Maths Revision & Practice Booklet

Name: _____

Fractions, Decimals and Percentages
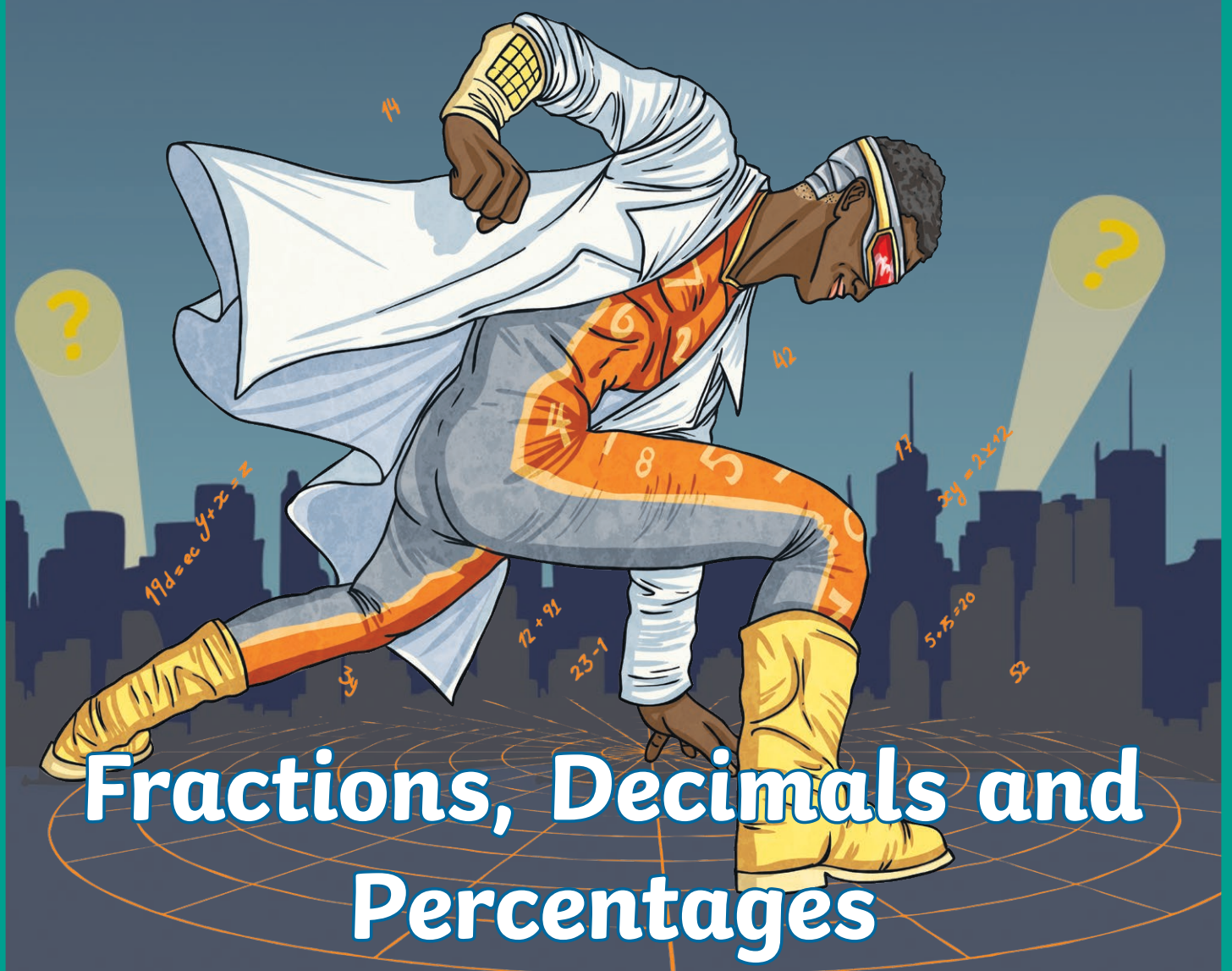
Revise

Using Common Factors to Simplify Fractions

Fractions that have the same value but represent this using different denominators and numerators are equivalent. We can recognise and find equivalent fractions by multiplying or dividing the numerator and denominator by the same amount. When we simplify a fraction, we use the highest common factor of the numerator and denominator to reduce the fraction to the lowest term equivalent fraction (simplest form).

$$\frac{21}{36}$$

Factors of 21: 1 ③ 7

Factors of 36: 1 2 ③ 4 6 9 12 18 36

The highest common factor is 3.

$$\frac{21}{36} \quad \begin{array}{l} \div 3 = 7 \\ \div 3 = 12 \end{array} \quad \frac{7}{12}$$

Using Common Multiples to Express Fractions in the Same Denomination

To compare or calculate with fractions, we often need to give them a common denominator. We do this by looking at the denominators and finding their lowest common multiple.

$$\frac{3}{5} \qquad \frac{4}{7}$$

5 × 7 = 35
35 is the lowest common multiple.

$$\frac{3}{5} \quad \begin{array}{l} 3 \times 7 = \underline{21} \\ 5 \times 7 = \underline{35} \end{array} \qquad \frac{4}{7} \quad \begin{array}{l} 4 \times 5 = \underline{20} \\ 7 \times 5 = \underline{35} \end{array}$$

Remember that whatever we do to the denominator, we have to do to the numerator.

Comparing and Ordering Fractions, Including Fractions > 1

To compare and order fractions with the same denominators... ➡️ ...look at the numerators. ➡️ $\dfrac{5}{9} > \dfrac{2}{9}$

To compare and order fractions with different denominators... ➡️ ...change the fractions into equivalent fractions with the lowest common denominator. ➡️ $\dfrac{5}{9}$ and $\dfrac{3}{5}$

×5   ×9

$\dfrac{25}{45} < \dfrac{27}{45}$

To compare and order fractions with mixed numbers... ➡️ ...change the mixed number into an improper fraction and continue as needed. ➡️ $1\dfrac{2}{7}$ and $1\dfrac{1}{3}$

$\dfrac{9}{7}$ and $\dfrac{4}{3}$

×3   ×7

$\dfrac{27}{21} < \dfrac{28}{21}$

Add and Subtract Fractions with Different Denominators and Mixed Numbers

When we add and subtract fractions with different denominators, we need to give them a common denominator. We use the lowest common multiple as the common denominator to create equivalent fractions which we can then add and subtract.

If one of the fractions is a multiple of the other, use multiplication to change the smaller denominator to the same denominator as the other fraction.

$\dfrac{5}{9} + \dfrac{2}{3} =$

$\dfrac{5}{9} + \dfrac{2}{3} \begin{array}{l} ×3 = 6 \\ ×3 = 9 \end{array}$

$\dfrac{5}{9} + \dfrac{6}{9} = \dfrac{11}{9} = 1\dfrac{2}{9}$

$$\frac{8}{9} - \frac{3}{4} =$$

$$\frac{8}{9} \begin{smallmatrix} \times\, 4 \\ \times\, 4 \end{smallmatrix} = \frac{32}{36} \qquad \frac{3}{4} \begin{smallmatrix} \times\, 9 \\ \times\, 9 \end{smallmatrix} = \frac{27}{36}$$

$$\frac{32}{36} - \frac{27}{36} = \frac{5}{36}$$

If the fractions aren't multiples of each other, use multiplication to change them both to the lowest common denominator.

If the fractions involve adding or subtracting mixed numbers, there are two methods that can be used:

Add the whole numbers and the fractions separately.	Convert the mixed numbers to improper fractions.
$2\frac{3}{5} + 3\frac{1}{4} =$ $2 + 3 = 5$ $\frac{3}{5} + \frac{1}{4} = \frac{12}{20} + \frac{5}{20} = \mathbf{\frac{17}{20}}$ $5 + \frac{17}{20} = 5\frac{17}{20}$	$2\frac{5}{6} - 1\frac{1}{5} =$ $\frac{17}{6} - \frac{6}{5} = \frac{85}{30} - \frac{36}{30} = \mathbf{\frac{49}{30}}$ $\frac{49}{30} = \mathbf{1\frac{19}{30}}$

Multiplying Simple Pairs of Proper Fractions, Writing the Answer in its Simplest Form

Multiply a Proper Fraction by a Whole Number	➡	Write the whole number with a denominator of 1. Multiply the numerators together and multiply the denominators together.	➡	$\frac{5}{7} \times \frac{4}{1} =$ $\frac{20}{7} = 2\frac{6}{7}$

Multiply Proper Fractions Together	➡	Multiply the numerators together and multiply the denominators together. Simplify the answer if needed.	➡	$\frac{3}{5} \times \frac{3}{8} =$ $= \frac{9}{40}$

Dividing Proper Fractions by Whole Numbers

Multiplication and division are **inverse operations** of each other.

$$\div \; \frac{5}{1} \; \text{ is the same as } \; \times \; \frac{1}{5}$$

$$\frac{7}{9} \div 6 =$$

$$\frac{5}{8} \div 4 =$$

$$\frac{7}{9} \times \frac{1}{6} =$$

$$\frac{5}{8} \times \frac{1}{4} =$$

$$\frac{7 \times 1}{9 \times 6} = \frac{\textbf{7}}{\textbf{54}}$$

$$\frac{5 \times 1}{8 \times 4} = \frac{\textbf{5}}{\textbf{32}}$$

Calculating Decimal Equivalents of Fractions

Every proper fraction has a decimal number equivalent, which we can calculate by dividing the numerator by the denominator.

Common decimal equivalents of fractions can be learnt as facts:

Fraction	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{10}$	$\frac{1}{5}$
Decimal	0.5	0.25	0.1	0.2

We can calculate the decimal equivalents of trickier fractions using written methods of division.

Sometimes, a decimal equivalent will be a long number. In these cases, you can round the decimal to one or two decimal places.
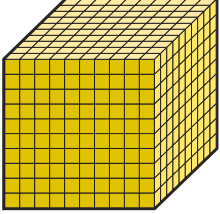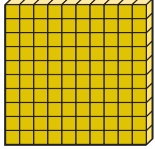
$$\frac{4}{7} = \quad 7 \overline{\smash{\big)}\, 4 \cdot {}^4 0 \; {}^5 0 \; {}^1 0} \quad \rightarrow \quad 0 \cdot 5 \; 7 \; 1$$

$\frac{4}{7}$ = 0.57 rounded to two decimal places.

Identify the Value of Each Digit in Numbers to Three Decimal Places

In order to be able to read, write and calculate with decimal numbers, we need to understand the place value of each digit after the decimal point.

As the place value position moves right of the decimal point, the digits become ten times smaller.

ones	tenths	hundredths	thousandths
	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

Recall and Use Equivalences between Simple Fractions, Decimals and Percentages

Fractions, decimals and percentages are equivalent ways of expressing the same proportion.

Fraction	Percentage	Decimal
$\frac{1}{2}$	50%	0.5
$\frac{1}{4}$	25%	0.25
$\frac{3}{4}$	75%	0.75
$\frac{1}{5}$	20%	0.2
$\frac{1}{10}$	10%	0.1

To calculate trickier equivalents, we can use the rules in this diagram to help us:

Percentage to Fraction

Write the percentage as a fraction with a denominator of 100 and then simplify.

$\frac{60}{100} = \frac{6}{10} = \frac{3}{5}$

$$\frac{3}{5}$$
Fraction

Fraction to Decimal

Divide the numerator by the denominator.

$\frac{3}{5} = 3 \div 5 = 0.6$

60%
Percentage

0.6
Decimal

Decimal to Percentage

Multiply the decimal by 100 and add the % sign.

$0.6 \times 100 = 60\%$

Practise

Supercharge your powers by answering these questions.

1. Put these fractions in order of size, starting with the smallest.

$$\frac{3}{4} \qquad \frac{1}{6} \qquad \frac{7}{12} \qquad \frac{2}{3}$$

smallest   greatest

2. The numbers in this sequence increase by the same amount each time. Write the missing numbers.

	1	$1\frac{3}{7}$	$1\frac{12}{14}$	

3. In each box, circle the number that is greater.

$1\frac{3}{5} \qquad 1.55$ $\qquad$ $1\frac{2}{3} \qquad 1.8$

$1\frac{9}{100} \qquad 1.9$ $\qquad$ $1\frac{7}{10} \qquad 1.67$

4. Write the missing fraction in this calculation.

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

Practise

5. Write the missing numbers in these equivalent fractions.

$$\frac{4}{5} \ = \ \frac{12}{\Box} \ = \ \frac{\Box}{90}$$

6. Circle the improper fraction that is equivalent to $4\frac{7}{9}$

$$\frac{40}{9} \qquad \frac{41}{9} \qquad \frac{42}{9} \qquad \frac{43}{9} \qquad \frac{44}{9}$$

7. Tick the calculation that is the best estimate.

$$4\frac{11}{12} \ - \ 1\frac{1}{5} \ + \ 1\frac{5}{6}$$

☐ 4 - 1 + 2   ☐ 5 - 2 + 2

☐ 5 - 1 + 2   ☐ 4 - 1 + 1

8. I spent £1.40 on a drink and £1.70 on a sandwich. I have three fifths of my money left. How much money did I have to start with?

Show your method

£

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9. Yesterday, I read $\frac{3}{7}$ of my book. Today, I read the remaining 152 pages to finish the book. How many pages are there in my book?
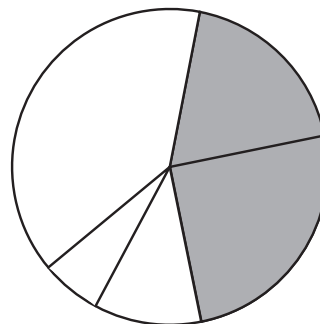
Show your method

pages

10. One fruit smoothie contains $\frac{2}{3}$ of a carton of orange juice. I make 7 smoothies. Calculate, as a mixed number, how much orange juice I use altogether.

Show your method

cartons

11. In this circle, $\frac{1}{4}$ and $\frac{3}{16}$ are shaded.
What fraction of the whole circle is not shaded?

Show your method

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12. What fraction of this diagram is shaded?

$$\frac{1}{8}$$ $$\frac{2}{3}$$

Show your method

2 marks

😊 😐 😟
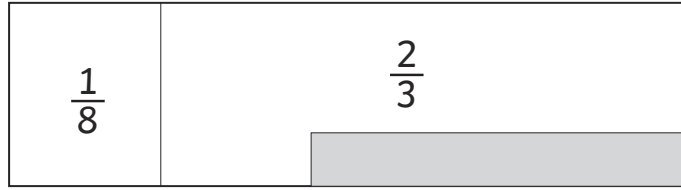
13. I make a model out of 25 cubes.
     What percentage of the cubes in the model are blue?

Show your method

%
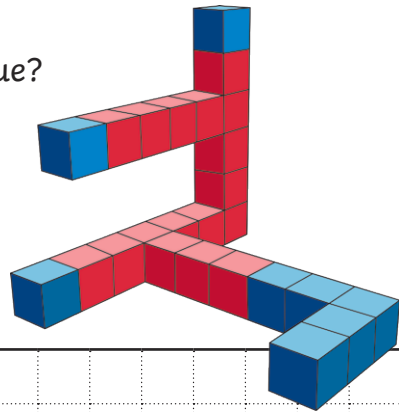
2 marks

😊 😐 😟

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Practise

14. I have £380. I spend 18% of my money on a new bike. How much money do I spend on my new bike?

Show your method

£

total for this page

Self-Assessment

Colour in the superhero strength-o-meter to show how you feel about each of these statements:

I can use common factors to simplify fractions and use common multiples to express fractions in the same denomination.

I can compare and order fractions, including fractions > 1.

I can add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.

I can multiply simple pairs of proper fractions, writing the answer in its simplest form.

I can divide proper fractions by whole numbers.

I associate a fraction with division and calculate decimal fraction equivalents.

I can recall and use equivalences between simple fractions, decimals and percentages.