THE BRITISH INTERNATIONAL SCHOOL ABU DHABI

A NORD ANGLIA EDUCATION SCHOOL

Year 7 Maths

Topic 4–5–6 Workbook

In the table below translate the key terms into your home language and write a short definition for each term [if needed visit www.mathsisfun.com/definitions/].

TOPIC 4 - FRACTIONS		
TERM	**TRANSLATION**	**DEFINITION**
Fraction		
Mixed Number		
Improper Fraction		
Numerator		
Denominator		
TOPIC 5 – FRACTIONS, DECIMALS & PERCENTAGES		
Decimal		
Percentage		
Conversion		
TOPIC 6 – NUMBER PROPERTIES		
Odd		
Even		
Prime Numbers		
Factors		
Multiples		
Square Numbers		
Cube Numbers		

Equivalent Fractions

1. Draw a line between each pair of equivalent fractions.

$\frac{1}{4}$ $\quad$ $\frac{4}{6}$ $\quad$ $\frac{3}{8}$ $\quad$ $\frac{5}{25}$

$\frac{6}{16}$ $\quad$ $\frac{1}{5}$ $\quad$ $\frac{3}{12}$ $\quad$ $\frac{2}{3}$

2. Debbie asks some of her classmates to name their favourite sport.

$\frac{2}{5}$ of them said speed knitting and $\frac{3}{8}$ said cricket.

a) Did more of her classmates say speed knitting or cricket?

.....

b) Debbie asked 40 of her classmates in total. Six of them said that their favourite sport is football. What fraction of her classmates said football? Give your answer in its simplest form.

.....

3. Julia, Parvinder and Richard are each given the same number of sweets. Julia eats $\frac{2}{5}$ of her sweets, Parvinder eats $\frac{5}{12}$ of his sweets and Richard eats $\frac{7}{15}$ of his sweets.

Write their names in order, starting with the person who has the fewest sweets left.

..... $\quad$ ..... $\quad$ .....

fewest sweets $\quad$ most sweets

How did you do?

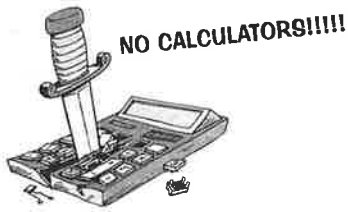
Well, that got Section Two off to a flying start. Hopefully, you got a decent fraction of this stuff right. Once you're happy with it all, put a big tick in the boxes below. You should be able to:

- ☐ Identify equivalent fractions.
- ☐ Compare the sizes of different fractions.
- ☐ Write fractions in their simplest form.

☹ ☐ 😐 ☐ ☺ ☐

Fractions

Fun Fact: $\frac{9}{5}$ of people struggle with fractions...
Put your calculator away for these pages —
you'll need to face fractions without one I'm afraid.



Q1 Which is bigger?

a) $\frac{1}{6}$ or $\frac{3}{12}$ .....

c) $\frac{6}{8}$ or $\frac{7}{10}$ .....

b) $\frac{3}{10}$ or $\frac{5}{20}$ .....

d) $\frac{1}{3}$ or $\frac{14}{32}$ .....

It's easier if you make the numbers on the bottom the same using equivalent fractions.

Q2 Change these improper fractions to mixed numbers:

a) $\frac{5}{2}$ = ...

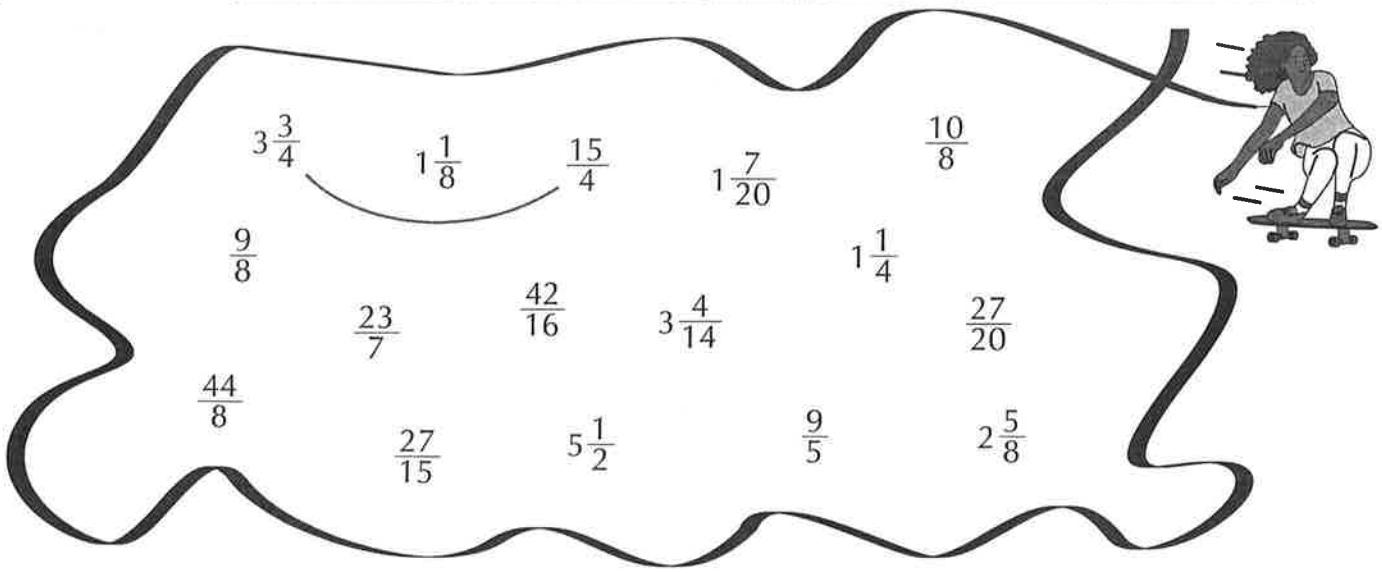
c) $\frac{41}{10}$ = ...

b) $\frac{7}{3}$ = ...

d) $\frac{22}{5}$ = ...

Q3 Pair up the equal numbers. The first one has been done for you.

Simplify all the fractions as far as possible and convert any mixed numbers into improper fractions. That should make them easier to match up.



Mixed Numbers and Improper Fractions

1. Show that $1\frac{2}{3}$ is bigger than $\frac{4}{3}$.

Convert one of the fractions so that they're both in the same form.

2. Convert between mixed numbers and improper fractions to complete this table.

Mixed Number	Improper Fraction
$3\frac{1}{2}$	.....
.....	$\frac{8}{5}$
.....	$\frac{18}{7}$
$7\frac{2}{3}$	.....

3. Write the following numbers in order, starting with the smallest.

$2\frac{3}{8}$ $\quad\frac{3}{4}$ $\quad3\frac{2}{7}$ $\quad\frac{8}{3}$

....., ..., ..., ...

4. Oliver's pet snail is $1\frac{2}{5}$ inches long and Jemma's pet grasshopper is $\frac{13}{9}$ inches long.

Whose pet is longer? Show your working.

.....

How did you do?

Whole numbers and fractions together... Don't let this mixed number business get you all mixed up. Once you've got your head around it, tick off these boxes. By now, you should be able to:

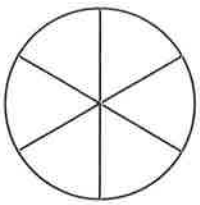
- ☐ **Convert between mixed numbers and improper fractions.**
- ☐ **Compare the sizes of mixed numbers and improper fractions.**

Adding and Subtracting Fractions

1. Mary cuts a cake into six equal slices. She eats $\frac{1}{2}$ of it and her brother eats $\frac{1}{3}$ of it.

a) Shade the diagram to show how much of the cake has been eaten.

b) What fraction of the cake is left?



.....

2. Work out the following, giving your answers as mixed numbers where necessary.

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

.....

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

.....

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

.....

$3\frac{3}{7} - 1\frac{6}{7}$

.....

3. Frank wants to sell some apples at the market. $\frac{5}{19}$ of his apples have worms in and $\frac{3}{19}$ of the apples have gone rotten, so they can't be sold.

What fraction of his apples can Frank sell at the market?

.....

4. A hiker sets off on a walk that is $10\frac{7}{8}$ miles long. She walks for $2\frac{3}{8}$ miles and then stops for lunch.

How many miles does she have left to walk?
Give your answer as a mixed number in its simplest form.

..... miles

Adding and Subtracting Fractions

5. A box of ice creams contains three different flavours. $\frac{1}{10}$ of the ice creams are chocolate flavour, $\frac{3}{5}$ are vanilla flavour and the rest are spinach flavour.

What fraction of the ice creams are spinach flavour?

.....

6. Work out the following, giving your answers as mixed numbers (where necessary) in their simplest form.

$\frac{1}{2} + \frac{3}{4}$ $\frac{15}{9} - 1\frac{5}{18}$ $2\frac{4}{9} + 6\frac{2}{3}$

....

7. Emily, Lei and Quentin picked some blackberries. They used identical baskets. Emily filled $1\frac{1}{2}$ baskets, Lei filled $\frac{7}{4}$ baskets and Quentin filled $1\frac{3}{8}$ baskets.

a) How many baskets of blackberries did they pick in total?
Write your answer as a mixed number in its simplest form.

.....

b) A basket holds approximately 80 blackberries.
Estimate how many more blackberries Lei picked than Quentin.

.....

How did you do?

This stuff is pretty key — you never know when you're going to need to add or subtract a fraction or two. Before you get too excited and move on to the next page, make sure you can:

- ☐ **Add and subtract fractions with the same denominator.**
- ☐ **Use equivalent fractions to add and subtract fractions with different denominators.**

Fractions

Q4 Work out these, giving your answers in their simplest form:

Make the numbers on the bottom the same first. You'll need to use equivalent fractions.

a) $\frac{5}{8} + \frac{1}{8} =$ .....

b) $\frac{1}{2} + \frac{3}{4} =$ .....

c) $\frac{1}{8} + \frac{1}{2} =$ .....

d) $\frac{4}{5} - \frac{3}{4} =$ .....

e) $\frac{2}{3} - \frac{1}{6} =$ .....

f) $\frac{1}{3} + 1\frac{1}{3} =$ .....

Q5 Calculate the following, giving your answers in their simplest form:

a) $\frac{1}{5} \times \frac{3}{5} =$ .....

b) $\frac{1}{10} \times \frac{4}{10} =$ .....

c) $\frac{4}{7} \times \frac{5}{6} =$ .....

d) $\frac{3}{8} \times \frac{3}{4} =$ .....

Q6 Calculate the following, giving your answers in their simplest form:

a) $\frac{1}{5} \div \frac{1}{3} =$ .....

b) $\frac{1}{2} \div \frac{1}{4} =$ .....

c) $\frac{1}{2} \div \frac{1}{8} =$ .....

d) $\frac{1}{4} \div \frac{5}{8} =$ .....

Q7 Calculate the following:

a) $\frac{1}{6}$ of £1.80 = ...

b) $\frac{3}{7}$ of 14 kg = ...

c) $\frac{5}{6}$ of 12 months = ...

When you get a "fraction of..." type question, just multiply by the top and divide by the bottom — what could be simpler?

Fractions, Decimals and Percentages

1. Draw lines to match the values on the top row with an equivalent value on the bottom row.

0.24	35%	$\frac{9}{100}$	4.3	170%
430%	0.09	1.7	$\frac{12}{50}$	$\frac{7}{20}$

2. Convert...

a) 32% into a decimal,

.....

b) $\frac{7}{25}$ into a percentage,

..... %

c) 0.54 into a fraction (in its simplest form).

.....

3. Complete the table below by filling in the equivalent amounts.

Write any fractions in their simplest form.

Fraction	Decimal	Percentage
$\frac{9}{20}$	.....	.....
.....	.....	80%
.....	0.24	.....

4. Patrick looks at the sports kits of the teams in his hockey league. There are 20 teams in the league. 3 teams have stripy, orange kits.

a) What percentage of the teams have a stripy, orange hockey kit?

..... %

b) 40% of the teams have stripy kits.
What fraction of the teams have kits that are stripy but not orange?

.....

Fractions, Decimals and Percentages

5. George scored 36 out of 40 in his maths test and 88% in his French test. Which subject did he score a higher proportion of the marks in?

.....

6. Cathy has different vegetable plants growing in her greenhouse. $\frac{1}{4}$ of her plants are cucumbers, $\frac{3}{10}$ are tomatoes and $\frac{2}{5}$ are chillies.

a) Cathy claims that 25% of her plants are chillies. Is she correct? Explain your reasoning.

.....

.....

b) What percentage of her plants are not cucumbers, tomatoes or chillies?

.....%

7. A film magazine publishes a list of the '25 Best Horror Films About Whales'.

a) Joseph has watched 14 of the films on the list. Write the proportion of the films he has watched as a decimal.

Find the proportion as a fraction first, then convert to a decimal.

.....

Over the weekend, Joseph watches another 24% of the films on the list.

b) What fraction of the films on the list has he watched now? Give your answer in its simplest form.

.....

How did you do?

With a bit of practice, you'll be switching between fractions, decimals and percentages like you've been doing it your whole life. Before you move on to the next bit, check that you can:

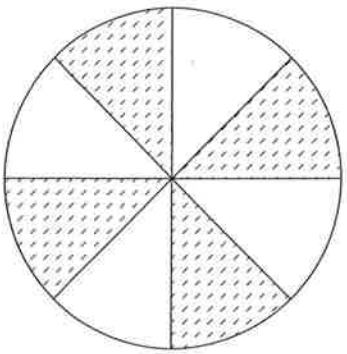
☐ **Switch between equivalent fractions, decimals and percentages.**

Fractions, Decimals and Percentages

Finding the fraction of a shaded shape is a doddle. All you need do is count how many equal parts you've got (the bottom number) and look for how many of them are shaded (the top number) — then cancel if you can...

Q1 Give the shaded area of these shapes as a fraction and a percentage of the whole.

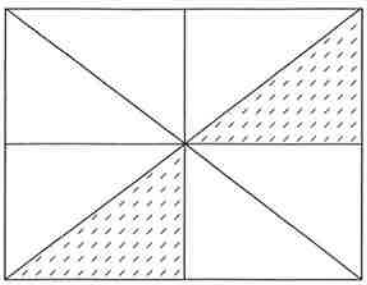
a)



Fraction = ...

Percentage = ...

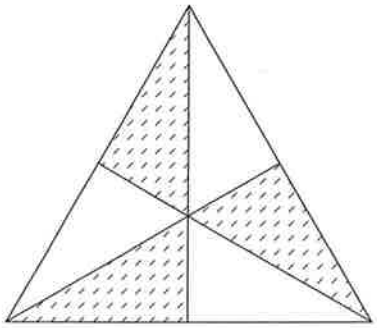
c)



Fraction = ...

Percentage = ...

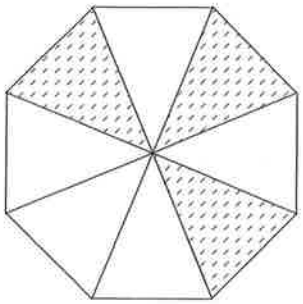
b)



Fraction = ...

Percentage = ...

d)



Fraction = ...

Percentage = ...

Q2 Change these fractions to percentages.

a) Fraction = $\frac{3}{4}$, percentage = ...

b) Fraction = $\frac{6}{10}$, percentage = ...

c) Fraction = $\frac{3}{5}$, percentage = ...

d) Fraction = $\frac{1}{8}$, percentage = ...

When you've got to go from fractions to percentages, ALWAYS go via decimals... it'll make life far easier.

Fractions, Decimals and Percentages

Changing a percentage to a decimal just means moving the decimal point 2 places to the left. Piece of cake.

Q3 Change these percentages to decimals.

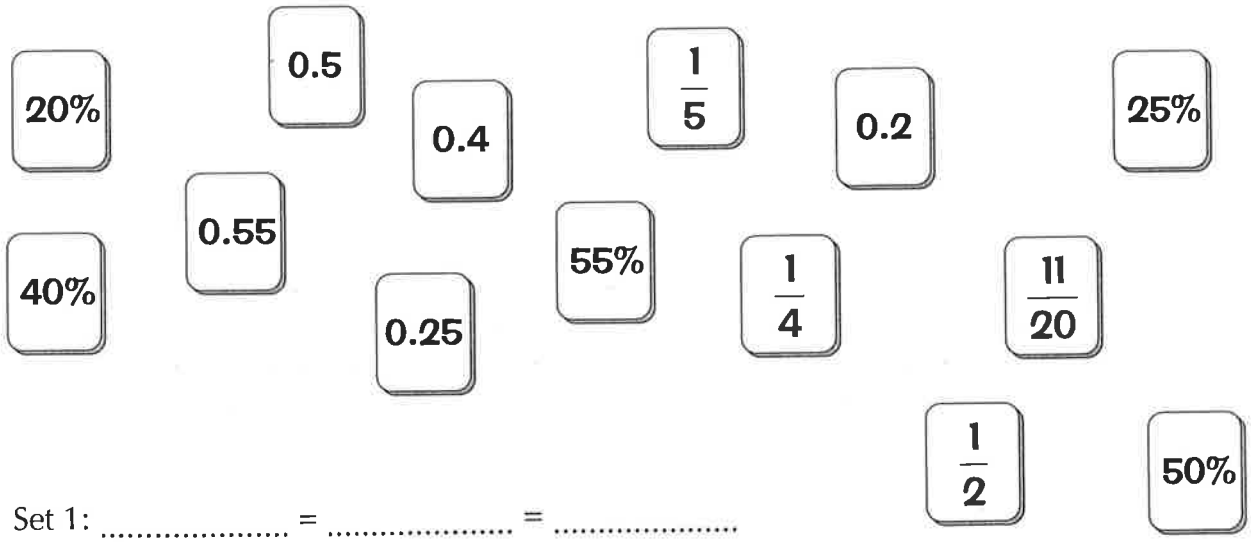
a) Percentage = 50%, decimal = ...

b) Percentage = 20%, decimal = ...

c) Percentage = 35%, decimal = ...

d) Percentage = 41%, decimal = ...

Q4 Arrange these cards into five sets that show the same number.



Set 1: ..... = ... = ...

Set 2: ..... = ... = ...

Set 3: ..... = ... = ...

Set 4: ..... = ... = ...

Set 5: ..... = ... = ...

Prime Numbers, Multiples and Factors

Remember that the multiples of a number are just its times table.
Its factors are the numbers that divide exactly into it.

Q1 List all the multiples of 5 up to 60.

.....

Q2 Find all the factors of:

a) 8

.....

b) 12

.....

c) 15

.....

Q3 Work out whether each of the following numbers is prime.

A prime number is a number that can only be divided by itself and 1.

a) 42

(Yes/No) .....

b) 35

(Yes/No) .....

c) 41

(Yes/No) .....

d) 13

(Yes/No) .....

e) 69

(Yes/No) .....

f) 29

(Yes/No) .....

Q4 List all the multiples of 3 which are less than 50.

.....

.....

Is 45 a prime number? (Yes/No) .....

Multiples and LCM

1. Tick the box next to the sentence A, B or C which describes the numbers: 20, 30, 5, 15, 25.

A: They are all multiples of 2. ☐

B: They are all multiples of 3. ☐

C: They are all multiples of 5. ☐

2. Every multiple of 6 has been circled on the number line below.

1 2 3 4 5 (6) 7 8 9 10 11 (12) 13 14 15 16 17 (18)

a) Circle every multiple of 3 on the number line below.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

b) Circle every multiple of 4 on the number line below.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

c) What is the lowest common multiple of 3, 4 and 6?

.....

3. Rami and Elle are running laps of a track. They set off together.

In this question, each person runs each of their laps in the same time.

a) Rami takes 6 minutes and Elle takes 8 minutes to run a lap. After how long will they first cross the line together?

..... minutes

b) Omar starts running as Rami and Elle cross the line. It takes 2 hours for all three to cross the line together again. What is the shortest possible time that Omar takes to run a lap?

..... minutes

How did you do?

Well, that's your lot — you'll be glad to know there aren't multiple pages of this stuff.
You know the drill by now — check your answers and make sure you can:

☐ Find multiples of a number. ☐ Find common multiples.

☐ Find the lowest common multiple of two or three numbers.

Factors and HCF

1. The factors of 15 are 1, 3, 5 and 15.

a) What are the factors of 18?

....., ..., ..., ..., ... and .....

b) What are the common factors of 15 and 18?

..... and .....

2. Matt has the following sweets: 10 chocolate bars, 30 lollipops and 70 gummy bears.

a) What are the common factors of 10, 30 and 70?

....., ..., ... and .....

b) Matt shares the sweets equally into party bags, so that each bag has the same number of each type of sweet. He makes as many party bags as possible.

(i) How many party bags does Matt make?

..... party bags

(ii) How many of each sweet is in each party bag?

..... chocolate bar(s), ... lollipop(s) and ..... gummy bear(s)

3. Polly is finding common factors.

a) Write down all the factors of the following numbers.

(i) 60 .....

(ii) 84 .....

b) What is the highest common factor of 60, 84 and 140?

.....

How did you do?

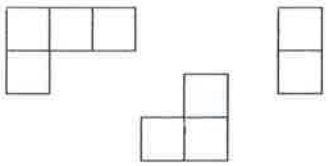
Finding factors can be hard work, so you've done well to make it this far.
Here are the things that you should be able to do:

- ☐ **Find factors of a number.**
- ☐ **Find common factors.**
- ☐ **Find the highest common factor of two or three numbers.**

Powers and Roots

1. Here's a hands-on exercise about square numbers.

a) Arrange the following pieces into a square. Draw it in the space below.



b) Complete the following calculation.

3^2 = ... × ..... = ...

c) Explain how your answer to part b) relates to the square from part a).

.....

2. Some naughty numbers have been locked behind bars.

a) Underline the square numbers.

b) Put a circle around every cube number.

4	27	32	25	8
6	36	18	16	3
5	52	64	49	7

3. Rohan buys 64 m² of carpet to fit a square room. What is the width of the room?

..... m

4. Work out the following.

$\sqrt[3]{8}$ = ... $\sqrt{81}$ = ... 5^3 = ... $\sqrt[3]{216}$ = ...

How did you do?

Squares, cubes and plants — you'll find roots everywhere you look. For now, your time with powers and roots has come to an end — so check that you can:

- ☐ **Calculate squares.**
- ☐ **Calculate cubes.**
- ☐ **Calculate square roots.**
- ☐ **Calculate cube roots.**

Special Types of Number

This page is all about different types of numbers — you should be pretty familiar with even and odd, but square and cube numbers are a bit trickier. The best idea is to learn the first few of each type — then you'll be able to spot them a mile off.

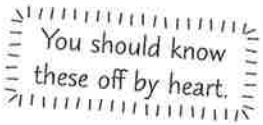
Q1 List all the even numbers between, but not including, 20 and 40.

.....

Q2 List all the odd numbers between 30 and 50.

.....

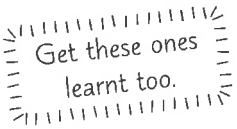
Q3 Write down the first 6 square numbers.



$1 \times 1 =$ ....., $2 \times 2 =$ ....., ..., ...

....., ..., ...

Q4 Write down the first 5 cube numbers.



$1 \times 1 \times 1 =$ ....., $2 \times 2 \times 2 =$ ....., ...

....., ..., ...

Q5 From this list of numbers:

36 100 71 62 343 121

a) write down all the even numbers .....

b) write down all the odd numbers .....

c) write down all the square numbers .....

d) write down all the cube numbers .....