BOOK 3

KEY STAGE 3

Mastering Mathematics

Develop and Secure

Practice Book

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CHAPTER 1

Powers and indices

Fluency · Reasoning · Problem solving

1.1 Index notation

1 Work out:

a 4^2 **b** 3^2 **c** 9^2

d 2^3 **e** 10^3 **f** 2^4

Remember that 5 × 5 is written as 5^2. You say that 5 is the **base** and 2 is the **index** or **power**.

In the same way, repeated multiplications can be written using **index notation** like this:

$\underbrace{5\times5\times5}_{3\text{ fives}}=5^3$ $\underbrace{5\times5\times5\times5}_{4\text{ fives}}=5^4$

In general,

$\underbrace{a\times a\times a\times\ldots\times a\times a}_{n\text{ times}}=a^n$

2 Write each expression as a power of 8.

a $8\times8\times8$

b $8\times8\times8\times8\times8$

c $8\times8\times8\times8\times8\times8\times8$

d $8\times8\times8\times8$

3 Write each expression as a single power.

a 9×9

b $4\times4\times4\times4\times4$

c $11\times11\times11$

d $57\times57\times57\times57\times57\times57$

e $0.6\times0.6\times0.6$

f $18.2\times18.2\times18.2\times18.2$

4 **a** Work out the value of 2^6.

b Find the value of $8^2+10^3+2^4$.

c Calculate the difference between 2^3 and 2^5.

5 Write the correct symbol <, > or = between each pair of numbers.

a 9^2 ☐ 7^2 **b** 10^2 ☐ 10^3

c 2^6 ☐ 6^2 **d** 3^3 ☐ 5^2

e 1^8 ☐ 4^2 **f** 4^3 ☐ 8^2

To write $3^5\times3^4$ as a single power of 3:

$3^5\times3^4=(3\times3\times3\times3\times3)\times(3\times3\times3\times3)$

$=3^9$

The powers have been added: 5 + 4 = 9

6 Write each of these as a single power.

a $11^4\times11^2$

b $4^7\times4^3$

c $7^5\times7^{10}\times7^6$

To write $3^6\div3^4$ as a single power of 3:

$3^6\div3^4=\frac{3^6}{3^4}=\frac{3\times3\times\cancel{3}\times\cancel{3}\times\cancel{3}\times\cancel{3}}{\cancel{3}\times\cancel{3}\times\cancel{3}\times\cancel{3}}$

$=3\times3$

$=3^2$

The powers have been subtracted: 6 − 4 = 2

7 Write each of these as a single power.

a $5^7\div5^3$ **b** $12^{11}\div12^8$ **c** $\frac{8^9}{8^2}$

In the previous examples, the base was 3, but the rules are true for any base number.

Here are the general rules for multiplying and dividing powers:

$a^m\times a^n=a^{m+n}$ and $a^m\div a^n=a^{m-n}$

Take care! The bases must be the same – you can't combine powers if the bases are different.

8 Where possible, write each of these as a single power.

a $7^9\div7^3$ **b** $4^5\times4^8$ **c** 10^2+10^3

d $\frac{6^{15}}{6^4}$ **e** $23^9\times23^7$ **f** $4^5\div9^3$

9 Eleni says that $3^5\times3^7$ is equal to 9^{12}.

Eleni is wrong. What mistake has she made? What is the correct answer?

Sometimes powers involve brackets. To write $(3^2)^4$ as a single power of 3:

$(3^2)^4=(3^2)\times(3^2)\times(3^2)\times(3^2)$

$=(3\times3)\times(3\times3)\times(3\times3)\times(3\times3)$

$=3^8$

The powers have been multiplied: 2 x 4 = 8

The general rule for a power of a power is:

$(a^m)^n=a^{m\times n}$

10 Write each of these as a single power.

a $(5^3)^2$ **b** $(9^2)^7$ **c** $(16^5)^6$

11 Write each of these calculations as a single power.

a $(4^9)^3$ **b** $3^8\div3^6$

c $9^5\times9^{11}$ **d** $13^7\div13^4$

e $(25^2)^9$ **f** $17^3\times17^4\div17^5$

You now know that
$8^3 \div 8^2 = 8^1$

The powers have been subtracted: 3 − 2 = 1

Writing this calculation as a fraction: $\frac{8 \times \not{8} \times \not{8}}{\not{8} \times \not{8}} = 8$

This shows that $8^1 = 8$.

Here is a general rule: any number to the power 1 is itself.

$$a^1 = a$$

12 Write each of these as a single power.

a $3^7 \div 3$ **b** 6×6^{11}

c $8^5 \times 8$ **d** $9^5 \times 9 \times 9^{12}$

e $14^8 \times 14^2 \times 14$ **f** $2^5 \div 2 \times 2^2$

You now also know that $7^3 \div 7^3 = 7^0$

The powers have been subtracted: 3 − 3 = 0

Writing this calculation as a fraction: $\frac{\not{7} \times \not{7} \times \not{7}}{\not{7} \times \not{7} \times \not{7}} = 1$

This shows that $7^0 = 1$.

Here is another general rule: any number to the power 0 is 1.

$$a^0 = 1$$

13 Work out the value of:

a 5^0 **b** 23^0

c 1.9^0 **d** $(-4)^0$

1.2 Standard form

1 Write these numbers as powers of 10.

a 100 **b** 10 000

c 10 000 000 **d** 1000

e 10

2 Work out these powers of 10.

a 10^5 **b** 10^2 **c** 10^1

d 10^6 **e** 10^0

3 **a** Write down ten thousand as:

i an ordinary number

ii a power of 10.

b Write down ten million as:

i an ordinary number

ii a power of 10.

4 **a** Copy and complete this pattern.

$4.5 \times 10^0 = 4.5$

$4.5 \times 10^1 = 4.5 \times 10 = \square$

$4.5 \times 10^2 = 4.5 \times 100 = \square$

$4.5 \times 10^3 = 4.5 \times \square = \square$

$4.5 \times 10^4 = 4.5 \times \square = \square$

b Work out the value of 4.5×10^6.

c Copy and complete this calculation:

$4\,500\,000\,000 = 4.5 \times 10^{\square}$

In maths and science, large and small numbers are usually written using powers of 10.

Standard form is a way of writing down large numbers without writing down all the zeros.

A number is in standard form when it is written as a number between 1 and 10 multiplied by a power of 10.

In symbols this is written as $A \times 10^n$ where A can be any number from 1 up to 10 ($1 \leqslant A < 10$) and n must be an integer (whole number)

5 Which of these numbers is in standard form? Explain the mistakes in the other answers.

a 0.5×10^7 **b** $4.08 \times 10^{2.6}$

c 9.2×10^5 **d** 31.5×10^2

A forest covers an area of 83 000 m².

1 To write this number in standard form, first find the value of A.

83 000 in standard form is $8.3 \times 10^{\square}$

A is always between 1 and 10.

2 Use a place value diagram to help you work out what the power of 10 should be.

T Th	Th	H	T	U		t
				8	.	3
8	3	0	0	0	.	

$83\,000 = 8.3 \times 10\,000$

$= 8.3 \times 10^4$

You have to multiply 8.3 by ten 4 times to get 83 000.

So, the forest covers an area of 8.3×10^4 m².

6 Copy and complete these by filling in the missing numbers.

a $\square \times 10^3 = 9000$

b $\square \times 10^2 = 400$

c $2 \times 10^{\square} = 200\,000$

d $8.3 \times 10^{\square} = 830$

e $\square \times 10^5 = 560\,000$

f $\square \times 10^4 = 13\,000$

7 Write these numbers in standard form.

a 500 **b** 30 000

c 8000 **d** 670 000

e 9400 **f** 4 250 000

g 801 000 000 **h** 36 000
i 71 400 **j** 12

8 Write these numbers as powers of 10.
a 0.01 **b** 0.0001
c 0.1 **d** 0.000 01

9 Work out these powers of 10.
a 10^3 **b** 10^{-1} **c** 10^5
d 10^{-4} **e** 10^{-2}

The mass of a grain of rice is approximately 0.029 g.

1 To write this number in standard form, first find the value of A.
0.029 in standard form is $2.9 \times 10^{\square}$
A is always between 1 and 10.

2 Use a place value diagram to help you work out what the power of 10 should be.

U		T	h	th
2	.	9		
0	.	0	2	9

$0.029 = 2.9 \times 100$
$= 2.9 \times 10^{-2}$

Dividing by 10 is the same as multiplying by 10^{-1}.
Dividing by 100 is the same as multiplying by 10^{-2}.
So, the mass of a grain of rice is 2.9×10^{-2} g

10 Write these numbers in standard form.
a 0.004 **b** 0.000 03
c 0.9 **d** 0.07
e 0.082 **f** 0.000 75
g 0.000 001 02 **h** 0.000 934
i 0.0051 **j** 0.308

11 Write the numbers in the statements in standard form.
a The circumference of the Earth is approximately 40 000 kilometres.
b A red blood cell has a diameter of 0.000 007 metres.
c In 2018, England had an estimated population of 56 000 000.
d The mass of a grain of sand is 0.011 grams.

To convert from standard form back to ordinary numbers, remember that when the power of 10
- ▶ is positive then the number is BIG
- ▶ is negative then the number is SMALL.

To convert numbers from standard form to ordinary numbers, first think about the power of 10:
$2.7 \times 10^3 = 2.7 \times 1000 = 2700$
$2.7 \times 10^{-3} = 2.7 \times 0.001 = 0.0027$

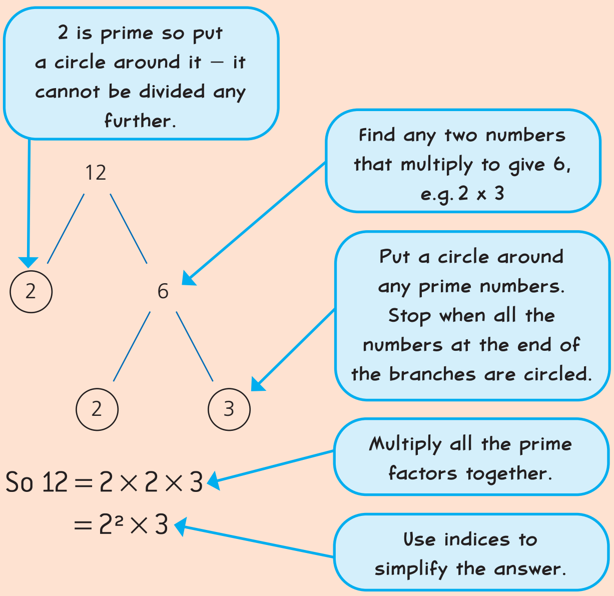
12 Write each of these as an ordinary number.
a 5×10^3 **b** 3×10^2
c 9×10^5 **d** 4.2×10^4
e 8.7×10^6 **f** 1.5×10^1
g 7×10^{-3} **h** 4×10^{-4}
i 8×10^{-2} **j** 1.9×10^{-6}
k 2.6×10^{-1} **l** 6.8×10^{-5}

1.3 Prime factorisation

1 Look at these numbers:
10 7 6 36 25 1 3 2 4 24 8
Write down all the numbers that are:
a multiples of 5 **b** factors of 12
c square numbers **d** cube numbers.

2 Prime numbers are numbers that have exactly 2 factors: 1 and the number itself.
Which of the numbers in the box in question **1** are prime?

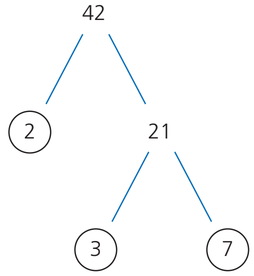
Every number can be made by multiplying together prime numbers.
For example, $60 = 2 \times 2 \times 3 \times 5 = 2^2 \times 3 \times 5$. This is called a **product of prime factors**.
One method of finding prime factors is to use a **factor tree**.
For example, to write 12 as a product of prime factors, start with 12 at the top.
Look for any two numbers that multiply to give 12, e.g. 2×6



There is only one way to write any number as a product of prime factors.
There may be different factor trees, but they will always give the same product of prime factors.

3 Use the factor trees to write each number as a product of prime factors.

a



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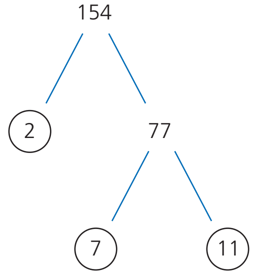

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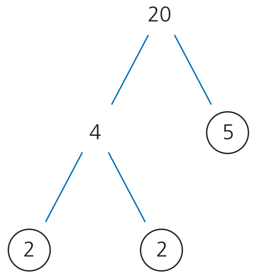


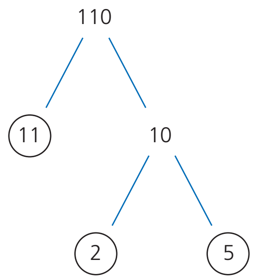
4 Draw factor trees to write these numbers as products of the prime factors.

a 30 **b** 70 **c** 66
d 130 **e** 105

5 Write each of the numbers as a product of its prime factors, using indices.

a 18 **b** 44 **c** 75
d 56 **e** 100

6 Jessica uses a factor tree to write 110 as a product of prime factors.



Jessica writes:

110 = 2 + 5 + 11

Jessica is wrong. What mistake has she made?

The **h**ighest **c**ommon **f**actor (HCF) of two numbers is the largest factor that they share.

You can find the HCF of two numbers by listing their factors.

Factors of 20:
1, 2, 4, 5, 10, 20

Factors of 30:
1, 2, 3, 5, 6, 10, 15, 30

The highest common factor of 20 and 30 is 10.

7 **a** What are the factors of 10?
b What are the factors of 12?
c What is the highest common factor (HCF) of 10 and 12?

8 Find the highest common factor (HCF) of each pair of numbers.

a 35 and 50
b 16 and 24
c 45 and 36

The **l**owest **c**ommon **m**ultiple (**LCM**) of two numbers is the lowest multiple that they share.

You can find the LCM of two numbers by listing their multiples.

Multiples of 8:
8, 16, 24, 32, 40, ...

Multiples of 3:
3, 6, 9, 12, 15, 18, 21, 24, 27, ..

The lowest common multiple of 8 and 3 is 24.

9 **a** What are the first ten multiples of 4?
b What are the first ten multiples of 9?
c What is the lowest common multiple (LCM) of 4 and 9?

10 Find the lowest common multiple (LCM) of each pair of numbers.

a 5 and 7 **b** 6 and 10
c 8 and 12

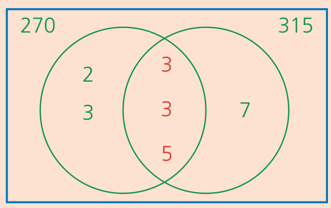
A **Venn diagram** can be used to find the HCF and LCM of two numbers.

1 First, write both numbers as a product of their prime factors.

$270 = 2 \times 3 \times 3 \times 3 \times 5$

$315 = 3 \times 3 \times 5 \times 7$

2 Next, show the prime factors in a Venn diagram.



3, 3 and 5 are common factors so they go in the intersection.

The highest common factor is found by multiplying the numbers in the intersection.

$3 \times 3 \times 5 = 45$

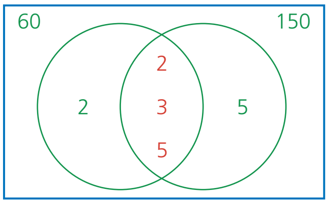
So, the HCF of 270 and 315 is 45.

The lowest common multiple is found by multiplying all of the numbers in the Venn diagram.

$2 \times 3 \times 3 \times 3 \times 5 \times 7 = 1890$

So, the LCM of 270 and 315 is 1890.

11 Here is a Venn diagram showing the prime factors of 60 and 150.



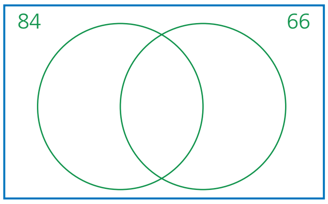
a What is the highest common factor of 60 and 150?

b What is lowest common multiple of 60 and 150?

12 Here are 84 and 66, written as products of prime factors:

$84 = 2 \times 2 \times 3 \times 7$ **$66 = 2 \times 3 \times 11$**

a Copy and complete the Venn diagram showing the prime factors of 84 and 66.



b Find the highest common factor of 84 and 66.

c Find the lowest common multiple of 84 and 66.

13 Find the highest common factor and lowest common multiple of these pairs of numbers by first finding their prime factors.

a 56 and 20 **b** 42 and 60

c 20 and 140 **d** 66 and 154

CHAPTER 2

Fractions

Fluency Reasoning Problem solving

2.1 Fractions review

1 Find the lowest common multiple of these pairs of numbers.

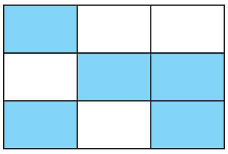
a 3 and 5 **b** 4 and 10
c 2 and 7 **d** 6 and 9

2 Find the highest common factor of these pairs of numbers.

a 10 and 14 **b** 35 and 20
c 11 and 15 **d** 24 and 16

3 What fraction of each of the shapes is shaded?

a



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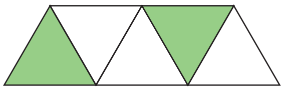
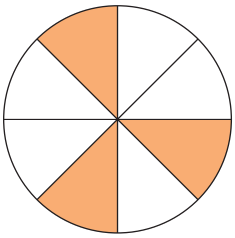
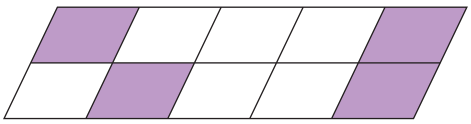


c



d



You can change a fraction into a decimal by either writing an equivalent fraction with a denominator of 10 or 100 and using place value, or by dividing the numerator by the denominator.
For example, $\frac{4}{5} = \frac{8}{10} = 0.8$ and $\frac{3}{8} = 3 \div 8 = 0.375$.

4 Write these fractions as decimals.

a $\frac{7}{10}$ **b** $\frac{1}{2}$ **c** $\frac{11}{20}$
d $\frac{3}{4}$ **e** $\frac{8}{25}$ **f** $\frac{7}{8}$

You can find **equivalent fractions** by multiplying or dividing **both the numerator and denominator** by the same number.

Equivalent fractions simplify to give the same fraction in its lowest terms.
So, $\frac{3}{8} = \frac{6}{16}$ and $\frac{12}{32} = \frac{3}{8}$

You can't simplify $\frac{3}{8}$ any further, so you say that $\frac{3}{8}$ is in its **simplest form**.

5 Simplify these fractions.

a $\frac{12}{15}$ **b** $\frac{30}{45}$ **c** $\frac{24}{28}$
d $\frac{44}{77}$ **e** $\frac{12}{36}$ **f** $\frac{63}{81}$

6 Look at these fractions.

$\frac{2}{8}$ $\frac{6}{12}$ $\frac{4}{6}$ $\frac{5}{20}$ $\frac{14}{21}$ $\frac{9}{18}$ $\frac{6}{9}$ $\frac{3}{12}$ $\frac{5}{10}$

Write down all the fractions that are equivalent to:

a $\frac{1}{2}$ **b** $\frac{1}{4}$ **c** $\frac{2}{3}$

You can use equivalent fractions to rewrite a decimal as a fraction.
For example, 0.42 means 42 hundredths, which is $\frac{42}{100}$

Simplifying the fraction gives $\frac{42}{100} = \frac{21}{50}$ so $0.42 = \frac{21}{50}$

7 Write each of these decimals as a fraction in its simplest form.

a 0.8 **b** 0.14
c 0.128 **d** 0.625

Remember: you can only add or subtract fractions when they have the **same denominator**.
To work out $\frac{3}{4} + \frac{1}{5}$:

1 Find the lowest common multiple of the denominators.
The LCM of 4 and 5 = 20
2 Write equivalent fractions with this denominator.
$\frac{3}{4} = \frac{15}{20}$ and $\frac{1}{5} = \frac{4}{20}$
3 Add or subtract the numerators.
$\frac{3}{4} + \frac{1}{5} = \frac{15}{20} + \frac{4}{20} = \frac{19}{20}$

8 In each pair, which fraction is bigger?

a $\frac{1}{4}$ or $\frac{1}{5}$ **b** $\frac{3}{4}$ or $\frac{3}{7}$
c $\frac{2}{5}$ or $\frac{3}{5}$ **d** $\frac{2}{9}$ or $\frac{1}{4}$

9 Work these out giving each answer as a fraction in its simplest form.

a $\frac{7}{11}-\frac{5}{11}$ **b** $\frac{3}{4}+\frac{1}{8}$ **c** $\frac{1}{3}+\frac{5}{12}$

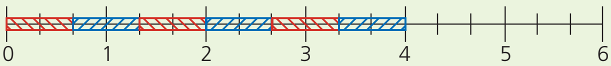
d $\frac{1}{2}-\frac{1}{6}$ **e** $\frac{2}{5}+\frac{1}{3}$ **f** $\frac{5}{6}-\frac{3}{4}$

g $\frac{3}{4}-\frac{1}{3}$ **h** $\frac{1}{2}+\frac{5}{11}$

Multiplication is commutative, which means that it doesn't matter in which order you multiply numbers.

So, 6 lots of $\frac{2}{3}=6\times\frac{2}{3}=\frac{2}{3}\times 6=\frac{2}{3}$ of 6

This number line shows that $6\times\frac{2}{3}=4$



To find fractions of amounts, first divide by the denominator and then multiply by the numerator.

For example, to find $\frac{2}{3}$ of 6:

$6\div 3=2$ $\frac{1}{3}$ of $6=2$

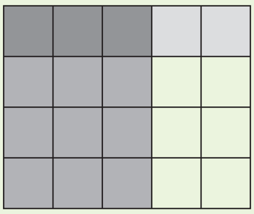
$2\times 2=4$ $\frac{2}{3}$ of $6=4$

10 Work out:

a $\frac{1}{4}$ of 24 **b** $\frac{1}{9}\times 36$ **c** $66\times\frac{1}{6}$

d $\frac{3}{8}\times 40$ **e** $\frac{2}{5}$ of 35 **f** $14\times\frac{4}{7}$

You can also multiply fractions together.



For example, $\frac{1}{4}\times\frac{3}{5}$ means $\frac{1}{4}$ of $\frac{3}{5}$.

The diagram shows $\frac{1}{4}$ of $\frac{3}{5}$.

So $\frac{1}{4}\times\frac{3}{5}=\frac{3}{20}$.

Remember that to multiply fractions, you multiply the numerators and multiply the denominators.

Cancelling out common factors before multiplying means you do not need to simplify at the end.

$$\frac{3}{8}\times\frac{4}{9}=\frac{12}{72}=\frac{1}{6}\quad(\div 12)$$

$$\frac{\cancel{3}^{1}}{{}_{2}\cancel{8}}\times\frac{\cancel{4}^{1}}{\cancel{9}_{3}}=\frac{1}{6}$$

11 Work these out, giving each answer as a fraction in its simplest form.

a $\frac{1}{2}\times\frac{1}{7}$ **b** $\frac{2}{5}\times\frac{4}{9}$ **c** $\frac{3}{11}\times\frac{1}{2}$

d $\frac{2}{9}\times\frac{1}{4}$ **e** $\frac{5}{9}\times\frac{3}{5}$ **f** $\frac{4}{9}\times\frac{9}{20}$

Remember that $1\div\frac{1}{5}$ means 'how many fifths are there in 1 whole?'

So, $1\div\frac{1}{5}=5$

Dividing by $\frac{1}{5}$ is the same as multiplying by 5

Every division by a fraction can be written as a multiplication by the **reciprocal**.

12 Write down the reciprocal of each of these:

a 4 **b** $\frac{1}{2}$ **c** $\frac{3}{5}$

d $\frac{1}{8}$ **e** $\frac{4}{9}$ **f** $\frac{7}{3}$

13 Work out these division calculations.

a $3\div\frac{1}{4}$ **b** $4\div\frac{1}{3}$ **c** $9\div\frac{1}{2}$

d $10\div\frac{1}{6}$ **e** $6\div\frac{1}{5}$

14 Work out the following, giving each answer as a fraction in its simplest form.

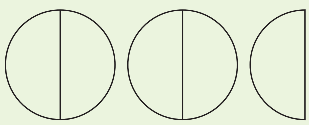
a $\frac{1}{5}\div\frac{1}{4}$ **b** $\frac{1}{7}\div\frac{1}{3}$ **c** $\frac{1}{6}\div\frac{6}{7}$

d $\frac{1}{2}\div\frac{3}{4}$ **e** $\frac{2}{5}\div\frac{7}{8}$ **f** $\frac{3}{5}\div\frac{9}{10}$

2.2 Mixed numbers

Fractions can be used to represent numbers which are greater than 1.

This diagram shows $\frac{5}{2}$.



There are 2 halves in one whole.

So, there are 4 halves in 2 wholes. 5 halves make 2 and a half.

Fractions like $\frac{5}{2}$ are called top heavy or **improper fractions**.

They can also be written as **mixed numbers** (a mix of a whole number and a fraction).

For example, $\frac{5}{2}=2\frac{1}{2}$.

Every improper fraction can be written as a mixed number.

1 Find the missing number in each statement.

a $1 = \frac{\square}{3}$ **b** $1 = \frac{\square}{8}$

c $1 = \frac{\square}{10}$ **d** $2 = \frac{\square}{3}$

e $3 = \frac{\square}{4}$ **f** $10 = \frac{\square}{5}$

g $5 = \frac{\square}{6}$ **h** $4 = \frac{\square}{2}$

i $8 = \frac{\square}{10}$

To write $\frac{19}{5}$ as a mixed number, change the fraction to a division.

$\frac{19}{5} = 19 \div 5$ $19 \div 5 = 3$ remainder 4 So $\frac{19}{5} = 3\frac{4}{5}$.

2 Write these improper fractions as mixed numbers.

a $\frac{7}{4} = 1\frac{\square}{4}$ **b** $\frac{11}{5} = 2\frac{\square}{5}$

c $\frac{13}{3} = \square\frac{\square}{3}$ **d** $\frac{9}{7} = 1\frac{\square}{\square}$

e $\frac{63}{10} = \square\frac{3}{\square}$ **f** $\frac{17}{6}$

g $\frac{21}{8}$ **h** $\frac{23}{4}$

i $\frac{16}{3}$ **j** $\frac{27}{5}$

To write $2\frac{7}{8}$ as an improper fraction, first think about how many eighths are in 2 wholes.

$2 = \frac{16}{8}$

So, $2\frac{7}{8} = \frac{16}{8} + \frac{7}{8} = \frac{23}{8}$.

3 **a** How many fifths are there in 1 whole?

b Write $1\frac{4}{5}$ as an improper fraction.

4 Write these mixed numbers as improper fractions.

a $1\frac{3}{4} = \frac{\square}{4}$ **b** $1\frac{5}{8} = \frac{\square}{8}$

c $2\frac{1}{10} = \frac{\square}{10}$ **d** $3\frac{2}{7} = \frac{\square}{7}$

e $5\frac{2}{3} = \frac{17}{\square}$ **f** $1\frac{2}{5}$

g $2\frac{3}{4}$ **h** $9\frac{1}{5}$

i $10\frac{4}{9}$ **j** $6\frac{3}{11}$

5 Work out these subtractions.

a $1 - \frac{1}{5}$ **b** $2 - \frac{1}{3}$ **c** $4 - \frac{1}{2}$

d $5 - \frac{2}{7}$ **e** $3 - \frac{4}{9}$

There are two methods for adding and subtracting mixed numbers.

1 Deal with the whole numbers first and then the fractions.

2 Convert to improper fractions first and then add or subtract as normal.

For example, to work out:

a $2\frac{1}{3} + 1\frac{4}{5}$ **b** $2\frac{1}{3} - 1\frac{4}{5}$

Part a Method 1	Part a Method 2
$2\frac{1}{3} + 1\frac{4}{5} = 2\frac{5}{15} + 1\frac{12}{15}$ $= 2 + 1 + \frac{5}{15} + \frac{12}{15}$ $= 3 + \frac{17}{15}$ $= 3 + 1 + \frac{2}{15}$ $= 4\frac{2}{15}$	$2\frac{1}{3} + 1\frac{4}{5} = \frac{7}{3} + \frac{9}{5}$ $\frac{7}{3} + \frac{9}{5} = \frac{35}{15} + \frac{27}{15}$ $= \frac{62}{15}$ $= \frac{60}{15} + \frac{2}{15}$ $= 4\frac{2}{15}$

Part b Method 1	Part b Method 2
$2\frac{1}{3} - 1\frac{4}{5} = 2\frac{5}{15} - 1\frac{12}{15}$ $= 2 - 1 + \frac{5}{15} - \frac{12}{15}$ $= 1 - \frac{7}{15}$ $= \frac{8}{15}$	$2\frac{1}{3} - 1\frac{4}{5} = \frac{7}{3} - \frac{9}{5}$ $= \frac{35}{15} - \frac{27}{15}$ $= \frac{8}{15}$

6 Work these out giving your answers as mixed numbers.

a $\frac{5}{7} + \frac{4}{7}$ **b** $\frac{2}{3} + \frac{7}{9}$ **c** $\frac{3}{4} + \frac{5}{6}$

d $\frac{3}{2} + \frac{6}{5}$ **e** $\frac{5}{4} + \frac{7}{3}$ **f** $\frac{5}{2} + \frac{8}{3}$

7 Work these out giving your answers as mixed numbers.

a $\frac{11}{3} - \frac{4}{3}$ **b** $\frac{11}{4} - \frac{6}{5}$ **c** $\frac{7}{2} - \frac{4}{3}$

d $\frac{5}{2} - \frac{8}{7}$ **e** $\frac{12}{5} - \frac{4}{3}$ **f** $\frac{13}{2} - \frac{7}{6}$

BOOK 3

KEY STAGE 3

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