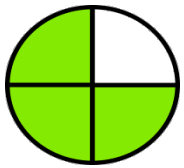
Varied Fluency

1 Lee has $\frac{2}{5}$ of a chocolate bar. He shares it with his friend.
How much chocolate do they get each?

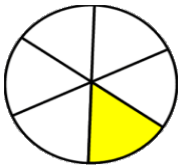


2 Use the diagrams to help you calculate:

$\frac{3}{4} \div 3$



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



3 Calculate:

$\frac{7}{8} \div 2$ $\frac{10}{13} \div 5$ $\frac{6}{7} \div 3$

Divide Fractions by Integers (1)

Reasoning and Problem Solving

Roman says

When dividing fractions by a whole number, I just ignore the numerator.

Do you agree?
Explain why.

No, you do not ignore the numerator as it is also divided in the process.

Solve the following calculations:

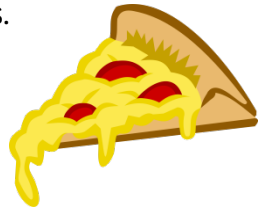
$\frac{1}{3} \div 2 =$ $\frac{1}{4} \div 2 =$

$\frac{1}{5} \div 2 =$ $\frac{1}{6} \div 2 =$

What do you notice?

The numerator stays the same; the denominator changes. The denominator has doubled in each fraction.

Becky's mum ordered a pizza for her and her friends.



By the time they arrived home there was only $\frac{3}{4}$ of it left.
When she shared it among her friends they each got $\frac{1}{4}$
How many friends did Becky have with her?

Becky had three friends:

$\frac{3}{4} \div 3 = \frac{1}{4}$

Divide Fractions by Integers (2)

Notes and Guidance

Children will divide fractions by a whole number, including mixed number fractions. They should learn how to represent the fractions and divide it visually.

They may find an alternative strategy for dividing fractions during this process.

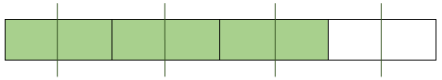
Mathematical Talk

How could you represent this fraction?
Which parts should you shade?
What would happen if we divided each eighth into half? How many pieces would we have in total?
How many sub-parts would you dive each section into?
What is the value of the denominator?
What is the value of the numerator?
Can it be simplified?

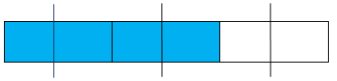
Varied Fluency

1 Calculate:

$\frac{3}{4} \div 2$

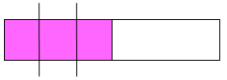


$\frac{2}{3} \div 2$



$\frac{3}{5} \div 2$

$\frac{1}{2} \div 3$



What do you notice?
Is there another strategy you could use to solve these calculations?

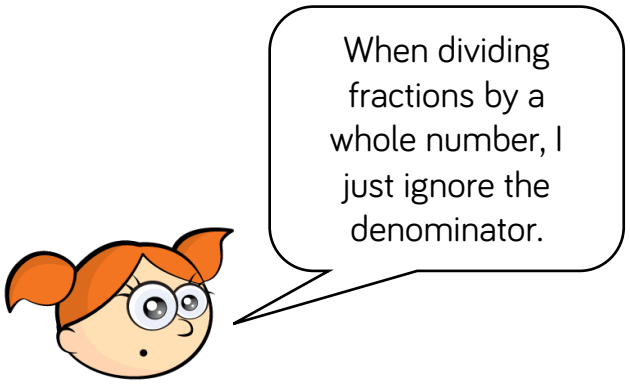
2 Calculate:

$\frac{3}{7} \div 4$ $\frac{7}{9} \div 3$ $\frac{3}{8} \div 5$

Divide Fractions by Integers (2)

Reasoning and Problem Solving

Kelly says,



Do you agree?
Explain why.

No, Kelly is incorrect. The denominator shows the parts the whole is divided into therefore we need to divide it by the whole number.

Solve

$$\square \div 4 = \frac{7}{36}$$

$$\frac{6}{29} \div \square = \frac{6}{58}$$

$$\square \div \square = \frac{9}{65}$$

Have you found all of the possibilities?

There are various possibilities:

1. $\frac{7}{9}$

2. 2

3. $\frac{9}{13} \times 5$ or $\frac{9}{65} \times 1$

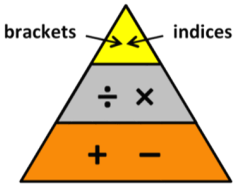
(denominators and whole numbers can swap)

Four Rules with Fractions

Notes and Guidance

During this small step children will apply the rules of the four operations when working with fractions.

They may need to be reminded of which operation to use first.

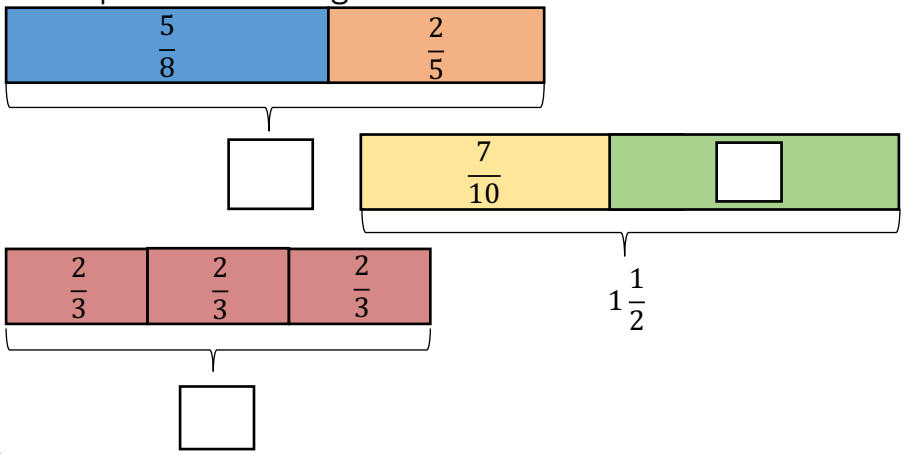


Mathematical Talk

What does it mean when we have a number or a fraction in front of the bracket?
Which operation should we use first? Why?
Is there another way we could answer this?
What would happen if we did not use the brackets? Would the answer be correct? Why?

Varied Fluency

1 Complete the missing boxes.



2 Jack had one quarter of a bag of sweets and Harry had two thirds of the sweets. They shared their sweets with Sophie. What fraction of the sweets do they all receive?

3 Match each calculation to the correct answer.

$(\frac{2}{3}+\frac{1}{5})\times 3$	$\frac{41}{70}$
$\frac{5}{9}-\frac{1}{3}\div 2$	$\frac{7}{18}$
$\frac{2}{5}\times 2-(\frac{3}{7}\div 2)$	$2\frac{3}{5}$

Four Rules with Fractions

Reasoning and Problem Solving

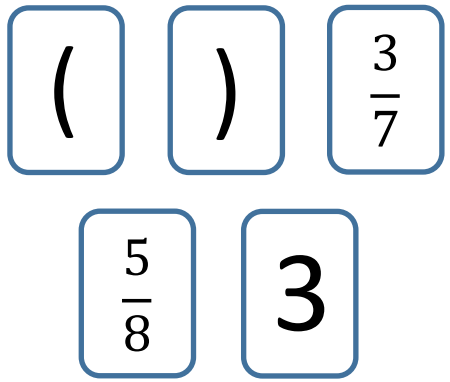
Add two set of brackets to make the following calculation correct:

$$\frac{1}{2} + \frac{1}{4} \times 8 + \frac{1}{6} \div 3 = 6\frac{1}{18}$$

Explain where the brackets go and why.
Did you find any difficulties?

$(\frac{1}{2} + \frac{1}{4}) \times 8 + (\frac{1}{6} \div 3)$

Using the following cards and any operation find an answer of $\frac{33}{56}$



$(\frac{5}{8} - \frac{3}{7}) \times 3 = \frac{33}{56}$

$\frac{33}{56} - \frac{24}{56} = \frac{11}{56}$

$\frac{11}{56} \times 3 = \frac{33}{56}$

Fraction of an Amount

Notes and Guidance

Children find unit and non-unit fractions of amount, quantities and measures.

It is important that the concept is explored pictorially through bar models to support children to make sense of the abstract.

Mathematical Talk

How many equal groups have you shared 49 into? Why?

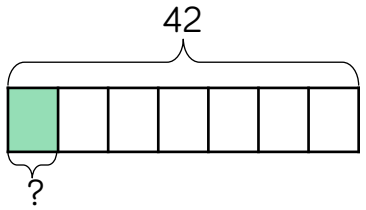
What does each equal part represent as a fraction and an amount?

What could you do to 1 metre to make the calculation easier?

Could you convert $\frac{4}{5}$ to make the calculation any easier?

Varied Fluency

1 Find $\frac{1}{7}$ of 42



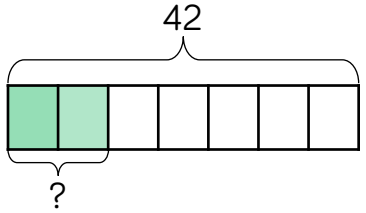
$42 \div 7 = 6$

$\frac{1}{7}$ of 42 is 6

Use this method to find

$\frac{1}{8}$ of 56 $\frac{1}{6}$ of 480 $\frac{1}{9}$ of 81 m

2 Find $\frac{2}{7}$ of 42



$42 \div 7 = 6$

$6 \times 2 = 12$

$\frac{2}{7}$ of 42 is 12

Use this method to find

$\frac{3}{8}$ of 56 $\frac{5}{6}$ of 480 $\frac{4}{9}$ of 81 m

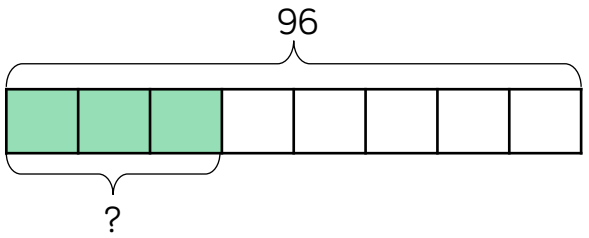
3 Draw a bar model to help you calculate

$\frac{4}{5}$ of 1 m $\frac{5}{12}$ of 1.44 litres $\frac{3}{7}$ of 21 kg

Fraction of an Amount

Reasoning and Problem Solving

Write a problem that matches the bar model.



Possible response:

There are 96 cars in a car park.
$\frac{3}{8}$ of them are red.
How many cars are red?

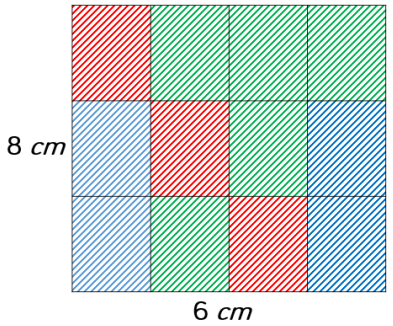
$\frac{7}{16}$ of a class are boys.

There are 18 girls in the class.

How many children are in the class?

There are 32 children in the class.

Find the area of each colour in the rectangle.



Area of rectangle:
$6 \times 8 = 48$ cm^2

Blue
$\frac{4}{12}$ of $48 = 16$ cm^2

Red
$\frac{3}{12}$ of $48 = 12$ cm^2

Green
$\frac{5}{12}$ of $48 = 20$ cm^2

Fraction of an Amount

Notes and Guidance

Children will learn how to find the whole amount from the known value of the fraction. In this small step children will look at examples where the amounts both increase and decrease in value.

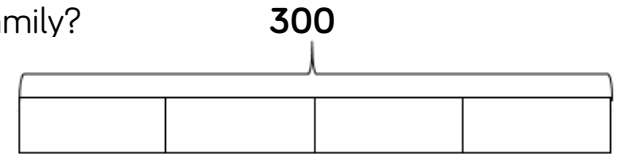
Mathematical Talk

How can you represent this problem?
Which parts should you shade?
What is the value of the shaded parts?
What is the value of the whole?
How much has the value increased/decreased by?

Varied Fluency

1 The school kitchen has 48 kg of potatoes. They use $\frac{5}{8}$ to make mash potato for lunch.
How much potato do they have left?
Use the bar model to find the answer to this question.

2 A football team has 300 tickets to give away. They give $\frac{3}{4}$ of them to a local school and give $\frac{1}{3}$ of the remainder to a local business. How many tickets are left to give to friends and family?



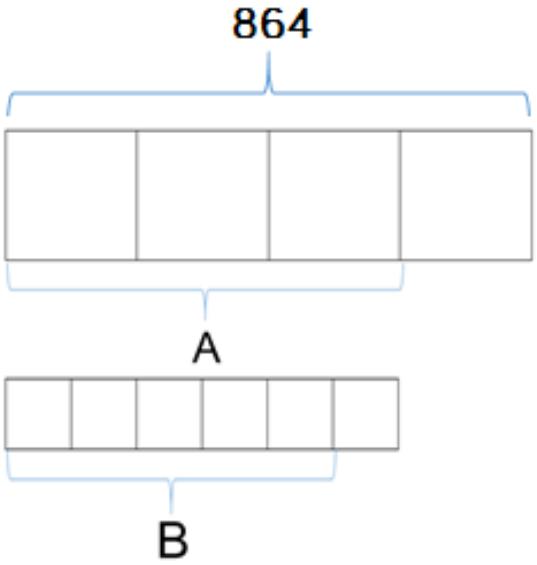
3 Complete: $\frac{3}{8}$ of 40 = $\frac{\quad}{10}$ of 150

$\frac{1}{5}$ of 315 = $\frac{\quad}{8}$ of 72

Fraction of an Amount

Reasoning and Problem Solving

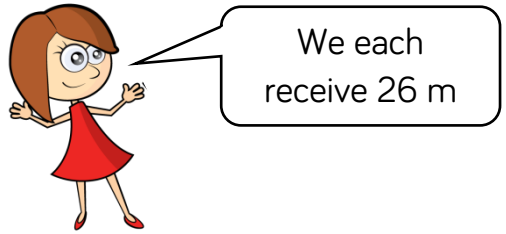
What is the value of A?
What is the value of B?



A = 648
B = 540

Two fashion designers receive $\frac{3}{8}$ of 208 m of materials.

One of them says:



Is she correct?
Explain your reasoning

She is incorrect because 26 is only one eighth of 208.
She needs to multiply her answer by 3 so that they each get 78 m each.

Finding the Whole

Notes and Guidance

Children will learn how to find the whole amount from the known value of a fraction.

Children should use their knowledge of finding fractions of amounts and apply this when finding the whole amount.

Mathematical Talk

How could you represent this fraction?

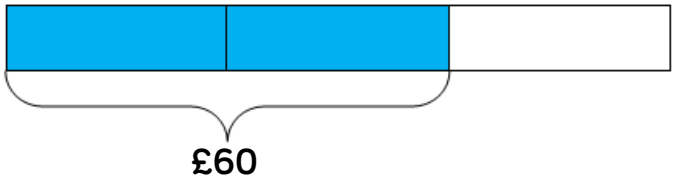
Which parts should you shade?

What is the value of the shaded parts?

What is the value of the whole bar?

Varied Fluency

1 Sam has spent $\frac{2}{3}$ of his money.
He spent £60, how much did he have to start with?



2 Jen eats $\frac{2}{5}$ of a packet of biscuits. She eats 10.
How many in original packet?

$\frac{3}{8}$ of a town voted.
If 120 people voted, how many people lived in the town?

3 Write a problem which this bar model could represent.

Finding the Whole

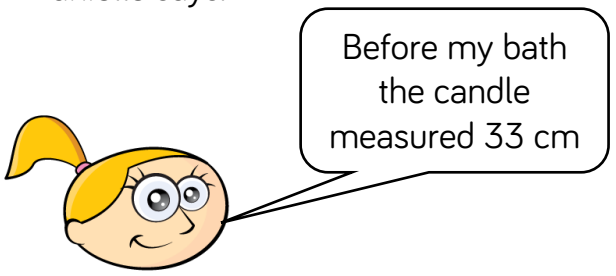
Reasoning and Problem Solving

Danielle lit a candle while she had a bath.

After her bath, $\frac{2}{5}$ of the candle was left.

It measured 13 cm.

Danielle says:



Is she correct?

Explain your reasoning.

She is incorrect.

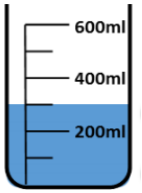
$13 \div 2 = 6.5$

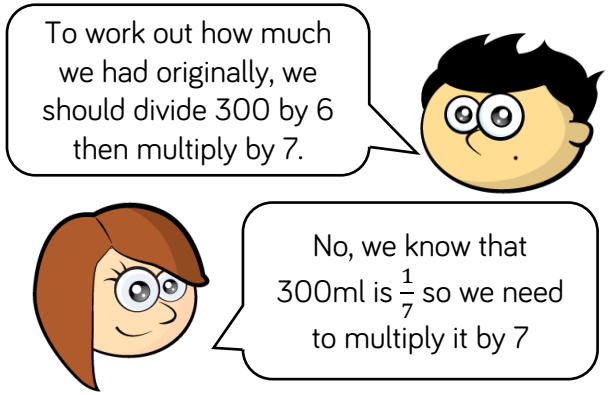
$6.5 \times 5 = 32.5\text{cm}$

She either didn't half correctly or didn't multiply correctly

Milly and Sam are making juice.

They use $\frac{6}{7}$ of the water in a jug and are left with this amount of water:





Who is correct?

Explain your reasoning.

They are both correct. Milly's method calculates $\frac{1}{7}$ then $\frac{7}{7}$ whereas Sam's method recognises $\frac{1}{7}$ is left in the jug therefore multiplies it by 7 to find the whole.

Fractions as Operators

Notes and Guidance

Children link their understanding of fractions of amounts and multiplying fractions to use fractions as operators.

They use their knowledge of commutativity to help them understand that you can change the order of multiplication without changing the outcome.

Mathematical Talk

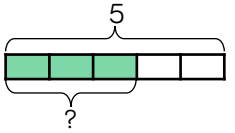
Is it easier to multiply a fraction of find a fraction of an amount? Does it depend on the whole number you are multiplying by?

Can you see the link between the numbers? Can you use previous calculations to help you calculate missing numbers?

Varied Fluency

1 Jenny has calculated and drawn a bar model for two calculations.

$5 \times \frac{3}{5} = \frac{15}{5} = 3$ 

$\frac{3}{5}$ of $5 = 3$ 

What's the same and what's different about Jenny's calculations?

2 Complete:

2 lots of $\frac{1}{10} =$ ☐ $\quad\quad \frac{1}{10}$ of $2 =$ ☐

8 lots of ☐ $= 200$ $\quad\quad$ 8 lots of $2.5 =$ ☐

8 lots of $\frac{1}{4} =$ ☐ $\quad\quad \frac{1}{4}$ of $8 =$ ☐

3 Use this to complete:

$20 \times \frac{4}{5} =$ ☐ of $20 =$ ☐ $\quad\quad$ ☐ $\times \frac{2}{3} =$ ☐ of $18 = 12$

☐ $\times \frac{1}{3} = \frac{1}{3}$ of ☐ $= 20$

Fractions as Operators

Reasoning and Problem Solving

Which calculations are easier to multiply the fractions, and which are easier to find the fraction of an amount?
Explain you choice for each one.

$25 \times \frac{3}{5}$ or $\frac{3}{5}$ of 25

$6 \times \frac{2}{3}$ or $\frac{2}{3}$ of 6

$5 \times \frac{3}{8}$ or $\frac{3}{8}$ of 5

Possible response:

1. Children may find it easier to find 3 fifths of 5 rather than multiply 25 by 3
2. Children may choose either as they are of similar difficulty.
3. Children will probably find it easier to multiply than divide 5 by 8

Jamie and Sam are thinking of a two-digit number between 20 and 30

Jamie finds two thirds of the number

Sam multiplies the number by $\frac{2}{3}$

Their new two-digit number has a digit total that is one more than that of their original number

What number did they start with?

Show each step of their calculation.

They started with 24

Jamie:
$24 \div 3 = 8$
$8 \times 2 = 16$

Sam:
$24 \times 2 = 48$
$48 \div 3 = 16$