Let's Do Mathematics
Book 5

Easy Path Series

Revised Edition 2004

ACKNOWLEDGEMENTS

The Ministry of Education wishes to acknowledge the work done by the following persons who were involved in the production of the first edition:

Jean Bovell
Sybil James
Jenifer Anderson
Harriet Hackett-Nials
Peter Wintz
Latchman Ganesh
Fitzroy Marcus
Hazel Moses

The work of the following persons who were involved in the production of the second edition is also acknowledged:

Joseph Mckenzie
Mohandat Goolsarran

* * * * * * * * * * * * * * * *

Published by The Ministry of Education, Georgetown, Guyana.

Printed by: Eniath's Printing Company Limited
6 Gaston Street, Lange Park, Chaguanas,
Trinidad and Tobago.

Revised 2005

LET'S DO MATHEMATICS
BOOK 5

WRITING TEAM:	Indra Ramnarine Jeneva Hoyte Marie Stoby Danishwar Persaud Dhanpaul Ganesh
SUBJECT SPECIALIST:	Marva Hestick
ILLUSTRATORS:	Maylene Duncan Tyrone Doris
DESIGN TYPISTS:	Volda Hamilton Petaline McDonald
GRAPHICS PLACED BY:	Volda Hamilton
COVER DESIGN BY:	Ainsworth McKend Maylene Duncan

GOG/IDB Primary Education Improvement Programme

Easy Path Series

FOREWORD

One welcomes the publication of this series of textbooks as part of the Primary Education Improvement Project funded by the Inter-American Development Bank and the Government of Guyana.

This series of texts has been long in planning, writing and producing. In the process however, many Guyanese have developed skills in textbook writing and publication. This will serve Education well in the future.

We congratulate all those responsible for the production of these texts. They have done a good job. Guyanese children at the Primary level, and, indeed, the society as a whole, will be the beneficiaries of their labour.

Thanks to the Inter-American Development Bank for its financial support. Primary Education in Guyana will benefit considerably with the availability of relevant reading material.

Dale A. Bisnauth
Senior Minister of Education
and Cultural Development

PREFACE

I hear and I forget
I see and I remember
I DO and I understand
A Chinese Proverb.

Let's Do Mathematics is part of the Easy Path series, a GOG/IDB Primary Education Improvement Project.

The success of this project hinges to a great extent on the commitment and dedication of the writing team and the committee, both of which comprise experienced Primary School teachers; lecturers of the Cyril Potter College of Education and the University of Guyana; Curriculum Writers and Officers of the Ministry of Education.

This series caters for the requirements of the Primary Schools' Curriculum in Guyana and attempts to provide teachers and pupils with a clearer understanding of the topics/concepts listed. It comprises pupils' books for six (6) levels, accompanied by Teachers' Manuals and is designed to foster greater interest in the learning and teaching of Mathematics.

At each level, the book is organized into thirty (30) units which suggest a year's work. There are six (6) 'Let us look back' pages in each level. These are designed for the revision of concepts previously taught. The results of these must therefore be carefully analysized and used to the pupils' advantage. Care should be taken to ensure that each concept is fully accomplished before attempting a higher level concept.

A deliberate attempt is made to present the years' work in sequence. The emphasis throughout the course is a 'hands on' approach. Great care has been taken to ensure that the books are simple to follow and are related to the likely experiences of the pupils.

WHY MATHEMATICS?
So that recipes may be doubled
meals may be ordered
food/money may be divided
time/plants may be estimated and measured
prices in shops and stores may be compared
graphs/charts may be interpreted
bills may be paid
change calculated
and love may be shared.

LET'S **DO** MATHEMATICS

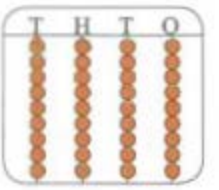
CONTENTS

UNIT 1 NUMBERS

Read the numerals: 1768, 3584, 8026, 9145
These are all four-digit numerals.

Look at the abacus.
What is the numeral shown on the abacus?
It is 9999 - nine thousand, nine hundred ninety nine.
Add 1 to 9999

$$\begin{array}{r} 9999 \\ +\quad 1 \\ \hline 10\,000 \end{array}$$



How many digits are there in the new numeral?
10 000 is read ten thousand.
10 000 is a 5-digit numeral.
The smallest 5-digit numeral is 10 000

Look at the Place Value Chart.

Tens of Thousands	Thousands	Hundreds	Tens	Ones
1	2	4	3	2

Examine the place value of each digit in the numeral, 12 432
Begin to look at the numerals from the left.
The numeral 12 432 is read as twelve thousand, four hundred thirty-two.

Exercise A

1. Write the names for these numerals:
   14 628; 42 375; 19 136; 53 290; 20 791; 60 505

Hundreds of Thousands

Look at the tally chart.

Tens of Thousands	Thousands	Hundreds	Tens	Ones
𝍸 1111	𝍸 1111	𝍸 1111	𝍸 1111	𝍸 1111

What is the numeral shown on the tally chart?
99 999 - ninety-nine thousand, nine hundred ninety-nine.

Wow! 99 999 is the largest 5-digit numeral.

One more than 99 999 is 100 000.
100 000 is read as - one hundred thousand.
It is a 6-digit numeral

> Remember
> Whenever there are five or more digits in any numeral, the digits may be grouped into threes to show the thousands and millions e.g. 34 726; 190 251; 1 402 345

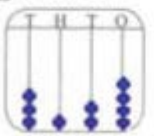
Look at the numeral 28 756. The place value of the 2 is 10 000.
What is the value of the 8; 7; 5; 6 in the numeral?
If we expand this numeral 28 756, this is what it will look like:
20 000 + 8000 + 700 + 50 + 6
Expand 392 543 and write the value of each digit in the numeral.

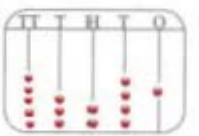
Exercise B

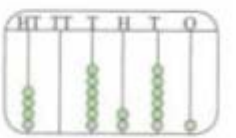
1. Write in words:
   (a) 40 005
   (b) 56 139
   (c) 297 443
2. Write expanded numerals for:
   (a) 64 736
   (b) 81 017
   (c) 314 470

3. What is the place value of each digit in bold type?
   (a) 48 271 (b) 79 352 (c) 53 139 (d) 389 236

Ordering Numbers

(a) 

b) 

c) 

Read the numeral on each abacus.
Write the numerals.
Which abacus shows (a) the smallest numeral? (b) the largest numeral?

We can order numbers from the smallest to the largest or from the largest to the smallest.

Exercise C

1. Order these numerals from smallest to largest:

(a) 29 364,	87 521,	9864,	140 678
(b) 34 762,	110 684,	7689,	204 546
(c) 86 094,	150 025,	263 028,	73 844

Comparing Numbers

Here are the symbols used for comparing numbers.

> is greater than	< is less than	= is equal to

Look at these comparisons. Read them:

(a) $5300 > 5218$ (b) $4014 < 14\,014$ (c) $210\,416 = 210\,416$

2. Compare these. Use >, < or =:

(a) 7438 ☐ 11 623 (c) 54 342 ☐ 54 342

(b) 19 275 ☐ 15 169 (d) 95 256 ☐ 172 349

Number Sequences

Look at the number line:

(a) Begin at 100, move three spaces forward; you will find that the numeral 100 is increased by 10 each time.

(b) Begin at 190, move three spaces backwards; you will find that the numeral 190 is decreased by 10 each time.

We can write number sequences by adding or subtracting the same quantity. Look for the pattern. Follow the pattern.

Exercise D

Complete the sequences:

(a) 10, 12, 14, , , ,

(b) 25, 28, 31, , , ,

(c) 131, 141, 151, , , ,

(d) 250, 280, 310, , , ,

Odd and Even Numbers

Even numbers have 0, 2, 4, 6 or 8 in the ones place.
Odd numbers have 1, 3, 5, 7 or 9 in the ones place.

Any whole number when multiplied by 2 gives an even number.

When one is added to an even number, we get an odd number.

Whole Number	0	1	2	3	4	5	6	7	8
× 2									
Whole Number	0	2	4	6	8	10	12	14	16
+ 1									
Odd Numbers	1	3	5	7	9	11	13	15	17

Exercise E

1 Say which of these are **odd** or **even**:
(a) 826, 72, 287, 55007, 481 (b) 753, 9 000, 444, 778, 396

2. Use Odd or Even to complete these:
(a) An odd number plus 1 is an ..... number.
(b) An even number plus an even number is an ..... number.
(c) An odd number plus an even number is an ..... number.
(d) An even number plus 1 is an ..... number.

REVIEW

1. Write in words:
(a) 17 023 (b) 53 709 (c) 132 911 (d) 40 516

2. Write numerals for:
(a) Twelve thousand forty-seven.
(b) Thirty-thousand ninety-three.
(c) Seventy-four thousand three hundred seventeen.

3. Compare these using >, < or =:
(a) 11 004 ☐ 11 040 (b) 36 700 ☐ 36 070 (c) 95 119 ☐ 95 119

4. Use the digits 7, 3, 6, 9, 1, 5 to write the
(a) smallest 6-digit numeral (b) largest 6-digit numeral.

5. Complete the sequences:
(a) 235, 345, 455, 565, , , ,
(b) 1309, 1109, 909, 709, , , ,

UNIT 2 GEOMETRY

Solids

Rishi has a match box. He examines it by rubbing his finger along the edges, surfaces and vertices.

Use a match box. Find out how many edges, surfaces and vertices it has.

Exercise A

1. Here are some solids.
   Examine them and record the number of edges, surfaces and vertices on each.



2. Match the solids with the properties:

   (a) four vertices 

   (b) three edges 

   (c) six surfaces 

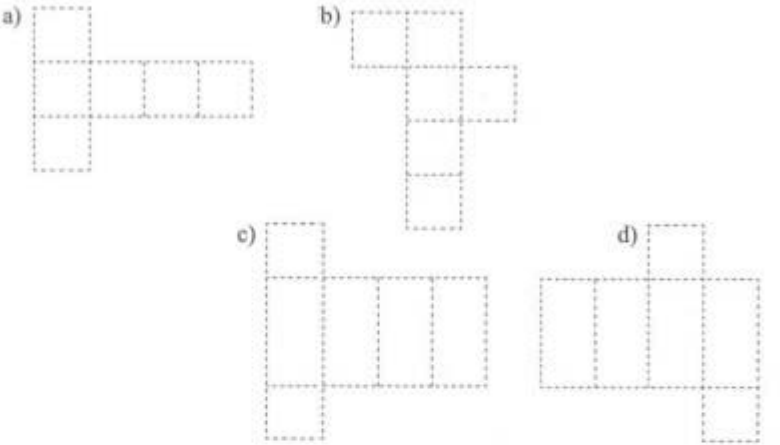
3. Copy and complete:

Solid	Number of		
	Edges	Vertices	Surfaces
			

Nets of Solids

Exercise B

1. a) Draw these nets.
   b) Cut out and fold along the dotted lines.
   c) Name the solid made from each net.



2. Use the nets you have made to make models of solids.

REVIEW

1. Collect a variety of solids and identify the edges, surfaces and vertices. Display these in your classroom.
2. Use solids such as boxes of different shapes and sizes to make other solids.

UNIT 3 FRACTIONS

Fractional Parts of Sets

Study this:
Anil has a set of 18 marbles.

$\frac{1}{2}$ of the set is black. The others are white.

How many are black?

Dan and Suzette worked to find out

$$\begin{array}{r} 9 \\ 2\overline{)\ 18} \text{ marbles} \\ -\ 18 \\ \hline 0 \\ \hline \end{array}$$

There are 9 black marbles

So $\frac{1}{2}$ of 18

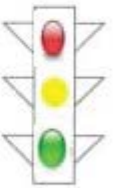
$= \frac{1}{2} \times \frac{18}{1} = 9$ black marbles

Divide 18 by 2 because two halves make a whole. There are 9 black marbles.

We can use fractions to tell about parts of a set.

We can find how many are there in fractional parts of a set by dividing and multiplying.

Exercise A



1. Look at these:

(a) The traffic lights are red, amber and green.
What fraction of the traffic lights is : red? amber? green?
not red? not amber? not green?

(b) Molly cuts a square piece of fudge into 24 equal pieces.
If she shares 7 pieces to us, write the fractions to show:
(i) What part is shared? (ii) What part is left?

(C) Marie gets $500 pocket money each day. She spends $300 each day.
Write fractions to show the money spent and money left:
(i) at the end of 1 day. (ii) at the end of 1 week.

Fractions are used in almost everything we do.

2. Look at these:

Write all the fractions you can about each picture.
Tell your class other situations in which fractions are used in everyday life.

Here is another example. 15 fruits are in a basket:

$\frac{4}{15}$ are oranges, $\frac{2}{15}$ are mangoes, $\frac{5}{15}$ are bananas, $\frac{2}{15}$ are papaws and $\frac{2}{15}$ are limes.

3. Choose **ONE** of these situations.
Write as many fractions as you can about it.

(a) 12 children in the park.
(b) 6 pencils on a desk.
(c) 8 tubs of ice-cream in a freezer.
(d) 4 books on a shelf.
(e) 10 sweets in ajar.

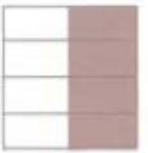
Equivalent Fractions

1. Use a large sheet of paper.

Fold it to show halves
Shade one half.

Fold it again so that it shows four equal parts.

Fold it a third so that it shows eight equal parts.



How many parts are shaded in each? Into how many parts is each divided?
What remains the same about the three pictures?
What is different?
Write the fraction for the shaded part in each.

Try folding the paper again and again. Name the shaded part each time.

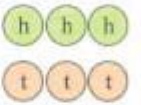
Is the shaded part bigger or smaller than $\frac{1}{2}$? Give reasons for your anwer.

2. Marie and Jenny tossed 6 coins.
3 coins turned up heads. 3 coins turned up tails.

3 out of 6 coins turned up heads. So $\frac{3}{6}$ of the coins are heads.

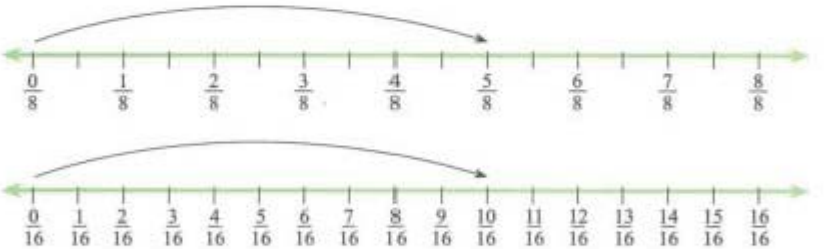
1 out of every 2 coins turned up heads.

So $\frac{1}{2}$ of the coins are heads.



Look at the coins that show heads.
Which fraction describes the set of coins that shows heads.

3. Look at the number lines.



Marie makes 1 jump and stands on $\frac{5}{8}$.

Jenny makes 1 jump and stands on $\frac{10}{16}$.

When fractions name the same quantity they are called **equivalent fractions.**

Examine the fractions $\frac{5}{8}$ and $\frac{10}{16}$

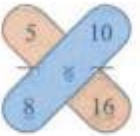
Take a closer look at the number lines.

What must be done to change $\frac{5}{8}$ to $\frac{10}{16}$?

$$\frac{5}{8} = \frac{5 \times 2}{8 \times 2} = \frac{10}{16}$$

Try the same for changing $\frac{1}{2}$ to $\frac{2}{4}$ to $\frac{4}{8}$; $\frac{1}{2}$ to $\frac{3}{6}$

Let us find out if $\frac{5}{8}$ and $\frac{10}{16}$ are equivalent.

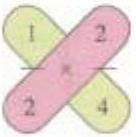
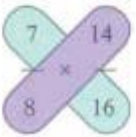


Find their cross products.

To find their cross products we 'cross multiply'
the numerators and denominators, if the products are the same,
the fractions are equivalent.

Exercise B

1. Copy and complete:

Since	We know	We write	We think
	$\frac{5}{8}$ and $\frac{2}{4}$ are equivalent	$\frac{1}{2} = \frac{2}{4}$	$\frac{1}{2}$ and $\frac{2}{4}$ name the same number.
	_____	_____	_____
	_____	_____	_____

2. Copy and complete:

a) $\frac{1}{2} = \frac{2}{4} = \frac{\square}{6} = \frac{4}{\square}$

b) $\frac{2}{5} = \frac{\square}{10} = \frac{6}{\square}$

3. Write 3 equivalent fractions for each.

(a) $\frac{1}{5}$ (b) $\frac{2}{3}$ (c) $\frac{1}{8}$

Comparing Fractions

Study the fraction chart
The bars are the same size.
Find all the fractions that name one half.

Is $\frac{2}{3}$ equivalent to $\frac{1}{2}$? Say why.

Is it true to say $\frac{4}{10} = \frac{1}{5}$? Say why.

Exercise C

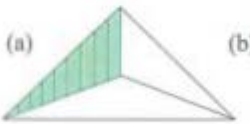
1. Use >, < or = to compare these:

(a) $\frac{5}{8} \square \frac{1}{6}$ (b) $\frac{5}{10} \square \frac{1}{2}$ (c) $\frac{3}{5} \square \frac{1}{2}$

(d) $\frac{3}{4} \square \frac{4}{6}$ (e) $\frac{4}{8} \square \frac{2}{4}$ (f) $\frac{6}{10} \square \frac{1}{2}$

REVIEW

1. Write the fraction for the shaded part of each:

(a)  (b)  (c) 

2. Copy and draw a circle around the fraction which is equivalent to the first in each set.

(a) $\frac{3}{5} \rightarrow \frac{3}{10}\ \frac{6}{12}\ \frac{6}{10}\ \frac{8}{15}$ (b) $\frac{1}{4} \rightarrow \frac{2}{8}\ \frac{6}{4}\ \frac{4}{8}\ \frac{1}{2}$ (c) $\frac{2}{3} \rightarrow \frac{3}{2}\ \frac{3}{6}\ \frac{4}{6}\ \frac{2}{5}$

UNIT 4 PLANE SHAPES

Properties of Plane Shapes

Here are some shapes.

triangle square rectangle kite circle

Exercise A

1. Copy and complete:

Shape	Name	Number of	
		Sides	Angles

Plane shapes from Solids

Look at these pictures.

How many plane shapes can you see in each?
Name the plane shapes which make up each picture.
How many angles and vertices are there in each?

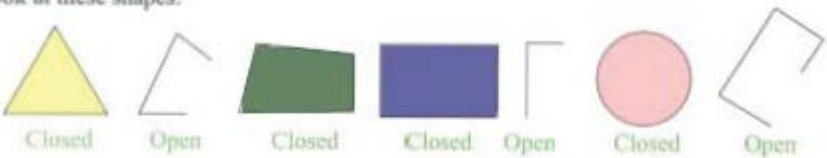
> Remember
> Where two lines meet
> - we have a vertex:
> - an angle is formed.

Exercise B

1. Collect solids such as cubes, cuboids, cones, cylinders and spheres.
   Name the different plane shapes you find on each.
   Trace around the edges of each surface.
   Name the shape.
   List the number of sides and angles on each traced shape.

Closed And Open Shapes

Look at these shapes:



What do you notice about their sides?

> Shapes with sides which meet with no space between the line segments are called closed shapes.
> A **closed shape** has a part of its space called the **inside**.
> When there are line segments that do not meet the shapes are **open**.

Exercise C

1. Use pieces of string. Try to make each of the above shapes.
   Group them as open shapes and closed shapes.

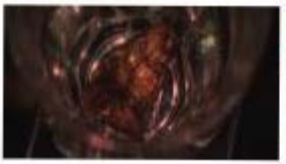
2. Here are three pictures; a bird and two cages.
   Into which cage will he be able to enter:
   (a) more freely? (b) with difficulty?

   Give reasons for your answers.

3. Here are some open shapes.
   Join two appropriate shapes to make a closed shape.
   How many closed shapes have you made?

Inside, Outside, On

Look at these:



Write **inside**, **outside** or **on** to complete these:

(a) The man is standing ..... his home.

(b) The ant is crawling ..... the bread.

(c) The roach is ..... the bottle.

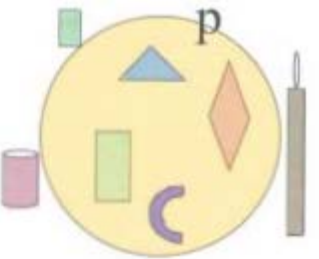
REVIEW

1. (a) Draw four closed, plane shapes. Below each, write the name of the shape.
   (b) Draw three open, plane shapes.

2. Look at these pictures.
   Draw as many shapes as you can find in this picture.

(a)

(b)



3. Play Quiz Time with your friend.
   Take turns to ask and answer simple questions based on plane shapes.
   Example : What Am I?
   I am bounded by four equal straight lines.
   I have four right angles, four corners.
   What am I?

UNIT 5 OPERATIONS

Addition, Subtraction, Multiplication

Exercise A

1. Do these:

(a) $9 + 9 = \square$ (b) $5 + 9 = \square$ (c) $4 + 7 = \square$

$7 + 6 = \square$ $8 + 6 = \square$ $9 + 3 = \square$

$11 + 5 = \square$ $13 + 5 = \square$ $12 + 4 = \square$

> Remember
> The order in which we add two numbers does not change the total.
> Example : $4 + 8 = 12$; $8 + 4 = 12$

2. Do these:

(a) $6 + 4 = \square + 6$

$10 + \square = 9 + 10$

$\square + 12 = 12 + 4$

(b) $110 + 21 = \square + 110$

$308 + 0 = \square + 308$

$216 + 84 = 84 + \square$

Compare the additions for $3 + 6 + 8$

(a) $(3 + 6) + 8$ (b) $3 + (6 + 8)$ (c) $(3 + 8) + 6$ (b) $8 + (3 + 6)$

$9 + 8$ $3 + 14$ $11 + 6$ $8 + 9$

$= 17$ $= 17$ $= 17$ $= 17$

> The order in which we group the addends does not change the answer.

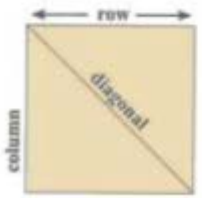
Exercise B

1. Add these:
Group the addends in four different ways.

(a) $4 + 7 + 5$ (c) $19 + 22 + 30$ (e) $52 + 17 + 21$

(b) $2 + 3 + 5$ (d) $9 + 6 + 8$ (f) $205 + 143 + 36$

2. (a) Magic Squares
Look at the arrows. Learn the names.



4	9	2
3	5	7
8	1	6

Read and add the numbers in each: row; column; diagonal.

Is your answer the same number each time?
Squares like these are called **magic squares.**
In a magic square, the rows, columns and diagonals give the same sum.

(b) Copy and complete
The sum of each magic square is given below it:

5	10	9
7		11

24

6	7	
1	5	
8		4

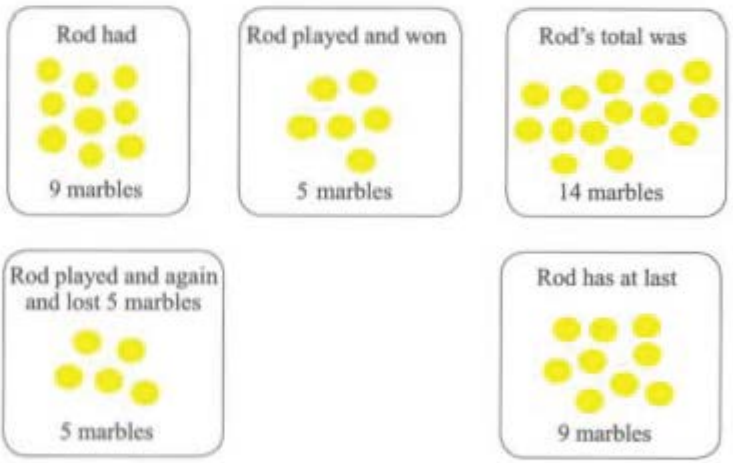
15

16		
	10	
12		4

30

3. (a) Read the problem:
Rod had 9 marbles. He played with Sarika and won 5 more.
Rod played again and lost 5 marbles.
How many marbles did he have at the end of the game?

This is Rod's picture of what happened.



Rod wrote a number sentence to tell his story
$9 + 5 - 5 = 9$
Try this:
Take 6, add 3 to it, subtract 3 from the sum.
What is your answer?

When the same number is added to, then subtracted from a given number, the answer is the given number.

(b) Do these mentally. Write the answers.

7 + 5 - 5	8 + 6 - 6	16 + 12 - 12
56 + 32 - 32	325 + 14 - 14	230 + 10 - 10

4. (a) What number must be added to 144 to give 500?
   (b) In three days a grocer sold 614 kg of sugar. On the first day he sold 215 kg and on the second day 64 kg more than the first day. How many kilograms of sugar did he sell on the third day?
   (c) Sunil is 19 years old, his sister is 27 years old and his brother is 21 years old. What is their total age?

Exercise C

Let us multiply.

1. Write answers for:

(a) 6 × 2	3 × 0	7 × 8	9 × 9
(b) 4 × 1	6 × 5	6 × 4	3 × 2
(c) 5 × 7	8 × 3	8 × 8	5 × 6

When we multiply two numbers, the answer is the **product**. Each number is a factor of the product.

2. Find the product of:

(a) 35 and 4	(b) 648 and 2	(c) 3132 and 7
(d) 4004 and 8	(e) 132 and 9	(f) 1420 and 6
(g) 204 and 6	(h) 97 and 3	(i) 7005 and 5

3. Solve these problems:
   (a) 184 passengers are in an aeroplane. How many passengers will there be on 3 such aeroplanes?
   (b) A pencil costs $50. As a fund raising project, a Class Five pupil sold 6 pencils in a day. How much money was collected?

Multiplication to 12 × 12

Here is numeral 11. It has the same digit in the tens and the ones place.

2	5	9
× 11	× 11	× 11
____	____	____

What do you notice about the products and the numbers multiplied?

> Remember
> When a number is multiplied by 1
> the product is the number itself.

Exercise D

1. Write the answers.

(a) 7×11	(b) 4×11	(c) 6×11	(d) 1×11
(e) 9×11	(f) 3×11	(g) 5×11	(h) 8×11

2. Multiply

(a) 29	(b) 43	(c) 28	(d) 56	(e) 71
$\times$ 11	$\times$ 11	$\times$ 11	$\times$ 11	$\times$ 11
____	____	____	____	____

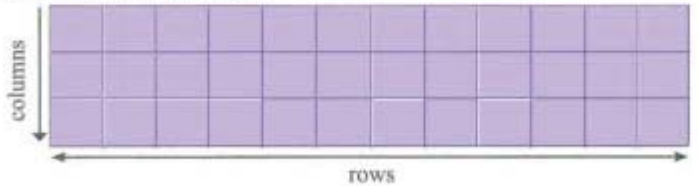
Count the number of stars in each set.
We can record this in different ways

3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 36

12 sets of 3 = 36
12 times 3 = 36
12 × 3 = 36
3 × 12 = 36

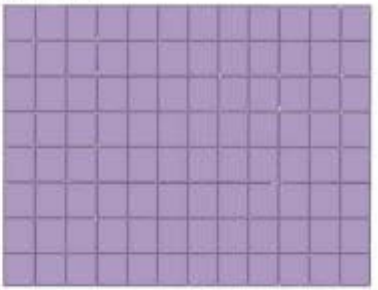
3. Draw sets to show :
   (a) 12×2 (b) 12×5 (c) 1 set of 12 (d) 12 + 12 + 12 + 12

You can use squares to build tables



Count the number of squares on the grid.
Count the number of squares in each row 12
Count the number of squares in each column 3
To find how many in all, we multilpy the number in one row by number in one column.
$12 \times 3 = 36$

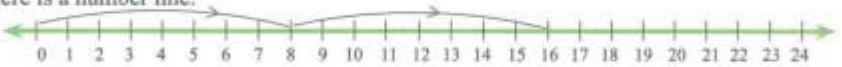
4. Use the method of counting the squares to find these:



each row = ☐ squares
each column = ☐ square
☐ × ☐ = ☐ squares

each row = ☐ squares
each row = ☐ squares
☐ × ☐ = ☐ squares

Here is a number line.



It shows 8 + 8 or 2 × 8
Try building your tables with the help of a number line.

Here is a multiplication grid (12 × 12)
Practise to multiply on this grid.

×	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	28	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	111	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

Exercise E

1. Use the grid. Write answers for

0 × 12	5 × 12	12 × 10	6 × 12	12 × 12
1 × 12	8 × 12	12 × 7	12 × 2	4 × 12

2. Find the product.

34	45	70	21	13
× 12	× 12	× 12	× 12	× 12
____	____	____	____	____

Some articles are put together in twelves.
Mother bought a tray of eggs at the supermarket.
She said, 'I bought one dozen eggs.'
How many are there in one dozen?

> Twelve things make a dozen.
> 1 dozen (doz) = 12

3. List 4 things sold by the dozen.
4. Find out how many things there are in :
   (a) 5 dozens (b) 9 dozens (c) 6 dozens (d) 2 dozens
   (e) 8 dozens (f) 1 baker's dozen.
5. Multiply these:
   (a) 37×10 (b) 12×10 (c) 135×10 (d) 4253×10

What do you know about multiplying by 10?

Lall did this multiplication 25×10 like this :

25	$10 \times 5 = 50$ 5 tens 0 ones
$\times$ 10	He wrote 0 in the ones place
250	10×2 tens = 20 tens 20 tens + 5 tens = 25 tens = 2 hundreds 5 tens

Lisa had a shorter way.

	She wrote 0 in the ones place, then wrote numerals
25	in the same order as they were because she knew that:
$\times$ 10	(i) any number multiplied by 1 is the number itself.
250	(ii) to multiply by 10, increase the value of each digit by placing them one place to the left. The ones place is filled with a 0.

6. Multiply each of these by 10
   5; 7; 9; 40; 35; 211; 4321; 3030

7. Multiply these:
   The first is done for you

24	
$\times$ 30	(2 tens + 4 ones) $\times$ 3 tens
720	(2 tens $\times$ 3 tens) + (4 ones $\times$ 3 tens)
	6 hundreds + 12 tens
	7 hundreds + 2 tens
	720

(a) 24×30 (b) 62×70 (c) 90×20 (d) 39×40
(e) 654×20 (f) 447×80 (g) 803×60 (h) 240×70

Multiply by 2-Digit Numerals

Read the problem.

A box has 24 birthday cards. How many cards will there be in 32 such boxes?

Find the answer.

(a)

24	
× 32	
48	2×24
720	30×24
768	32×24

multiply the ones
multiply the tens
add the products

Here are some other examples:

(b)

137	
× 45	
685	5×137
5480	40×137
6165	45×137

(c)

2317	
× 64	
9268	4×2317
139020	60×2317
148288	64×2317

Exercise F

1. Do these:
   (a) 37×22 (b) 30×57 (c) 86×38 (d) 40×65

2. (a) 164 × 26 (b) 514 × 75 (c) 430 × 98 (d) 2704 × 63

3. Solve these problems:
   (a) Find the product of 178 and 56.
   (b) What number is 47 times 509?
   (c) Father earns $1250. per day. How much money does he earn in 28 days?
   (d) A vendor sells 125 packets of milk per day. How many packets would he sell in the month of May?

REVIEW

1. My class teacher collected 6 dozens exercise books for the class. How many exercise books did she collect?
2. Multiply these:
   (a) 36×15 (b) 71×30 (c) 413×27
   (d) 46×50 (e) 2016×38 (f) 23×20

3. A biscuit factory produces 236 boxes of biscuits in a day. The factory operates from Monday to Saturday. How many boxes of biscuits will the factory produce in 3 weeks?
4. Write the number 14. Add 14 to it, then subtract 14 from your sum. What is your answer?

LET US LOOK BACK

1. Write in words:
   216 004; 82 309; 400 710

2. Write numerals for these:
   (a) one hundred five thousand, two hundred eleven.
   (b) sixty five thousand, one hundred one.
   (c) eight hundred fifty six thousand, nine hundred fifty.

3. What is the value of the digit in bold type:
   352 104; **7**05 006; 67 **3**80; 111 **1**11

4. Use >, = or < to complete these:
   (a) 65 017 ▭ 56 107 (b) $\frac{1}{3}$ ▭ $\frac{5}{6}$
   (c) 100 200 ▭ 350 002 (d) $\frac{1}{2}$ ▭ $\frac{5}{10}$
   (e) 3504 ▭ 3504 (f) $\frac{3}{8}$ ▭ $\frac{1}{4}$

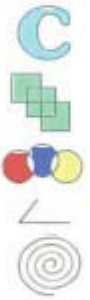
5. Write another equivalent fraction for each:
   (a) $\frac{1}{5}$; $\frac{2}{10}$; ☐ (b) $\frac{1}{3}$; $\frac{2}{16}$; ☐
   (c) $\frac{2}{4}$; $\frac{4}{8}$; ☐ (d) $\frac{1}{2}$; $\frac{2}{4}$; ☐

6. (a) Look at pictures of solids:

(a)  (b)  (c) 

Write the number of:
vertices, edges, surfaces in each.

7. Copy and indicate with a ✓ the ones that are closed and the ones that are open.

Shape	Closed	Open
		

UNIT 6 DECIMALS AND WHOLE NUMBERS

Read and Write Decimal Fractions

David opened a packet of his favourite sweets. They were red, blue and green.
Name the fraction for each colour.

$\frac{2}{10}$, $\frac{3}{10}$, and $\frac{5}{10}$ are fractions for Red, Blue and Green respectively.

How many sweets had David altogether?

We can write $\frac{2}{10}$, $\frac{3}{10}$ and $\frac{5}{10}$ another way.

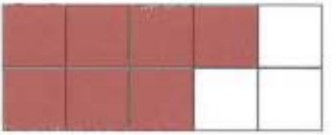
Fraction	Another Way
$\frac{2}{10}$	0.2
$\frac{3}{10}$	0.3
$\frac{5}{10}$	0.5

A decimal fraction is a fraction from a whole consisting of ten equal parts.

We call 0.2, 0.3 and 0.5 decimals.
We call the dot in 0.2, 0.3 and 0.5 a decimal point.
Here is how we read the decimals.

0.2 - zero point two
0.3 - zero point three
0.5 - zero point five

The shaded part of the diagram shows 0.7 or $\frac{7}{10}$



$\frac{7}{10}$ is a decimal fraction. 0.7 is a decimal

$\frac{7}{10}$ and 0.7 show the same shaded part so $\frac{7}{10} = 0.7$

Exercise A

Complete these:

1. What part of the diagram is shaded?
   Give your answer in words, then as :
   (i) a fraction (ii) a decimal

2. Write decimals for these. The first one is done for you:
   (a) five tenths = 0.5 (b) eight tenths (c) one tenth
   (d) two tenths (e) three tenths (f) nine tenths

3. Write as decimals :

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

4. The decimal below each diagram tells what part of the diagram you should shade.
   Copy and shade:

0.4

0.5

0.3

5. A glass set contained 10 glasses. Five were white, two were pink and the others were blue. Draw this set of glasses. Colour them.
   Write the decimals to show what part of the set was :
   (a) white (b) pink (c) blue

6. Joan had a pan of fudge. She sold $\frac{6}{10}$ of the fudge and kept the rest.
   Write decimals to show what part of the pan of fudge she:
   (a) sold (b) kept

Exercise B

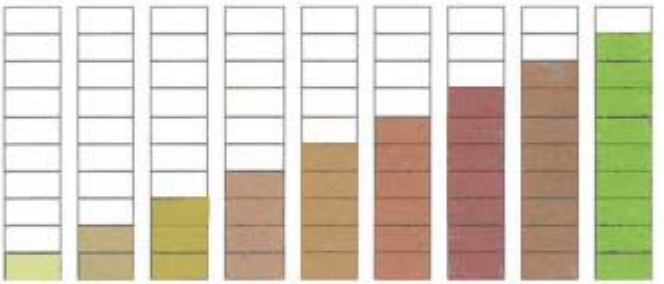
Try these:

1. Get a strip of cardboard about 35 cm long and 5 cm wide.
   Collect 10 drink corks of two different flavours and arrange them on your cardboard.
   Danny's arrangement looked like this :

What decimal represents grape?
Work with a friend. Take turns to make up and answer questions about your arrangement.

Arranging Decimals

2. Get 9 similar strips of paper, each 20 cm long. Divide each into 10 equal parts.
   Shade one part on the first strip, then two on the second and continue.
   Now arrange your strips in order starting with the strip that has one shaded part as shown in the diagram.



(a) On each strip write the decimal that tells the shaded part.
(b) From your strips say which is bigger:
   (i) 0.5 or 0.6 (ii) 0.1 or 0.9 (iii) 0.6 or 0.2
   (iv) 0.3 or 0.1 (v) 0.5 or 0.3

(c) Read the decimals from the strips starting from the smallest, then from the largest.

Exercise C

1. Compare these decimals, using > or < :

   (a) 0.1 ☐ 0.3 (b) 0.5 ☐ 0.6 (c) 0.4 ☐ 0.5

2. Copy and write in the missing decimals to complete the number line

Factors

Remember your multiplication facts?

$3 \times 4 = 12$

We say that 3 and 4 are factors of 12

Exercise D

1. Now complete these:

(a) $4 \times 6 = \square$	(d) $7 \times 4 = \square$	(g) $8 \times 2 = \square$
(b) $3 \times 9 = \square$	(e) $6 \times 5 = \square$	(h) $9 \times 8 = \square$
(c) $5 \times 6 = \square$	(f) $7 \times 9 = \square$	(i) $10 \times 3 = \square$

In (a) 4 and 6 are factors of 24
(b) 3 and 9 are factors of 27

2. Follow the examples above. State the factors of the other numbers in the Exercise.

3. Write other multiplication facts and state the factors of the numbers in the answers.

4. Write the factors in each of these:

(a) $8 \times 4 = 32$	(e) $7 \times 0 = 0$	(i) $7 \times 3 = 21$
(b) $8 \times 6 = 48$	(f) $6 \times 8 = 48$	(j) $3 \times 9 = 27$
(c) $3 \times 1 = 3$	(g) $0 \times 8 = 0$	(k) $4 \times 4 = 16$
(d) $5 \times 8 = 40$	(h) $5 \times 5 = 25$	(l) $5 \times 2 = 10$

Note: Zero does not have factors. Factors are defined only on counting numbers.

5. Write the missing numbers in each of these:

(a) $5 \times \square = 25$	(e) $7 \times \square = 49$	(i) $\square \times 4 = 36$
(b) $3 \times \square = 3$	(f) $8 \times \square = 0$	(j) $6 \times \square = 24$
(c) $9 \times \square = 27$	(g) $8 \times \square = 8$	(k) $\square \times 10 = 100$
(d) $\square \times 4 = 32$	(h) $\square \times 9 = 81$	(l) $7 \times \square = 21$

Some numbers have more than one factor. Example: $1 \times 12 = 12$

1, 2, 3, 4, 6 and 12 are factors of 12. $2 \times 6 = 12$

$3 \times 4 = 12$

6. Say which does not belong in each group

5×4	8×2	6×6	4×10
$2 \times 2 \times 5$	4×4	4×9	5×8
2×5	16×1	$3 \times 3 \times 4$	$5 \times 4 \times 2$
2×10	16×0	18×2	20×2
20×1	$2 \times 2 \times 2 \times 2$	$9 \times 3 \times 14$	40×1
10×1	$4 \times 2 \times 2$	$3 \times 3 \times 2 \times 2$	10×2

7. Make up other groups to show factors of:
   18 24 60 72

Powers of Factors

Look at this number sentence

$3 \times 3 \times 3 = 27$

Which number is the factor?
How many times is the factor used?
The factor is 3; it is used three times.

How many times is the factor 2 used in this number sentence?

$2 \times 2 \times 2 \times 2 = 16$

The factor 2 is used four times.
Another way to write this number sentence is

$2^4 = 16$ This is read two to the fourth power equals to sixteen
2^4 tells us that the factor 2 is used four times.

In $3 \times 3 \times 3 = 27$ the factor 3 is used three times
We write 3^3

Look at $4 \times 4 = 16$. So $4^2 = 16$.
4 is called the factor or base.
^{2} is called the power or index of 4

Exercise E

1. Write these in index form.
   The first is done for you:

   (a) $6 \times 6 \times 6 = 216$ (b) $10 \times 10 \times 10 \times 10 = 10000$ (c) $9 \times 9 = 81$

   $6^3 = 216$ $\square = 10000$ $\square = 81$

   (d) $3 \times 3 \times 3 \times 3 = 81$ (e) $1 \times 1 \times 1 \times 1 \times 1 \times 1 = 1$ (f) $8 \times 8 = 64$

   $\square = 81$ $\square = 1$ $\square = 64$

   (g) $4 \times 4 \times 4 = 64$ (h) $5 \times 5 \times 5 = 125$ (i) $7 \times 7 \times 7 = 343$

   $\square = 64$ $\square = 125$ $\square = 343$

2. Copy and complete:

(a) $4^2 = 4 \times 4 = 16$ (b) $5^4 =$ ..... (c) $9^2 =$ ..... (d) $2^5 =$ .....

$10^3 =$ ..... $7^3 =$ ..... $6^4 =$ ..... $3^5 =$ .....

$8^3 =$ ..... $12^2 =$ ..... $1^6 =$ ..... $4^4 =$ .....

3. Copy then name the factor or base and the power or index of the factor in each of these:

(a) $8^2 = 64$ (factor 8, power 2) $3^2 =$ ..... $3^4 =$ .....

(b) $4^5 =$..... $2^4 =$..... $5^4 =$..... $7^3 =$.....

REVIEW

1. Write the following as decimals:

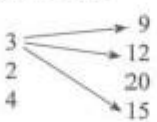
(a) three tenths (b) five tenths (c) six tenths

(d) $\frac{4}{10}$ (e) $\frac{7}{10}$ (f) $\frac{9}{10}$

2. Arrange these from smallest to largest:
0.9, 0.7, 0.8, 0.1, 0.5, 0.6

3. Write the factors of these numbers:
12, 18, 6, 24, 21

4. Copy and complete:
The arrow says "is a factor of"
Example : 3 is a factor of 9, 12 and 15



5. Complete these:

(a) $6 \times 6 \times 6 \times 6 = 6^4 =$ ☐ (b) $f \times f \times f \times f =$ ☐ (c) $5 \times 5 \times 5 =$ ☐

(d) $3^2 = 3 \times 3 =$ ☐ (e) $10^3 =$ ☐ (f) $4^5 =$ ☐

UNIT 7 MEASUREMENT

Length

James is about 150 cm tall.
A nail is about 20 mm long.
A table is less than 1 m wide.
The distance between two villages is about 2 km.
These are measurements of length.
We measure lengths in millimetres, centimetres, metres, kilometres.
These are the standard units for measuring length.

Unit	Symbol	Equivalent
millimetre	mm	10 mm = 1 cm
centimetre	cm	100 cm = 1 m
metre	m	1000 m = 1 km

Exercise A

1. Estimate and measure lengths of objects in the classroom.
   Example : a book, table, the chalkboard, an exercise book.
   Record the measurement on a table like this:

Objects	Length	
	Estimate	Actual
		

   Compare the estimates and the actual measures.

2. Estimate the length of each line segment.
   Measure to verify.

(a) 

(b)

(c) 

(d) 

3. (a) We often measure heights in centimetres.
Estimate then measure:
your friend's height; the height of the chalkboard; the height of the cupboard.
(b) Have your friend do the same.
Who is better at estimating ?

The metre is also used for measuring lengths.
Name 6 things we can measure in metres.

> Remember
> 1 metre = 100 centimetres
> 1 m = 100 cm

Mr. Pitt motored from Georgetown to Melanie. He covered a distance of about 16 kilometres. Very long distances are measured in kilometres.

> 1 kilometre = 1000 metres
> 1 km = 1000 m

Exercise B

1. Copy the table.
Choose the most appropriate unit of measure for each.
Place a ✓ in the appropriate column.

Object	Unit of Measure			
	mm	cm	m	km
a chalkboard eraser				
a sheet of cardboard				
the height of a child				
the outer edge of your desk				
length around a book				
a new pencil				
distance between two towns				
a hand span				

Mass

> Mass is measured in grams and kilograms.
> 1 kilogram = 1000 grams

2. Which unit is more appropriate for measuring the mass of each?

Objects	grams	kilograms
a tube of tooth paste a television set a letter a coin a set of mathematics books a packed suitcase		

3. Estimate, measure then compare the mass of some things in the home.
Record their mass.

4. Take turns to estimate and measure the mass of your friends.
Compare their mass?
Who is the heaviest? the lightest?
What is the difference between the heaviest and the lightest person?

Capacity

Capacity is the measure of how much liquid a container holds.
The litre is used to measure capacity.

1 litre = 1000 millilitres
1 *l* = 1000 *ml*

Exercise C

1. Name 6 items which can be measured in litres.

Here are two containers of different shapes, but equal capacity.

2. Collect some containers of different shapes and sizes.
Estimate the capacity of each then use a 1-litre measure to check your estimates.
Record your findings.
Do you have containers of equal capacity?

For very small amounts of liquid we use the millilitre.

$1000\ ml = 1\ l$

$500\ ml = \frac{1}{2}\ l$

$250\ ml = \frac{1}{4}\ l$

3. (a) Look at this litre measure. It is marked off in hundred millilitres. If you want to measure $\frac{1}{4}$ litre of syrup, the syrup must be seen half way between two numbers on this measure. Name the two numbers.

(b) Mr. Singh sold $\frac{3}{4}$ litre of milk to a customer.
Between which two numbers was the milk seen?
How many millilitres of milk did the customer get?

4. Use the symbols <, > or = to complete these comparisons.

(a) 500 *ml* ☐ $\frac{1}{2}$ *l* (b) 1 *l* ☐ 750 *ml*

(c) $\frac{1}{4}$ *l* ☐ 100 *ml* (d) 900 *ml* ☐ 1 *l*

5. Which unit is more appropriate to measure these capacities?
Place a ✓ in the box.

	litre	millilitre
gasolene in a car tank	☐	☐
drink in a bottle	☐	☐
water in an overhead tank	☐	☐
juice in a can	☐	☐

Time and the 24 - Hour Clock

The 24-hour clock notation is now widely used.
Most travel schedules use the 24-hour clock notation to show arrival and departure times.
Many watches and clocks are now using this system with digital readings.

It is 2 hours after midday.
We write this time as 14:00 h
We read it as fourteen hours.

The 24-hour clock names hours from 00:00 h to 24:00 h or midnight.

> Remember
> Always use 4 digits to write 24-hour time.
> The first two digits name the hours.
> The last two digits name the minutes.

Exercise D.

1. Write these times in 24-hour clock notation.

darkness

evening

darkness

2. Copy and complete:

(a)

12-hour clock	24-hour clock
6 o'clock in the morning	.....
.....	11:05 h
.....	13:30 h
20 past 7 at night	.....
3.10 pm	.....
.....	08:25 h

(b)

Departure	Time taken	Arrival
14:45 h	2 h 10 m	.....
10:30 h	.....	12:45 h
.....	3 h 20 m	16:30 h
15:00 h	.....	21:10 h
.....	1 h 35 m	11:55 h
06:15 h	.....	08:25 h

3. A boy leaves home at 07:45 h and arrives at school at 08:25 h. How long did it take for him to get to school?

4. An aeroplane leaves an airport at 20:00 h. After flying for $5\frac{1}{2}$ hours it arrived at it's destination. At what time did it arrive?

5. A minibus arrived at Rosignol at 17:15 h after travelling for 2 hours 20 minutes. At what time did the minibus leave Georgetown?

REVIEW

1. Copy and complete:
   1 metre = ☐ cm
   1 kilogram = ☐ g
   1 litre = ☐ ml

2. Use 24-hour clock notation complete these:
   (a) 6 hours after 07:00 h is .....
   (b) 30 minutes after 15:45 h is .....
   (c) 2 h 15 m before 14:00 h is .....

3. Draw a 24-hour clock face and show these times.
   (a) 17:10 h (b) 22:35 h

4. A customer estimated the capacity of his container to be 3 litres.
   He purchased kerosene and found that the container held $2\frac{1}{2}$ litres.
   Write a sentence to compare the estimate and the actual measure.

5. Two brothers stepped on a scale separately.
   Krishna's mass was 45 kg; Latchman's mass was 3 kg more than Krishna's.
   What was Latchman's mass?

UNIT 8 FRACTIONS

Fractions in Lowest Terms

Identify the fractions in this set.

$\frac{1}{2}, 6, \frac{2}{3}, \frac{5}{9}$ Name some other fractions.

Exercise A

1. Complete these equivalent fractions.

(a) $\frac{1}{4} = \frac{\square}{8}$ (b) $\frac{1}{4} = \frac{\square}{20}$ (c) $\frac{1}{4} = \frac{\square}{24}$ (d) $\frac{1}{4} = \frac{\square}{28}$

(e) $\frac{1}{6} = \frac{\square}{18}$ (f) $\frac{1}{6} = \frac{\square}{24}$ (g) $\frac{1}{6} = \frac{\square}{30}$ (h) $\frac{1}{6} = \frac{\square}{42}$

2. Complete these:

(a) $\frac{1}{5} = \frac{\square}{10} = \frac{3}{\square} = \frac{\square}{20} = \frac{5}{\square} = \frac{\square}{\square}$ (b) $\frac{1}{7} = \frac{2}{\square} = \frac{\square}{21} = \frac{4}{\square} = \frac{\square}{35} = \frac{\square}{\square}$

(c) $\frac{1}{3} = \frac{\square}{6} = \frac{3}{\square} = \frac{\square}{12} = \frac{5}{\square} = \frac{\square}{\square}$ (d) $\frac{1}{8} = \frac{2}{\square} = \frac{\square}{24} = \frac{4}{\square} = \frac{\square}{40} = \frac{\square}{\square}$

3. Which fraction in each equation has the smaller numerator than denominator?

(a) $\frac{1}{2} = \frac{2}{4} \rightarrow \frac{1}{2}$ because, comparing the numerators, 1 is less than 2 and comparing the denominators, 2 is less than 4.

(b) $\frac{3}{4} = \frac{12}{16}$ (c) $\frac{1}{9} = \frac{3}{27}$ (d) $\frac{6}{16} = \frac{3}{16}$ (e) $\frac{1}{4} = \frac{5}{12}$

(f) $\frac{10}{100} = \frac{1}{10}$ (g) $\frac{5}{6} = \frac{20}{24}$ (h) $\frac{8}{28} = \frac{2}{7}$ (i) $\frac{1}{8} = \frac{4}{32}$

4. In each set, name the fraction with the smallest numerator and smallest denominator:

(a) $\frac{4}{6}, \frac{8}{12}, \frac{2}{3}, \frac{12}{18}, \frac{6}{9}, \frac{10}{15}$ (b) $\frac{2}{10}, \frac{4}{20}, \frac{6}{30}, \frac{3}{15}, \frac{5}{25}, \frac{1}{5}$

Exercise B

Look at these fractions:

(a) $\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \frac{5}{10}, \frac{6}{12}$ and $\frac{7}{14}$

In this set of fractions, the numerator and denominator of $\frac{1}{2}$ cannot be reduced.

In the other fractions, when the numerators and the denominators are reduced to lowest terms, the result is $\frac{1}{2}$. We say $\frac{1}{2}$ is the fraction in its lowest terms.

(b) $\frac{3}{5}, \frac{6}{10}, \frac{12}{20}$ and $\frac{18}{30}$ are fractions for the same number.

$\frac{3}{5}$ is the fraction in its lowest terms. Why?

1. Look at these and answer the question that follows:

(a) $\frac{3}{6} = \frac{1}{2}$ (b) $\frac{2}{8} = \frac{1}{4}$ (c) $\frac{3}{15} = \frac{1}{5}$ (d) $\frac{14}{22} = \frac{7}{11}$

(e) $\frac{6}{8} = \frac{3}{4}$ (f) $\frac{2}{6} = \frac{1}{3}$ (g) $\frac{4}{6} = \frac{2}{3}$ (h) $\frac{6}{10} = \frac{3}{5}$

What do you notice about numerators and denominators in each pair of equivalent fractions?

2. Now look at this $\frac{4}{6} = \frac{2}{3}$

Find the answer for both of these questions.
(i) What can you do to 4 to get 2?
(ii) What can you do to 6 to get 3?

(b) $\frac{6}{9} = \frac{2}{3}$, find the same answer for both of these questions.

(i) What can you do to 6 to get 2?
(ii) What can you do to 9 to get 3?

(c) $\frac{4}{8} = \frac{1}{2}$

What can you do to both the numerator and denominator of $\frac{4}{8}$ to get $\frac{1}{2}$?

(d) $\frac{4}{12} = \frac{\square}{3}$

What can you do with 12 to get 3?
What will you do with 4 to get the numerator?

(e) $\frac{20}{24} = \frac{5}{\square}$

What can you do with the numerator 20 to get 5?
What can you do with 24 to get the denominator?

To reduce a fraction to its lowest terms
divide both the numerator and denominator
of the fraction by the same number or the H.C.F.

Exercise C

1. Change these fractions to lowest terms:

(a) $\frac{12}{18} = \frac{5}{\square}$ (b) $\frac{4}{12} = \frac{1}{\square}$ (c) $\frac{10}{15} = \frac{\square}{3}$ (d) $\frac{3}{9} = \frac{\square}{3}$ (e) $\frac{7}{14} = \frac{\square}{2}$

(f) $\frac{12}{24} = \frac{5}{\square}$ (g) $\frac{12}{16} = \frac{\square}{\square}$ (h) $\frac{10}{16} = \frac{\square}{\square}$ (i) $\frac{5}{20} = \frac{\square}{\square}$ (j) $\frac{6}{18} = \frac{\square}{\square}$

Look at these:

The factors of 18 are : 1, 2, 3, 6, 9, 18
The factors of 20 are : 1, 2, 4, 5, 10, 20

1 and 2 are common factors of 18 and 20 because they are factors of both 18 and 20, but 2 is greater than 1.
So 2 is the greatest or highest common factor of 18 and 20.
The H.C.F. of 18 and 20 is 2.

Similarly,

The factors of 12 are : 1, 2, 3, 4, 6, 12
The factors of 36 are : 1, 2, 3, 4, 6, 9, 12, 18, 36

The common factors of 12 and 36 are 1, 2, 3, 4, 6 and 12.
The highest common factor of 12 and 36 is 12.

2. Copy and complete the table below:

Numbers	Factors of the numbers	Common Factors	Highest Common Factor
6 12	1, 2, 3, 6 1, 2, 3, 4, 6, 12	1, 2, 3, 6	6
15 30			
9 12			
27 36			
18 12			

Study this problem:

Change $\frac{14}{18}$ to its lowest terms

$14 \div 2 = 7$; $18 \div 2 = 9$

So $\frac{14}{18} = \frac{7}{9}$, $\frac{7}{9}$ is a fraction in its lowest terms.

Study this one.

Change $\frac{12}{16}$ to its lowest terms

$12 \div 2 = 6$ $16 \div 2 = 8$

So $\frac{12}{16} = \frac{6}{8}$, but $\frac{6}{8}$ can be changed to lower terms

$6 \div 2 = 3$ $8 \div 2 = 4$

$\frac{6}{8} = \frac{3}{4}$. Now $\frac{3}{4}$ is a fraction in its lowest terms.

And $\frac{12}{16} = \frac{6}{8} = \frac{3}{4}$

You can change to its lowest terms in one step.
The highest common factor of 12 and 16 is 4.

$12 \div 4 = 3$ $16 \div 4 = 4$

And $\frac{12}{16} = \frac{3}{4}$

To change a fraction to its lowest terms in one step, divide both the numerator and the denominator of the given fraction by their highest common factor.

Exercise D

1. Write each fraction in its lowest terms. The first is done for you:

(a) $\frac{18}{30} = \frac{3}{5}$ (b) $\frac{15}{20} = \square$ (c) $\frac{10}{30} = \square$

$18 \div 6 = 3$

$30 \div 6 = 5$

(d) $\frac{4}{12} = \square$ (e) $\frac{20}{30} = \square$ (f) $\frac{21}{35} = \square$

2. Write each of these in its lowest terms without writing down your division: The first is done for you.

(a) $\frac{5}{15} = \frac{1}{3}$ (b) $\frac{10}{15} = \square$ (c) $\frac{10}{18} = \square$

(d) $\frac{27}{36} = \square$ (e) $\frac{12}{20} = \square$ (f) $\frac{6}{21} = \square$

Lowest Common Denominator

Look at this.

Multiples of 2: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Multiples of 3: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30

Numbers which are multiples of both 2 and 3 are common multiples of 2 and 3.
Three common multiples of 2 and 3 are 6, 12, 18.
The lowest common multiple (LCM) of 2 and 3 is 6.

Exercise E

List (i) the first ten multiples of each number in a set.
(ii) the common multiples of each set.
(iii) the lowest common multiple of each set.

(a) 3 and 4 (b) 4 and 6 (c) 6 and 8
(d) 3, 6 and 9 (e) 4, 6 and 8

Look at these equivalent fractions.

$$\frac{1}{2}=\frac{2}{4}=\frac{3}{6}=\frac{4}{8}=\frac{5}{10}=\frac{6}{12}=\frac{7}{14}=\frac{8}{16}=\frac{9}{18}=\frac{10}{20}$$

$$\frac{1}{5}=\frac{2}{10}=\frac{3}{15}=\frac{4}{20}=\frac{5}{25}=\frac{6}{30}=\frac{7}{35}=\frac{8}{40}=\frac{9}{45}=\frac{10}{50}$$

$\frac{1}{2}$ and $\frac{1}{5}$ written as fractions with the same denominator will be:

$\frac{5}{10}$ and $\frac{2}{10}$ or $\frac{10}{20}$ and $\frac{4}{20}$

Three common denominators for $\frac{1}{2}$ and $\frac{1}{5}$ are 10, 20 and 30.

The lowest common denominator for $\frac{1}{2}$ and $\frac{1}{5}$ is 10.

Notice the lowest common multiple of 2 and 5 is 10.

$$\frac{5}{6}=\frac{10}{12}=\frac{15}{18}=\frac{20}{24}=\frac{25}{30}=\frac{30}{36}$$

$$\frac{3}{4}=\frac{6}{8}=\frac{9}{12}=\frac{12}{16}=\frac{15}{20}=\frac{18}{24}$$

Now write $\frac{5}{6}$ and $\frac{3}{4}$ as fractions with the same denominator.

Which is the lowest denominator.

> The lowest common denominator of a set of fractions is the lowest common multiple of their denominators.

Exercise F

1. Rewrite using the lowest common denominator.

2. Copy and complete the table below. The first is done for you.

Fractions	Lowest Common		Fractions with
	Multiple of Denominators L.C.M.	Denominator of Fractions L.C.D.	L.C.M.
$\frac{2}{3}$ $\frac{4}{6}$	6	6	$\frac{4}{6}$ $\frac{4}{6}$
$\frac{1}{7}$ $\frac{1}{3}$			
$\frac{1}{10}$ $\frac{1}{25}$ $\frac{1}{5}$			
$\frac{7}{12}$ $\frac{1}{4}$ $\frac{2}{3}$			
$\frac{1}{3}$ $\frac{5}{6}$ $\frac{7}{8}$			

REVIEW

1. Copy and complete these pairs of equivalent fractions:

(a) $\frac{1}{9} = \frac{3}{\square}$ (b) $\frac{5}{8} = \frac{\square}{40}$ (c) $\frac{3}{4} = \frac{\square}{36}$ (d) $\frac{1}{8} = \frac{\square}{32}$ (e) $\frac{4}{5} = \frac{16}{\square}$

2. Reduce these fractions to lowest terms:

(a) $\frac{15}{20}$ (b) $\frac{12}{36}$ (c) $\frac{33}{99}$ (d) $\frac{49}{56}$ (e) $\frac{12}{108}$

3. Rewrite these fractions with lowest common denominator:

(a) $\frac{1}{2}, \frac{1}{4}$ (b) $\frac{3}{7}, \frac{1}{3}$ (c) $\frac{3}{4}, \frac{4}{5}$ (d) $\frac{3}{8}, \frac{1}{4}$

(e) $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}$ (f) $\frac{7}{9}, \frac{1}{3}, \frac{1}{2}$ (g) $\frac{6}{4}, \frac{7}{8}, \frac{1}{12}$ (h) $\frac{4}{7}, \frac{3}{14}, \frac{1}{2}$

UNIT 9 DECIMALS

The strip of paper above has been divided into 100 equal parts.

1 part = $\frac{1}{100}$ = 0.01 - we read this as zero point zero one

2 parts = $\frac{2}{100}$ = 0.02 - we read this as zero point zero two

3 parts = $\frac{3}{100}$ = 0.03 - we read this as zero point zero three

Now continue to zero point zero nine.

10 parts = $\frac{10}{100}$ = 0.10 read as zero point one zero

11 parts = $\frac{11}{100}$ = 0.11 read as zero point one one

12 parts = $\frac{12}{100}$ = 0.12 read as zero point one two

99 parts = $\frac{99}{100}$ = 0.99 read as zero point nine nine

100 parts will be the whole, this is written as $\frac{100}{100}$ or 1.00 or 1.

We have divided the strip into 100 equal parts. Each fraction has 100 as the denominator, each decimal fraction has two places to the right of the point.
Example: 0.01, 0.04, 0.11, 0.84, 0.99
We can write decimals on a place value chart.

whole			point	decimal	
hundreds	tens	ones		tenths	hundredths
		0	.	0	1
		0	.	1	1
		0	.	9	9

Exercise A

1. Write these fractions as decimals:

$\frac{15}{100}$, $\frac{28}{100}$, $\frac{60}{100}$, $\frac{58}{100}$, $\frac{30}{100}$, $\frac{96}{100}$

Compare Decimals

One part out of one hundred parts is 0.01
Five parts out of one hundred parts is 0.05
1 part is less than 5 parts
5 parts are greater than 1 part
0.01 is less than 5 parts or $0.01 < 0.05$
0.05 is greater than 1 part or $0.05 > 0.01$

2. Copy and complete these. Use > or <

(a) 0.01 ☐ 0.02	(b) 0.05 ☐ 0.03	(c) 0.56 ☐ 0.60
(d) 0.89 ☐ 0.79	(e) 0.85 ☐ 0.58	(f) 0.09 ☐ 0.19
(g) 0.65 ☐ 0.39	(h) 0.56 ☐ 0.65	(i) 0.12 ☐ 0.02

3. Arrange these in order - smallest first.

(a) 0.03, 0.09, 0.01, 0.08, 0.07 (b) 0.93, 0.86, 0.63, 0.79, 0.52
(c) 0.56, 0.65, 0.41, 0.21, 0.39 (d) 0.89, 0.98, 0.78, 0.87, 0.97

REVIEW

1. Write as decimals:

$$\frac{3}{10},\ \frac{18}{100},\ \frac{9}{100},\ \frac{48}{100},\ \frac{5}{100},\ \frac{25}{100},\ \frac{9}{100}$$

2. Write as fractions:
   0.6, 0.32, 0.07, 0.09, 0.59, 0.99

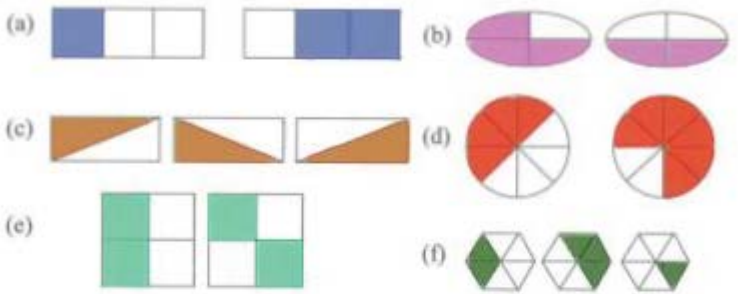
3. Copy and complete these. Use > or <
   (a) 0.85 ☐ 0.86 (b) 0.19 ☐ 10.91
   (c) 0.06 ☐ 0.60 (d) 0.59 ☐ 0.50

4. Arrange in order- smallest first:
   (a) 0.03, 0.33, 0.13, 0.53, 0.93
   (b) 0.15, 0.28, 0.06, 0.78, 0.01

UNIT 10 FRACTIONS

Improper Fractions

Look at these:



Write the fraction for the shaded parts in each row.

Example: in (a) three-thirds are shaded. We write $\frac{3}{3}$

Look at the fractions you have written.

Look at the numerator and the denominator of each fraction.

What do you notice about them?

Fractions like these are called **improper fractions.**

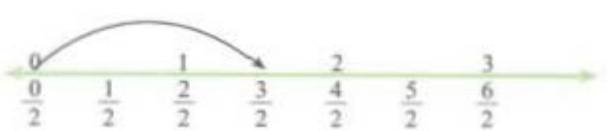
> Fractions with their numerators equal to or greater than their denominators are called **improper fractions.**
>
> Example: $\frac{3}{3}$, $\frac{5}{3}$

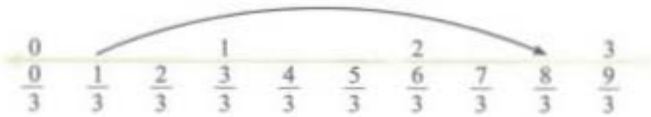
Exercise A

1. (a) Look at these number lines:

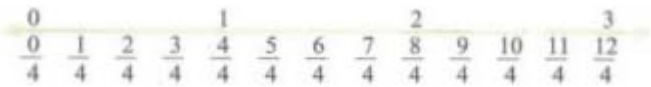
Write the fraction to show where the arrow points.

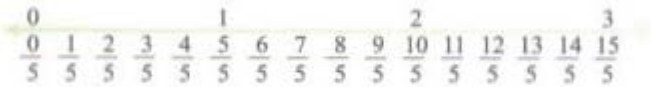
State if it is a proper or an improper fraction and why.





(b) Copy these number lines then draw a circle around the improper fractions on each:





(c) What do you know about improper fractions?

2. Copy the improper fractions in each row.
Give one reason why each is improper.

(a) $\frac{7}{5}$, $\frac{1}{2}$, $\frac{2}{3}$, $\frac{1}{1}$

(b) $\frac{3}{12}$, $\frac{1}{10}$, $\frac{7}{7}$

(c) $\frac{1}{4}$, $\frac{4}{6}$, $\frac{3}{2}$, $\frac{2}{8}$

(d) $\frac{1}{1}$, $\frac{3}{4}$, $\frac{9}{5}$

(e) $\frac{3}{3}$, $\frac{9}{2}$, $\frac{1}{6}$, $\frac{5}{12}$

(f) $\frac{5}{6}$, $\frac{2}{3}$, $\frac{11}{2}$

About Improper Fractions
- the numeraor is equal to or the same as the denominator
- the numerator is greater than the denominator
- the fraction represents a whole or more than a whole

Rename Improper Fractions
Mother baked two cakes.
They were both the same size.
She divided each cake into 6 equal parts.

She shared 9 parts to her children.

She shared $\frac{9}{6}$ 

$\frac{9}{6}$ is an improper fraction.

$\frac{6}{6}$ and $\frac{3}{6}$ of the cakes was shared.

$\frac{9}{6}$ = 

$\frac{9}{6} = \frac{6}{6} + \frac{3}{6}$

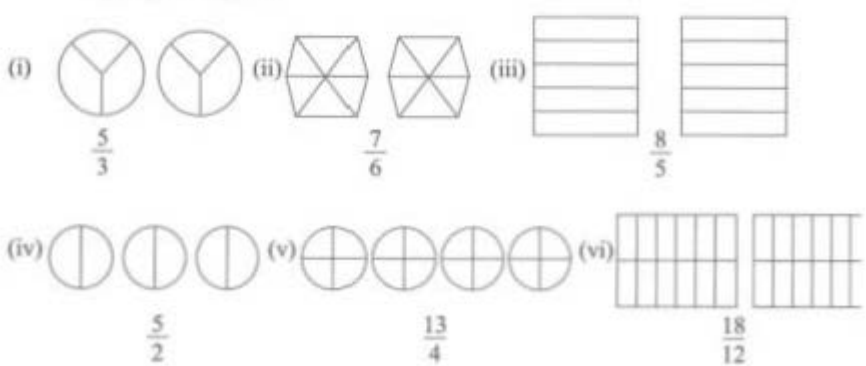
OR $1 + \frac{3}{6}$

That is $1\frac{3}{6}$

Use two rectangular pieces of paper as fudge pans.
Show that they are the same size and the fudge in each divided into 8 equal parts.
Shade to show 12 parts eaten.
Write the fraction for the parts eaten.
Is it a proper or an improper fraction?
How can you tell?
Write the fraction to show your reason.

Exercise B

1. (a) Copy the diagrams below and shade to show the fraction written under each group of diagrams:



$\frac{5}{3}$ $\frac{7}{6}$ $\frac{8}{5}$

$\frac{5}{2}$ $\frac{13}{4}$ $\frac{18}{12}$

(b) Write the fractions in (a) to show the wholes and parts of wholes.
The first is done for you.

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

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

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

$1\frac{2}{3}$ is a mixed number.

> Numbers made up of whole numbers and fractions are called **mixed numbers.**

2. Copy the mixed numbers in each row:

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

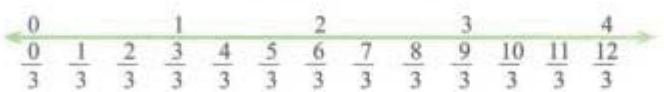
(b) $2\frac{1}{3}$, $\frac{7}{11}$, $\frac{5}{12}$, $1\frac{3}{8}$, 5

(c) 7, $\frac{5}{7}$, $\frac{3}{3}$, $\frac{8}{4}$, $5\frac{1}{10}$

3. (a) Write these improper fractions as mixed numbers:

$\frac{5}{4}$ $\frac{9}{4}$ $\frac{11}{4}$ $\frac{7}{4}$

(b) Write fractions to name some points on the number line.

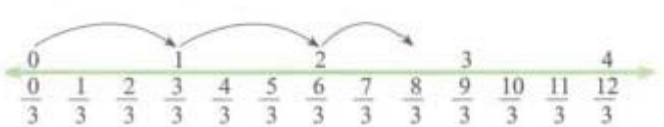


(c) Use the number line from (b).

(i) Write all the improper fractions between 0 and 3.

(ii) Write the improper fractions as mixed numbers or whole numbers.

How did you change improper fractions to mixed numbers?
Anil used the number line like this:



This is what Marnice did :-

She took the improper fraction $\frac{8}{3}$ and represented it like this.

Each whole is divided into thirds and written as thirds. One whole has 3 thirds.

So $\frac{8}{3} = \frac{3}{3} + \frac{3}{3} + \frac{2}{3}$

Or $\frac{8}{3} = 2\frac{2}{3}$

$8 + 3 = 2$ and 2 remainder

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

To write improper fractions as mixed numbers simply divide the numerator by the denominator.
Write the quotient as the whole number.
Write the remainder as a fraction with the divisor as its denominator.

Exercise C

1. (a) Write these improper fractions as mixed numbers:

$\frac{9}{5}$, $\frac{15}{12}$, $\frac{7}{2}$, $\frac{11}{9}$

(b) Write these mixed numbers as improper fractions:

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

(c) What did you find out in changing :
(i) improper fractions to mixed numbers?
(ii) mixed numbers to improper fractions?

To change a mixed number to an improper fraction:
- multiply the whole number by the denominator of the fraction.
- add the numerator to this.
- write the result as the numerator of the improper fraction.
- retain the denominator.

2. Change these mixed numbers to improper fractions:

(a) $3\frac{1}{2}$, $2\frac{2}{5}$, $7\frac{7}{8}$, $6\frac{2}{3}$

(b) $4\frac{3}{10}$, $1\frac{3}{12}$, $8\frac{5}{6}$, $9\frac{8}{9}$

REVIEW

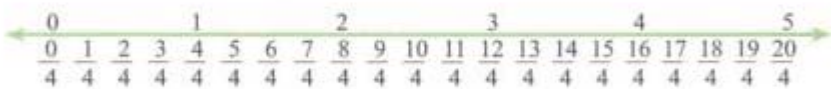
1. (a) Change to mixed numbers:

$\frac{4}{3}$, $\frac{32}{9}$, $\frac{20}{8}$, $\frac{16}{7}$, $\frac{9}{5}$

(b) Change to improper fractions:

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

2. Copy the number line:
Draw a triangle around each improper fraction.
Which fraction is the largest?



3. Solve these problems:

(a) $\frac{3}{8}$ of a bag of oranges were spoilt, $\frac{7}{8}$ of another bag of the same size were spoilt.
What fraction shows the spoilt oranges in the two bags?
Write your answer in two ways.

(b) Sunil bought 3 cases of drink. He found that $\frac{1}{4}$ of the first case, $\frac{3}{8}$ of the second case and $\frac{1}{8}$ of the third case were lemon flavour.
What fraction of the drink bought was lemon flavour?

(c) Sarika drank $\frac{2}{4}$ litre of milk, Sunil drank $\frac{4}{4}$ litre and Anil drank $\frac{3}{4}$ litre. How many litres of milk did they drink together?

4. Write an improper fraction to tell the length of the pencil in centimetres.

$7\frac{1}{2}$ cm

LET US LOOK BACK

1. (a) Copy and complete this table:

Fractions	Decimals
$\frac{1}{2}$	_____
_____	0.6
$\frac{1}{4}$	_____
_____	0.3
$\frac{1}{8}$	_____
$\frac{1}{5}$	_____

(b) Write these in order from the smallest to the largest:
0.4, 0.9. 0.1, 0.5, 0.7

(c) Write the factors of 64, 28, 81, 225.

(d) Write these in index form:
(i) $7 \times 7 \times 7$ (ii) 9×9
(iii) $3 \times 3 \times 3 \times 3$ (iv) $5 \times 5 \times 5 \times 5 \times 5$

2. (a) Estimate the length of this line _____ Measure it.
   (b) Copy and complete these sentences.
   (i) Estimated length is _____
   (ii) Actual length is _____
   (iii) My estimate is _____ more/less than the actual measure.

3. Copy the table below and write these fractions under the various headings.

$\frac{5}{9}$, $3\frac{1}{8}$, $\frac{1}{3}$, $\frac{6}{6}$, $\frac{7}{5}$, $4\frac{6}{7}$, $\frac{2}{2}$, $\frac{18}{7}$, $2\frac{5}{8}$

Proper fraction	Improper fraction	Mixed number

4. (a) Change mixed numbers to improper fractions
   (b) Change improper fractions to mixed numbers.

$\frac{3}{2}$, $5\frac{2}{3}$, $3\frac{1}{4}$, $\frac{6}{5}$, $1\frac{5}{6}$, $\frac{12}{7}$, $9\frac{1}{3}$, $\frac{26}{8}$

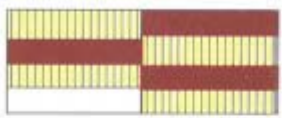
5. Which is smaller?
   (a) 0.83 or 0.3 (b) 0.75 or 0.92 (c) 0.47 or 0.68

6. Write these, beginning with the largest.
   (a) 0.42, 0.81, 0.65, 0.77 (b) 0.15, 0.53, 0.99, 0.62

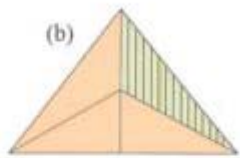
UNIT 11 FRACTIONS

Add and Subtract Proper Fractions

Study these:

(a) 

$$\frac{4}{8} + \frac{3}{8} = \frac{7}{8}$$

(b) 

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

Let us work together.

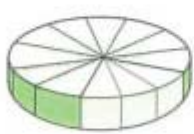
1. Suzette had a pan of fudge.
The shaded parts show the fraction she ate.
What fraction of the pan of fudge was left?

Finding the answer

The pan of fudge is divided into 12 equal parts.

So we have $\frac{12}{12}$ Suzette ate $\frac{5}{12}$

What remained? $\frac{12}{12} - \frac{5}{12} = \frac{7}{12}$



2. Mother baked a cake. She cut it in into 12 equal parts.

She shared $\frac{1}{2}$ of it to Father and $\frac{1}{4}$ to Danny.

(a) What fraction of the cake was shared?
(b) What fraction of the cake remained?

Finding the answer

The cake $= \frac{12}{12}$

$\frac{1}{2}$ to Father $= \frac{6}{12}$; $\frac{1}{4}$ to Danny $= \frac{3}{12}$

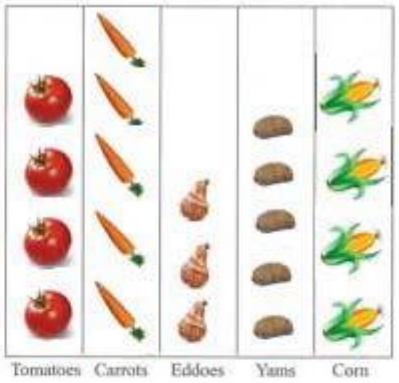
(a) Part shared $= \frac{1}{2} + \frac{1}{4} = \frac{6}{12} + \frac{3}{12} = \frac{9}{12}$

(b) Part remained = $\frac{12}{12} - \frac{9}{12} = \frac{3}{12}$

Exercise A

1. In the pictograph, one vegetable represents

$\frac{1}{25}$ of the garden.



Study the pictograph then answer the questions.

(a) Write the fraction which tells what part of the garden is used for: (i) yams and tomatoes; (ii) carrots and eddoes; (iii) corn and eddoes.

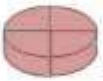
(b) How much more space is used for yams than for eddoes?

2. Find the sum or the difference:

(a) $\frac{3}{5} + \frac{1}{5}$ (b) $\frac{2}{6} + \frac{1}{6} + \frac{1}{6}$ (c) $\frac{3}{8} + \frac{2}{8} + \frac{1}{8}$

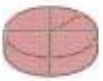
(d) $\frac{1}{12} + \frac{3}{12} + \frac{5}{12}$ (e) $\frac{7}{9} - \frac{2}{9}$ (f) $\frac{4}{4} - \frac{1}{4}$

Look at this:
Anil and Sarika were each offered a piece of cake.
The cakes were divided into equal parts like this.

Anil took  Sarika took 

What fraction tells how much cake they had together?

Anil Sarika

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

Finding the answer:

(a) The denominators are 4 and 3

Write the fractions with a common denominator.

Find the multiples of the denominators

Multiples of 4: 4, 12, 16, 20, etc.

Multiples of 3: 3, 6, 9,12, 15, etc.

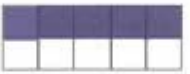
Identify the common multiple (12). Then the lowest common multiple (12).

12 is the lowest common denominator of the fractions.

So $\frac{1}{4} + \frac{1}{3} = \frac{3}{12} + \frac{4}{12} = \frac{7}{12}$

Fractions with unlike denominators	Rewrite with a common denominator	Add the numerators and retain the denominator
$\frac{1}{4} + \frac{1}{3}$	$\frac{1 \times 3}{4 \times 3} = \frac{3}{12}$ $\frac{1 \times 4}{3 \times 4} = \frac{4}{12}$	$\frac{3}{12} + \frac{4}{12} = \frac{7}{12}$

Look at a subtraction



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

Finding the answer

(a) The lowest common multiple of 2 and 5 is 10
The lowest common denominator of the fractions is 10.

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

(b) $\frac{1}{2} - \frac{2}{5} = \square$

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

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

Exercise B

1. Use diagrams to help you.

(a) $\frac{1}{2} + \frac{2}{3}$ (b) $\frac{1}{6} + \frac{1}{3}$ (c) $\frac{4}{5} + \frac{1}{2}$

(d) $\frac{3}{6} - \frac{1}{4}$ (e) $\frac{1}{2} - \frac{3}{8}$ (c) $\frac{5}{8} - \frac{2}{6}$

2. Write the answers to these in their lowest terms. The first two are done for you.

(a) $\frac{4}{8} + \frac{1}{4} = \square$

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

$\frac{4}{8} + \frac{2}{8} = \frac{6}{8}$

$\frac{6}{8}$ in lowest terms

$= \frac{6 \div 2}{8 \div 2} = \frac{3}{4}$

(b) $\frac{2}{4} - \frac{1}{6} = \square$

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

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

$\frac{6}{12} - \frac{2}{12} = \frac{4}{12}$

$\frac{4}{12}$ in lowest terms

$= \frac{4 \div 4}{12 \div 4} = \frac{1}{3}$

To write fractions in its lowest terms, divide the numerator **and** the denominator by the highest common factor.

(c) $\frac{1}{3} + \frac{1}{6} + \frac{4}{12}$ (d) $\frac{1}{4} + \frac{2}{8} + \frac{1}{6}$ (e) $\frac{2}{3} + \frac{3}{6} + \frac{1}{3}$

(f) $\frac{11}{15} - \frac{1}{3}$ (g) $\frac{3}{4} - \frac{7}{12}$ (h) $\frac{4}{5} - \frac{3}{10}$

Addition and Subtraction of Mixed Numbers

1. Baby slept for $3\frac{2}{3}$ h in the morning and $2\frac{4}{6}$ h in the afternoon.
How many hours did baby sleep that day?
Here is what Suzette did.

To add two mixed numbers	Rewrite fractions with a common denominator	Add the fractions	Add the whole numbers
$3\frac{2}{3} + 2\frac{4}{6}$	$3\frac{2}{3} = 3 + \frac{2 \times 2}{3 \times 2} = 3\frac{4}{6}$	$\frac{4}{6} + \frac{4}{6} = \frac{8}{6}$	$3 + 2 = 5$
	$2\frac{4}{6} = 2 + \frac{4 \times 1}{6 \times 1} = 2\frac{4}{6}$		$3\frac{4}{6} + 2\frac{4}{6} = 5\frac{8}{6}$

$\frac{8}{6}$ is an improper fraction. Rename $\frac{8}{6}$

So $5\frac{8}{6} = 5 + \frac{6}{6} = \frac{2}{6}$

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

$= 6\frac{2}{6}$

$\frac{2}{6}$ in its lowest terms $= \frac{2 \div 2}{6 \div 2} = \frac{1}{3}$

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

2. Danny drank $2\frac{3}{8}$ litres of orange juice from a container of $4\frac{3}{4}$ litres. How many litres of juice remained in the container?
Here is how he found out.
He used Suzette's pattern.

$4\frac{3}{4} - 2\frac{3}{8}$

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

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

Subtract the whole numbers $4 - 2 = 2$

Subtract the fractions $\frac{6}{8} - \frac{3}{8} = \frac{3}{8}$

So $4\frac{6}{8} - 2\frac{3}{8} = 2\frac{3}{8}$

> Remember
> To add or subtract, the fractions must have a common denominator.
> Rename when necessary!

Exercise C

1. Do these additions and subtractions:

(a) $13\frac{5}{6} - 9\frac{1}{3}$ (b) $11\frac{3}{4} + 15\frac{1}{2}$ (c) $6\frac{3}{5} + 12\frac{7}{20}$

(d) $16\frac{1}{5} - 5\frac{7}{10}$ (e) $16\frac{3}{4} - 4\frac{1}{2}$ (f) $2\frac{1}{2} + 16\frac{5}{8} + 10\frac{1}{4}$

2. Solve these problems:

(a) A gardener worked $2\frac{3}{4}$ hours on Monday, $4\frac{1}{3}$ hours on Tuesday and $1\frac{1}{8}$ hours on Friday. How many hours did he work in all?

(b) Mother bought cloth for curtains and sheets. Here is what she bought: $8\frac{1}{10}$ metres of cotton, $6\frac{3}{5}$ metres of lace, and $8\frac{1}{2}$ metres of tapestry.

(i) How many metres of cloth did she buy?
(ii) How much more tapestry than cotton did she buy?

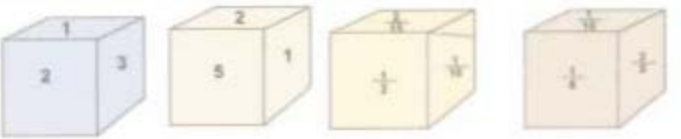
REVIEW

1. Find the sum or difference:

(a) $\frac{1}{5} + 1\frac{2}{10}$ (b) $4\frac{1}{3} + 1\frac{1}{3} + \frac{2}{3}$ (c) $3\frac{3}{4} + \frac{1}{4} + 1\frac{2}{4}$

(d) $5 + \frac{1}{12} + 3\frac{5}{12}$ (e) $3\frac{5}{8} + \frac{2}{8}$ (f) $7\frac{5}{6} - 1\frac{1}{6}$

2. Use 2 or more cubes. Number them like these.



Toss the cubes with a friend. Add and subtract the numbers that turn up each time. Remember to subtract the smaller number from the larger number.
Example:

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

$$= 3\frac{4}{10}$$

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

Check your score to determine the winner.

UNIT 12 NUMBERS

Prime and Composite Numbers

Look at the drawings below, then read the multiplication sentence for each.

1 row of $4 = 1 \times 4$ 2 rows of $2 = 2 \times 2$

There are two ways of writing the multiplication facts of 4

$1 \times 4 = 4$ $2 \times 2 = 4$

So the factors of 4 are 1, 2 and 4

Here is another example

1 row of $7 = 1 \times 7$

Exercise A

1. Copy and complete this chart to 50

Counting Numbers	Number Renamed With:		
	Product of Factors	Factors of Numbers	Numbers of Factors
1	1	1	1
2	1×2	1, 2	2
3	1×3	1, 3	2
4	1×4, 2×2	1, 2, 4	3
5	1×5	1, 5	2

2. Now look at the chart you have made.
   Complete these:
   (a) The counting numbers from 1 to 50, that has just 1 factor is .....
   (b) The first 6 counting numbers that have just 2 factors are 2, 3 and .....
   (c) The first 6 counting numbers that have more than 2 factors are 4, 6, 8 and .....

Numbers that have only two factors are prime numbers. Prime numbers between 1 and 15 are 2, 3, 5, 7, 11 and 13.

Numbers that have more than two factors are composite numbers. Composite numbers between 1 and 15 are 4, 6, 8, 9, 10, 12 and 14.

Note: 1 is neither prime nor composite.

Since the whole number 2 has just 1 and 2 as factors, then 2 is divisible by only 1 and 2.
Since the whole number 4 has 1, 2, and 4 as factors, then 4 is divisible by 1, 2, 4.
What do you know about numbers and their factors?

Exercise B

1. Answer these questions:
   (a) Which counting number is neither prime nor composite?
   (b) Say which of these numbers are prime and which are composite.
   8, 11, 15, 17, 21, 2.
   (c) What are the prime numbers less than 50; greater than 50?
   (d) What are the composite numbers less than 50; greater than 50?
   (e) Find the sum of the prime numbers between 1 and 10;
   the composite numbers between 1 and 10.

2. Complete these statements:
   (a) 3 is divisible by ..... and .....
   (b) 7 is divisible by ..... and .....
   (c) A prime number is divisible by ..... and itself.
   (d) 4 is divisible by ..... , ... and .....
   (e) 10 is divisible by ....., ..., and .....
   (f) A composite number is divisible by more than ..... counting numbers.

Multiples of 1- and 2-Digit Numbers

We can find all the factors of a whole number by writing all the multiplication facts.
Example: For 9 $1 \times 9 = 9$
$2 \times ? = 9$
$\boxed{3 \times 3 = 9}$

1, 3, 9 are factors of 9.
2 is not a factor of 9. Why?

For 12 $1 \times 12 = 12$
$2 \times 6 = 12$
$3 \times 4 = 12$

1, 2, 3, 4, 6, 12 are factors of 12

We can say that:
9 is a multiple of 3 because $3 \times 3 = 9$;
12 is a multiple of 2 because $2 \times 6 = 12$;
Is 9 a multiple of 4? Why?
9 is a multiple of 9 because $1 \times 9 = 9$
12 is a multiple of 3 because $3 \times 4 = 12$
Is 12 a multiple of 5? Why?

Exercise C

1. Answer these. If yes, give a multiplication fact to support your answer.
   Is the first number a multiple of the second?
   (a) 15 : 3 (b)27 : 2 (c) 12 : 2 (d) 11 : 3
   (e) 36 : 6 (f) 49 : 7 (g) 23 : 4 (h) 35 : 7

Lowest Common Multiple

We can list the first 8 multiples of 4 in this way:
$4 \times 1 = 4$ $4 \times 3 = 12$ $4 \times 5 = 20$ $4 \times 7 = 28$
$4 \times 2 = 8$ $4 \times 4 = 16$ $4 \times 6 = 24$ $4 \times 8 = 32$

Some Multiples of 4 are: 4, 8, 12, 16, 20, 24, 28, 32
Here are the first 8 multiples of 6.
$6 \times 1 = 6$ $6 \times 3 = 18$ $6 \times 5 = 30$ $6 \times 7 = 42$
$6 \times 2 = 12$ $6 \times 4 = 24$ $6 \times 6 = 36$ $6 \times 8 = 48$
The first 8 multiples of 6 are: 6, 12, 18, 24, 30, 36, 42, 48

Now look at this:

Multiples of 4: 4, 8, 12, 16, 20, 24, 28, 32, 36
Multiples of 6 are: 6, 12, 18, 24, 30, 36, 42, 48
12, 24 and 36 are the common multiples of 4 and 6.
The lowest common multiple of 4 and 6 is 12.

Exercise D

1. Do these:
   (a) Twelve multiples of:
   2 are..... 3 are.....
   Three common multiples of 2 and 3 are .....
   The lowest common multiple of 2 and 3 is .....

   (b) Ten multiples of:
   4 are ..... 6 are.....
   Two common multiples of 4 and 6 are.....
   The lowest common multiple of 4 and 6 is .....

2. Find these:
   (a) What is the lowest common multiple of:
   8 and 12; 9 and 15; 6 and 10; 20 and 25?

(b) What is the smallest number into which 2, 3 and 4 can be divisors?
(c) What is the LCM of
8, 9 and 12; 10, 14 and 15?

REVIEW

1. Copy and underline all the prime numbers:
   (a) 3, 6, 9, 11, 17, 21, 23
   (b) 29, 32, 37,45, 47, 53, 55
   (c) 57, 61, 69, 73, 79, 82, 86

2. Copy and underline all the composite numbers:
   (a) 2, 4, 5, 8, 10, 15, 19
   (b) 25, 31, 35, 41, 46, 51
   (c) 63, 65, 71, 75, 79, 93

3. Write true or false:
   (a) 10 is a multiple of 4 and 5
   (b) 30 is a multiple of 3 and 7
   (c) 12 is a multiple of 2, 3 and 4
   (d) 24 is a multiple of 3 and 6
   (e) 42 is a multiple of 6 and 21

UNIT 13 GEOMETRY

Polygons and Angles

Here are two shapes

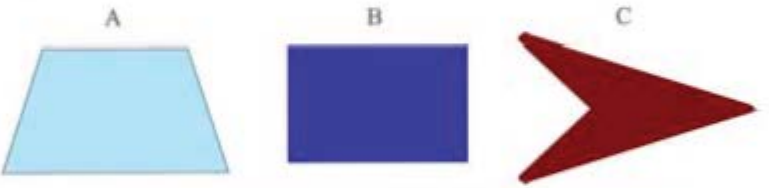
List some differences between them.

A has 3 sides and 3 angles.
It is a closed shape.
A is a closed shape made up of straight lines.
It is a polygon.

B has 2 straight lines and 1 angle.
It is an open shape.

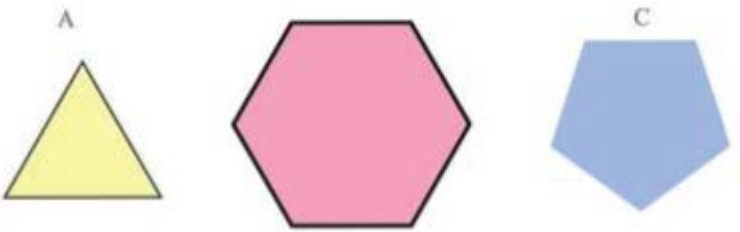
A polygon is a closed shape bounded by straight lines.

How many sides and angles are there in these shapes?



Shapes like these, with 4 sides and 4 angles are called Quadrilaterals.

Count the number of sides and angles in these shapes



Say if these are triangles or quadrilaterals?
Give a reason for your answer.

Shapes with 5 sides and 5 angles are Pentagons

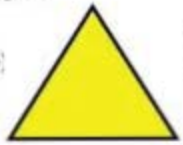
Shapes with 6 sides and 6 angles are Hexagons

What can you say about the number of sides and angles in any polygon?

Exercise A

1. Use pieces of cardboard. Cut out these polygons.
   A triangle; quadrilateral; pentagon; hexagon.
   Write the name on each.

2. Here are some polygons

(a)  (b)  (c)  (d) 

   Write the name on each.
   Record the information on a table in terms of the number of sides and angles.

Angles

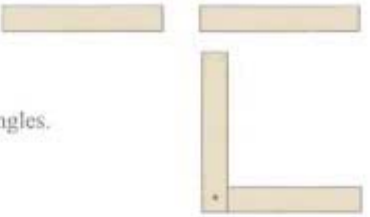
Do you remember the name of this angle?
It is a **right angle.**
Use your arm to show a right angle.

Now, close in your arm as shown in this picture.
Is this still a right angle?
Is it larger or smaller than a right angle?
An angle smaller than a right angle is an **acute angle.**

Return your arm to the right angle position.
Lower your arm as in this picture.
What do we have?
An angle greater than a right angle is an **obtuse angle.**

Form the right angle with your arm once more.
Now straighten your arm.
What is the name for this angle?
This is a **straight angle.**
A straight angle has 2 right angles.

Let us make an instrument to show angles.
Use two strips of cardboard like this.



Fasten them with a pin.
Try showing right angles; acute angles; obtuse angles.

Exercise B

1. Here is a set of angles.

Arrange them into 4 groups.

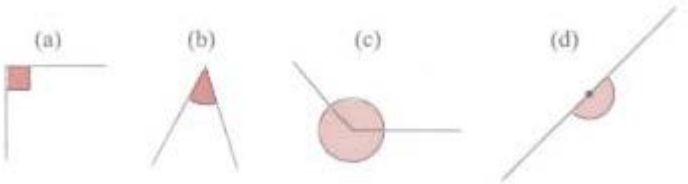
2. (a) Draw a right angle.
   (b) Draw a straight angle.

3. Use paper to make the 4 types of angles.
   Group them and display your angles in the Mathematics Corner in your class.

REVIEW

1. Here are some Polygons.
   Draw and name each. State the number of sides and angles in each:

2. Here are some angles.
   Arrange them according to their size, smallest first:



UNIT 14 OPERATIONS

Multiply And Divide

Look at this:

The triangles are arranged in rows of 5.
How many triangles are there in all?

$4 \times 5 = 20$

How many rows of 5 are there?

$20 \div 5 = 4$

We also use division to find the missing number.
Example: missing number (n) $\times 5 = 20$

$n = 20 \div 5$

$n = 4$

We can partition the set of 20 triangles to show subsets with 5 members each and find out how many such subsets we have.

So $20 \div 5 = n$

$20 \div 5 = 4$

$20 = 4 \times 5$

For each division sentence, there is a related multiplication sentence.

> Remember
> Division is the inverse of multiplication.
> Division will undo multiplication.
> Multiplication will undo division.

This doing and undoing is the inverse relationship between multiplication and division.

Exercise A

1. Write a related multiplication sentence to undo each division.

(a) $72 \div 3$ (b) $35 \div 5$ (c) $24 \div 2$

(d) $80 \div 2$ (e) $21 \div 3$ (f) $30 \div 5$

Division - 1-Digit Divisors

Study this problem.
There are 40 workers on a May Day Parade.
They are marching 4 in a row.
How many rows of workers are there?
Colleen and Robert solved this problem.

Colleen placed small dots in rows of 4 until she had 40. Then she counted the number of rows and stated what was done.
$40 \div 4 = 10$ rows.

Robert found the missing number.
$n \times 4 = 40$
So $n = 40 \div 4$
$40 \div 4 = 10$ rows

To verify her answer, she multiplied the number of rows (10) by the number in each row (4) i.e $10 \times 4 = 40$
Who is correct?
Notice, they both used the idea of doing and undoing.

Now let us suppose the 40 workers marched in rows of 3.
What will the solution look like?
What will be the answer?
Colleen made subsets of 3 from a set of 40, until she could make no more.
The answer looks like this

*** *** *** *** *** ***
*** *** *** *** *** ***
*** *

13 subsets of 3 and 1
13 rows of 3 workers
and 1 worker remains.

To verify she did this:
Number of subsets × number in each subset + remainder
$40 = (13 \times 3) + 1$
Robert used a number line to show 13 moves of 3 going back from 40 took him to 1.
He found out: There are 13 threes in 40.
If he subtracts 13 threes from 40, 1 remains.
To verify he did this: $40 = (13 \times 3) + 1$

Let us do the division

$40 \div 3$

quotient
13 → 1 remainder
divisor → 3) 40 ← dividend
30 10×3
10
9 3×3
1

Verify: dividend = (quotient × divisor) + remainder
$40 = 13 \times 3 + 1$
The remainder is always smaller than the divisor.

Exercise B

1. (a) Use partitioning to find the quotient and remainder in each.
Check each answer.

$29 \div 3,\ 13 \div 4,\ 21 \div 2,\ 17 \div 2,\ 22 \div 3,\ 25 \div 4$

(b) Use number lines
Find each quotient and remainder.
Check each answer.

2. Do these:

(a) $5\overline{)33}$ (b) $3\overline{)26}$ (c) $4\overline{)34}$ (d) $2\overline{)25}$

(e) $4\overline{)1452}$ (f) $3\overline{)3107}$ (g) $2\overline{)4931}$ (h) $5\overline{)5209}$

2-Digit Divisors

Divide by multiples of 10 and 100
Study this:
Dave had 550 drinking straws. He joined them to make lengths of 30 straws each.
How many lengths was he able to make from his set?
How many straws remained?

$30\overline{)550}$

(i) Think

3 tens$\overline{)5 \text{ hundreds}}$

If 3 tens × 1 ten = 3 hundreds
and 3 tens × 2 tens = 6 hundreds
then the quotient is less than 20

(ii) We know that:
If $30 \times 10 = 300$
And $30 \times 9 = 270$
Then there are 8 times 30 in 250

(iii) The remainder 10, is less than 30

So $30\overline{)550}$ 18 R10
18 lengths and 10 straws remained.
We can verify the answer.
$550 = (18 \times 30) + 10$

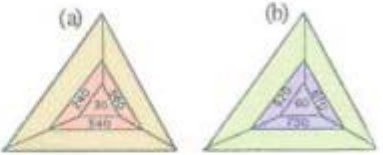
$$\begin{array}{rl} 18 \text{ R } 10 & \\ 30\overline{)550} & \\ -300 & 30 \times 10 \\ \hline 250 & \\ -240 & 30 \times 8 \\ \hline 10 & \end{array}$$

Exercise C

1. Copy and complete.
   Verify each answer.

   (a) $10\overline{)2132}$ (b) $40\overline{)1650}$ (c) $50\overline{)7253}$ (d) $20\overline{)3125}$

2. Try these:
   Use the number in the smallest triangle as your divisor.
   Divide each number.
   Write the quotient and remainder.



Zero in the Quotient

Study these:

(a) $6\overline{)1263}$

divide (i) $6\overline{)12 \text{ hundreds}}$

(ii) $6\overline{)6 \text{ tens}}$

(iii) $6\overline{)3 \text{ ones}}$

(b)

$$\begin{array}{r} 201 \text{ R } 2 \\ 6\overline{)1208} \\ -1200 \quad \text{(i) } 200 \times 6 \\ \hline 8 \quad \text{(ii) no tens, record 0} \\ -\ 6 \quad \text{(iii) } 1 \times 6 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 210 \text{ R } 3 \\ 6\overline{)1263} \\ -1200 \quad \text{(i) } 200 \times 6 \\ \hline 63 \\ -\ 60 \quad \text{(ii) } 10 \times 6 \\ \hline 3 \quad \text{(iii) } 3 < 6 \end{array}$$

Since there are no tens in the dividend, record a zero in the quotient and continue the division.

Since the dividend 3 is less than the divisor 6
record a zero in the quotient and 3 as the remainder.
In a shorter form

$$\begin{array}{r} 210 \text{ R } 3 \\ 6\overline{)1263} \\ -12\downarrow \\ \hline 6 \\ -\ 6\downarrow \\ \hline 3 \end{array} \qquad \begin{array}{r} 201 \text{ R } 2 \\ 6\overline{)1208} \\ -\ 12 \\ \hline 8 \\ -\ \ 6 \\ \hline 2 \end{array}$$

Look at these:
258 persons went to a cinema show. The cinema has 6 seats in each row and there are 55 rows. Will everyone be seated to watch this show? How many rows will be filled?

Let us work:

```
   43
6 ]258
  -240   (40 × 6)
    18
  - 18   (3 × 6)
     0
```

```
     4 <-- This means 40
6 ]25  tens

     3
6 ]18 ones
```

So everyone will be seated. 43 rows of seats will be filled.

If the cinema had rows of 5 seats. What will the new position be?

```
   51  R 3
5 ]258
  -250   (50 × 5)
     8
  -  5   (1 × 5)
     3
```

51 rows of seats will be filled.
3 is less than 5. So 3 persons will be in another row.

Exercise D

Try these:

1. (a) 6]6489 (b) 5]5815 (c) 6]4634 (d) 7]2772

2. A baker needs to bake 3765 loaves of bread. His oven bakes 15 loaves in each batch. How many batches will he need to bake?

REVIEW

1. Write a related mutliplication sentence for each division.
   (a) 135 ÷ 5 (b) 714 ÷ 7 (c) 284 ÷ 2
   (d) 6240 ÷ 6 (e) 972 ÷ 9 (f) 2493 ÷ 3

2. Use number lines to show these. Write the quotient and remainder.

(a) $4\overline{)42}$ (b) $3\overline{)37}$ (c) $5\overline{)29}$

3. Solve these problems:

(a) At a sports day, 156 children from 6 classes were present. Each class had an equal number of children there. How many children from Class 5 were there?

(b) 987 kg of peanuts are to be put into 80 kg bags.
(i) How many bags are needed?
(ii) How many kg of peanuts remained?
(iii) How many more kg of peanuts are needed to fill another 80 kg bag?

(c) Mother bought 58 m of curtain material. If each curtain uses 5 m of cloth, how many curtains will she get? How much of the material would be left over?

UNIT 15 OPERATIONS

Test for Divisibility

Do these divisions.

State the quotient and remainder in each.

(a) $2\overline{)16}$ (b) $2\overline{)40}$ (c) $2\overline{)72}$ (d) $2\overline{)68}$ (e) $2\overline{)34}$

In 16, 40, 68, 34 and 72, the remainder is zero but $23 \div 2$ gives a remainder 1.
2 is a factor of 16, 40, 68, 34, 72; but not a factor of 23.
23 is not a multiple of 2.

> Remember
> When one whole number divides another and leaves a remainder zero, we say the whole number is divisible by the other.
> Every multiple of a whole number is divisible by that number.

Exercise A

1. Here are some multiples of 2:
   0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24,
   (a) A multiple of 2 has special digits in the ones' place.
   Name them.
   (b) Which of these are divisible by 2? How can you tell?
   55, 36, 90, 87, 64.

> A whole number is divisible by 2 if the numeral has a 0, 2, 4, 6 or 8 in the ones' place.

2. List some multiples of 10:
   (a) How can you tell if a whole number is divisible by 10?
   (b) Which of these are **not** divisible by 10? Why not?
   5, 17, 10, 25, 44, 60, 80, 92.

3. Study these multiples of 5:
   0, 5, 10, 15, 20, 25, 30, 35, 40, 45.
   (a) What pattern is there in the numerals?
   (b) Are **all** multiples of 10 divisible by 5?
   (c) Are **all** multiples of 5 divisible by 10?

> A whole number is divisible by 5 if the numeral has a 0 or 5 in the ones' place.

4. Divide these by three. Which are divisible by 3?
   22, 18, 7, 9, 33, 27.

5. Look at these. Let us find the sum of the digits in each:
   (a) $213 \rightarrow 2+1+3$ (b) $612 \rightarrow 6+1+2$
   (c) $412 \rightarrow 4+1+2$ (d) $138 \rightarrow 1+3+8$
   (e) $111 \rightarrow 1+1+1$ (f) $178 \rightarrow 1+7+8$

6. Which are divisible by 3? What have you found out?
   Find the sum of the digits in these.
   (a) 426 (b) 602 (c) 371 (d) 546 (e) 222 (f) 777
   Which are divisible by 3?

> A whole number is divisible by 3 if the sum of the digits in the numeral is a multiple of 3.

7. (a) Write a 2-digit numeral. Find the sum of the digits.
   Is the sum divisible by 9?
   (b) Try this with (i) other 2- and 3- digit numerals; (ii) multiples of 9.
   (c) Are **all** multiples of 9 divisible by 9?

> A whole number is divisible by 9 if the sum of the digits in the numeral is a multiple of 9.

Averages

Study this:

Ann and Anil spent some time at the library each day for 5 days. This table shows the number of minutes spent at the library by each child, over the period.

Name	Mon	Tue	Wed	Thur	Fri
Ann	35	15	20	15	30
Anil	10	25	15	30	20

(a) Who spent more time at the library in the 5 days?
(b) Divide the total time for each child, by 5 days.
How many minutes is this per day for each child?

Ann spent a total of 115 minutes.
This means $115 \div 5 = 23$ minutes per day.
We say that Ann spent an average of 23 minutes at the library each day.
What is Anil's average time at the library over the 5 days?

(i) Find the sum of the time spent each day for 5 days.
i.e. $10 + 25 + 15 + 30 + 20 = 100$ minutes
(ii) Divide the sum by the number of addends(days)
i.e. $100 \div 5 = 20$ minutes per day.
So Anil spent an average of 20 minutes per day at the library.

Exercise B

Now do these:

1. Marnice recorded her correct answers in Mathematics quiz for 3 days.

M	W	F
15	18	9

   (a) How many correct answers did she give in the 3 days?
   (b) What is the average number of correct answers given.

2. Sue, Ann and Anil saved money to buy a new ball.
   Together they saved $450. What is the average amount saved by each child?

3. In a school there are 210 children. If 96 are boys and 114 are girls and there are 6 classes in the school, what is the average number of children in a class?

4. Ann wants a spelling average of 15 words in one week. She has 5 spelling lessons in the week. Her scores so far are 13, 16, 14, 15
   What must her last score be, so that her average will be 15 words?

   Let us find the answer.

   (i) What do we know?
   We know that (a) the average is 15.
   (b) the number of scores to give this average is 5.
   (c) 4 of the scores are 13, 16, 14, 15

   (ii) How to use what we know?
   Average = sum of the scores + number of scores
   15 = sum ÷ 5
   15 × 5 = sum = 75
   75 is the sum of 5 scores.
   If 5 scores = 75
   And 4 scores = 13 + 16 + 14 + 15 = 58
   Then the last score = 75 - 58 = 17
   Ann's last score must be 17 words.

Let's check
Sum of the scores = 13 + 16 +14 + 15 + 17 = 75 words
Average score = 75 + 5 = 15 words.

Exercise C

1. There are 11 boys on a football team. Their average height is 66 cm.
   The table provides the height of 10 boys. What is the height of the eleventh boy?

Height in cm											Total Height	Average Height
1	2	3	4	5	6	7	8	9	10	11		
69	55	64	58	56	54	59	61	65	66	-	-	66 cm

2. Three children read an average of 68 pages a day. If two of them read 76 and 68 pages, how many pages did the third child read?
3. The average mass of 5 parcels is 62 kg. If the average mass of 3 of them is 66 kg, what is the average mass of the other 2 parcels?
4. In 6 years father gained 42 kg. What was his average weight gain per year?

REVIEW

1. The chart below shows the heights of 5 pupils.

Names	Height in cm
Karen	143
Peter	160
Jai	108
Deo	100
Janice	124

What is their average height?

2. Find the average of:
   (a) 8, 9, 7, 11, 5
   (b) 4, 5, 0, 9, 7
   (c) 137, 64, 72
   (d) 39, 47, 48, 45, 46

3. (a) Three pieces of coloured paper are 32, 37 and 42 cm long. What is the average length of the 3 pieces of paper?

   (b) Jackie's score on 3 science tests were 84, 86 and 91. What was her average score?

   (c) The chart below shows the daily attendance of four classes on Monday.

Attendance	Mon.
Class 1	101
Class 2	92
Class 3	84
Class 4	55

What was the average attendance of the 4 classes on Monday?

(d) Find the average mass of 5 persons whose masses are

63 kg, 80 kg, 70 kg, 84 kg, 73 kg

(e) If 432 m of string was used to fly 8 kites, what was the average length of string for a kite?

LET US LOOK BACK

1. Find the L C M of:
   3 and 8; 20 and 15; 2 and 9

2. Work these:

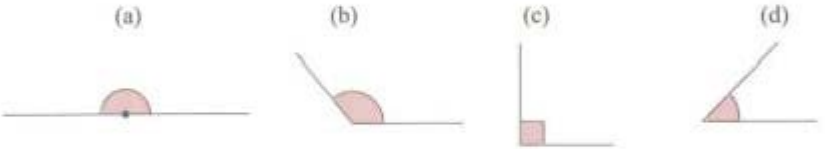
   (a) $\frac{3}{5} + \frac{1}{5}$ (b) $\frac{3}{7} + \frac{5}{7} + \frac{1}{7}$ (c) $\frac{1}{2} + \frac{2}{3} + \frac{5}{9}$

   (d) $\frac{7}{12} - \frac{5}{12}$ (e) $\frac{8}{9} - \frac{2}{3}$ (f) $\frac{3}{4} - \frac{5}{12}$

3. Draw a pentagon.
   How many sides and angles are there on your pentagon?

4. Aaron made a shape using 6 pieces of sticks. He called it a polygon.
   What is the name of the polygon he made?

5. Name these angles.



6. In 5 days a work gang cleared 320 garden beds. On the average, how many beds were cleaned in a day?

7. Find n if:
   $6 \times n = 48$; $8 \times n = 72$

8. A number divided by 6 gives the quotient 7 and a remainder 3. What is the number?

9. (a) Which of these is divisible by 3?
   23, 32, 36, 50, 64

   (b) Which of these is divisible by 5?
   27, 43, 45, 73, 81

UNIT 16 DECIMALS

Decimals as Improper Fractions

Here are 3 metre sticks.
Each metre stick is divided into ten equal parts.

There are 30 tenths in all. That is, $\frac{30}{10}$

How many tenths are shaded?

$\frac{27}{10}$ are shaded. This is an improper fraction.

It means 2 whole sticks and $\frac{7}{10}$ of the third are shaded.

$\frac{27}{10}$ can be written as a mixed number $2\frac{7}{10}$

$2\frac{7}{10}$ can be written as a decimal $2\frac{7}{10} = 2.7$

Now study this:

May had 5 pots of food to be sold at the school's fair.

She sold 4 pots and $\frac{9}{10}$ of the fifth pot of food.

In all she sold $4\frac{9}{10}$ pots of food.

This means she sold $\frac{49}{10}$ of the food.

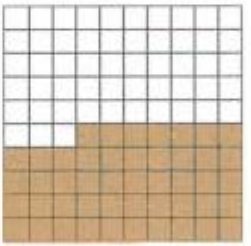
Exercise A

1. Copy and complete the table below. The first is done for you.

Improper Fraction	Mixed Number	Decimal
$\frac{14}{10}$	$1\frac{4}{10}$	1.4
$\frac{23}{10}$		
$\frac{35}{10}$		
$\frac{51}{10}$		
$\frac{83}{10}$		
$\frac{69}{10}$		

Look at these:

a) 

b) 

Each is divided into 100 equal parts. Each part is one hundredth or $\frac{1}{100}$.
In diagram (a) each part is shaded. The whole or 1 is shaded.

In (b) 47 parts are shaded $\left(\frac{47}{100}\right)$ is shaded. In all $1\frac{47}{100}$ is shaded.

As an improper fraction we write $1\frac{47}{100}$
As a decimal it is 1.47
We read the decimal as: one point four seven

When writing decimal hundredths we must have 2 places after the decimal point.

2. Write as improper fractions.

(a) $1\frac{13}{100}$, $1\frac{37}{100}$, $1\frac{9}{100}$, $2\frac{41}{100}$, $3\frac{12}{100}$

(b) $2\frac{26}{100}$, $2\frac{4}{100}$, $3\frac{19}{100}$, $1\frac{3}{100}$, $1\frac{58}{100}$

3. Write as decimals.

(a) $\frac{24}{100}$, $1\frac{33}{100}$, $\frac{7}{100}$, $2\frac{15}{100}$, $\frac{13}{100}$

(b) $\frac{57}{100}$, $2\frac{76}{100}$, $3\frac{1}{100}$, $1\frac{42}{100}$, $\frac{66}{100}$

Decimals in Expanded Form

When we write a decimal number the point separates the **ones** from the **tenths**. Look at this decimal number

23.5

Whole Number			Decimal
Tens	Ones	•	tenths
2	3	•	5

$2 \times 10 = 20$ $\quad 3 \times 1 = 3$ $\quad 5 \times \frac{1}{10} = \frac{5}{10}$

We can expand decimals in the same way as whole numbers.

$23.5 = 2 \text{ tens} + 3 \text{ ones} + 5 \text{ tenths}$

$= (2 \times 10) + (3 \times 1) + (5 \times \frac{1}{10})$

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

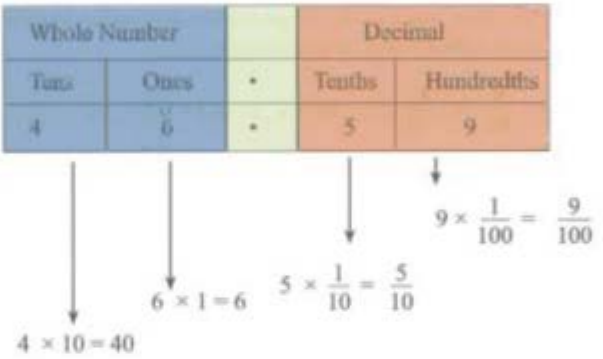
$= 23\frac{5}{10}$ or $23\frac{1}{2}$

Exercise B

1. Expand these:

(a) 29.6	(b) 23.1	(c) 38.5
(d) 16.3	(e) 35.2	(f) 47.1
(g) 52.7	(h) 60.5	(i) 71.9

Similarly we can write decimal hundredths in expanded form.
Look at 46.59
The point separates the ones from the tenths.



So 46.59 = 4 tens 6 ones 5 tenths 9 hundredths

$$= (4 \times 10) + (6 \times 1) + (5 \times \frac{1}{10}) + (9 \times \frac{1}{100})$$

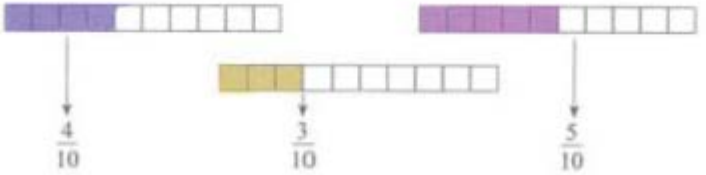
$$= 40 + 6 + \frac{5}{10} + \frac{9}{100}$$

$$= 46\frac{59}{100}$$

2. Complete these:
Follow the pattern used above.

(a) 28.13	(b) 51.62	(c) 69.34	(d) 124.67
(e) 37.45	(f) 43.71	(g) 73.52	(h) 208.39

Add and Subtract Decimals



The diagrams represent pans of fudge that Mrs Jones made. The shaded parts she gave to her friends. How much of the fudge did she give to her friends altogether? We can find out by using either fractions or decimals.

$\frac{4}{10} + \frac{3}{10} + \frac{5}{10} + \frac{12}{10}$ or $0.4 + 0.3 + 0.5 = 1.2$

$$\begin{array}{r} 0.4 \\ 0.3 \\ +\,0.5 \\ \hline 1.2 \end{array}$$

3. Complete these. The first is done for you.

(a) $\frac{2}{10} + \frac{3}{10} = \frac{5}{10}$

$0.2 + 0.3 = 0.5$

(b) $\frac{1}{10} + \frac{5}{10} =$ -------

$0.1 + 0.5 =$

(c) $\frac{7}{10} + \frac{2}{10} =$ -------

$0.7 + 0.2 =$ -------

(d) $\frac{4}{10} + \frac{3}{10} =$ -------

$0.4 + 0.3 =$ -------

(e) $\frac{9}{10} + \frac{1}{10} =$ -------

$0.9 + 0.1 =$ -------

(f) $\frac{8}{10} + \frac{1}{10} =$ -------

$0.8 + 0.1 =$ -------

4. Complete these:

(a)

0.2	0.4	4.3	5.8	6.7
+ 0.9	+ 0.6	+ 7.5	+ 4.1	+ 5.3

(b)

1.6	4.9	3.8	6.4	4.1
2.3	0.2	2.3	1.9	1.8
+ 4.7	+ 3.1	+ 5.9	+ 3.0	+ 0.3

Think about this problem.
Mary has 0.8 of a cake. She shared 0.3 of it to her friend.
What part of the cake does she have left ?

Mary would have 0.8 - 0.3 left
that is

$$\begin{array}{r} 0.8 \\ +\ 0.3 \\ \hline 0.5 \end{array}$$

Exercise C

1. Now do these:

(a) $\begin{array}{r} 5.6 \\ -\ 0.2 \\ \hline \end{array}$ (b) $\begin{array}{r} 3.7 \\ -\ 2.1 \\ \hline \end{array}$ (c) $\begin{array}{r} 8.5 \\ -\ 3.3 \\ \hline \end{array}$ (d) $\begin{array}{r} 12.5 \\ -\ 6.7 \\ \hline \end{array}$ (e) $\begin{array}{r} 14.3 \\ -\ 6.5 \\ \hline \end{array}$

(f) $\begin{array}{r} 20.0 \\ -\ 15.8 \\ \hline \end{array}$ (g) $\begin{array}{r} 24.2 \\ -\ 13.9 \\ \hline \end{array}$ (h) $\begin{array}{r} 30.1 \\ -\ 12.6 \\ \hline \end{array}$ (i) $\begin{array}{r} 42.7 \\ -\ 23.8 \\ \hline \end{array}$ (j) $\begin{array}{r} 56.3 \\ -\ 24.5 \\ \hline \end{array}$

2. Do these:
   (a) Subtract 9.4 from 13.2
   (b) From 45.6 take 42.9
   (c) Take 73.2 from 100.1
   (d) What is the difference between 33.5 and 30.3?
   (e) What must be added to 12.7 to make 15.4?
   (f) Take 17.8 from 20.3

Add and Subtract Decimal Hundredths

Look at these items and their prices.

Lollipop $10

Toffee $20

Chewing Gum $5

Cost of 1 lollipop $10, that is 0.1 of a hundred dollar.
Cost of 1 toffee is $20, that is 0.2 of a hundred dollar.
Cost of 1 chewing gum is $5 that is 0.05 of a hundred dollar.

Cost of all the items is

$$\begin{array}{r} \$\ 0.1 \\ 0.2 \\ 0.05 \\ \hline \$\ 0.35 \end{array}$$

of a hundred dollar.

So the cost of the lollipop, toffee and chewing gum is $ 0.35 of a hundred dollar.

Exercise D

1. Now do these:

(a)	(b)	(c)	(d)	(e)
0.23	0.64	6.15	5.38	7.24
+ 0.75	+ 0.57	+ 2.27	+ 1.63	+ 2.86
____	____	____	____	____

(a) 3.07 + 4.23 + 6.38 (b) 9.11 + 2.18 + 5.06

(d) 23.75 + 9.62 + 10.11 (e) 30.46 + 11.32 + 8.74

Now read this problem.
On Monday night power supply was off for 05:43 hours.
On Tuesday night power supply was off for 03:21 hours.
For how much longer was it off on Monday night than on Tuesday night?
The problem can be worked in this way:

05:43 hours
- 03:21 hours
02:22 hours

On Monday night power was off for 2 hours 22 minutes longer than on Tuesday night.

2. (a)

5.64	9.75	4.00	18.21	36.52
- 3.40	- 6.53	- 1.62	- 16.35	- 21.89
____	____	____	____	____

(b) From 17.09 take 10.12

(c) Subtact 25.16 from 40.01

(d) What is the difference 54.76 and 43.98 ?

(e) 86.35 minus 73.87

REVIEW

1. Copy and complete this table:

Improper Fractions	Mixed Number	Decimals
$\frac{33}{10}$	—	3.3
$\frac{129}{100}$	$2\frac{9}{10}$	—
$\frac{147}{100}$	—	1.47
$\frac{293}{100}$	—	2.93

2. (a) What is the place value of the 4 in the numeral 54.613?
   (b) What is the place value of the 8 in the numeral 82.476?
   (c) The place value of the 7 in the numeral 13.726 is —.
   (d) The place value of the 9 in the numeral 78.549 is —.

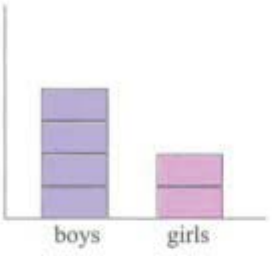
3. Expand these:
   (a) 59.82
   (b) 94.36
   (c) 81.95
   (d) 125.78

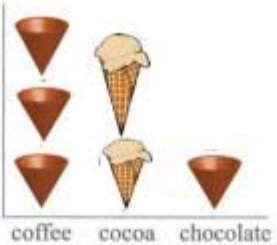
4. Add these:
   (a) 26.3; 5.09; 114.27
   (b) 8.76; 43.08; 153.9
   (c) 54.28; 6.713; 208.5

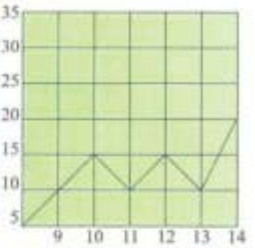
5. (a) From 7 take 3.21
   (b) Subtract 14.67 from 20
   (c) 60.53 - 25.675

UNIT 17 GRAPHS

Here are some graphs.







Can you remember the name of each type? Copy each and write the name below it

Pictographs

Here is some information about the children in a class.

No. of children	Age in years
12	9 to 13
3	9
2	10
6	11
1	12

Twelve children are between the ages of 9 and 13; 3 are 9; 2 are 10; 6 are 11; and 1 is 12.
Make a pictograph to show their information.
Read this:
Primary 3 has 24 children who travel to school everyday.
12 go by bus; 2 by car; 3 use bicycles and the others walk.
Now make a pictograph to show this information. Use templates to draw boys and girls.

Bar Graphs

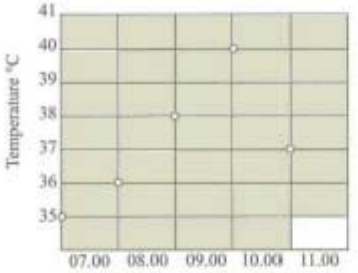
Use the information on your pictograph to make a bar graph.
Draw a bar graph to show the mass of four boys - Rishi 40 kg;
Harry 20 kg; Tom 30 kg and Mohan 50 kg.
Use templates of rectangles to build your graph.
Let 1 rectangle represent 10 kg.

Point Graphs

Molly's temperature in one day was recorded as:

07:00 h 35 °C 08:00 h 36 °C 09:00 h 38 °C
10:00 h 40 °C 011:00 h 37 °C

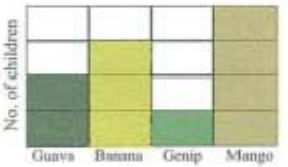
Let us show Molly's temperature on a graph.



We call this a Point Graph.
Use a point graph to show Danny's mass over a 4-year period.
At age 9 he was 20 kg, he gained 5 kg in the next year, 10 kg the following year and by his 12th birthday, he lost 5 kg.
What does the point graph look like?

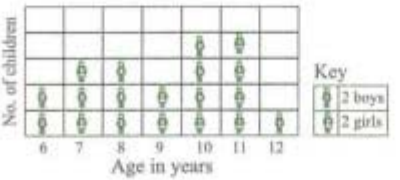
Exercise A

1. This bar graph tells about the fruits that children in Primary 3 like.



Study the graph and complete the following :
(a) How many children like each fruit?
(b) Which fruit do most children like?
(c) Which fruit do least children like?
(d) How many more children like banana than genip?

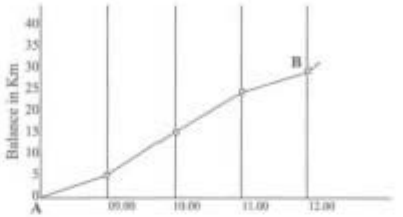
2. The pictograph below shows the ages of some children.



Study the graph and complete the following:
(a) How many children are six years old?
(b) How many girls are ten years old?

(c) Which groups have boys only?
(d) Which group has girls only?
(e) How many more girls than boys are eleven years old?

3. The graph below shows the movement of a man who left town A at 09:00 h for town B.



Study the graph then answer these:

(a) How many km did the man travel in:
the first hour? the second hour? the third hour? the fourth hour?
(b) What was the time when he was 15 km from town A?
(c) How far away was he from town B at 11:00 h?
(d) How many km had he completed at 12:00 hour?

4. The pie-chart below shows how the children in Primary 3 use their garden plot.

Study the chart and answer these:

(a) Which crop takes up the largest part of the plot?
(b) What is planted in the second largest part of the plot?
(c) Which crop takes up the same space as black-eye?
(d) Two crops which take up half of the garden are ..... and ..... .
(e) Pepper is grown on ..... of the garden plot.

REVIEW

Work in groups.
Build simple graphs and pie-charts from things in your home surroundings.
Supply simple questions to graphs you made up.
Take turns to answer the questions.
Display your graphs in the Mathematics corner in your classroom.

UNIT 18 NUMBERS

Roman Numerals

You can have fun writing Roman Numerals.
Here are some letters the Romans used.
I, V, X, L, C, D, M.
What numerals do they represent?
Points to remember when writing Roman Numerals.

(a) Some letters are repeated, e.g III, XX
(b) When a letter is repeated the numbers are added e.g
III means 1 + 1 + 1 = 3, XX means 10 + 10 = 20
(c) A letter can only be repeated three times in succession.
(d) V and L are never repeated.
(e) Two or more letters can be written together.
(f) When a letter of greater value comes first add the value of the letter.
e.g. VI is 5 + 1 = 6, XV is 10 + 5 = 15
(g) When a letter of smaller value comes first, subtract the value of the first letter from the value of the second.
e.g. IV is 5 - 1 = 4, IX is 10 - 1 = 9, XL is 50 - 10 = 40
(h) I can be subtracted from V and X only. X can be subtracted from L and C only. C can be subtracted from D and M only.

Exercise A

1. Write in Hindu-Arabic Numerals:
(a) IX (b) XXXVI (c) XXIV (d) XIX (e) LV
(f) LXXII (g) XIV (h) LVIII (i) XLVII (j) LXVII

2. Write Roman Numerals for:
(a) 11, 40, 30, 70, 59, 49, 90
(b) 32, 86, 66, 26, 43, 99, 1949

3. XXIX is 10 + 10 + 9 = 29. Follow the pattern and do these:
(a) LVII is ..... (b) XLIV is .....
(c) LXII is ..... (d) XXXVIII is .....

The Romans also used 100.
They used the letter **C** to represent 100.
We can follow 'Points To Remember' when using the letter C.
Example :

1. CC is C + C = 100 + 100 = 200

Look at the other examples. Give the rules for them.

2. CV is 100 + 5 = 105
3. XC is 100 - 10 = 90

Here are some Roman Numerals you have learn and the Hindu-Arabic Numerals for them.

ROMAN NUMERALS	I	V	X	L	C
HINDU-ARABIC	1	5	10	50	100

Exercise B

1. Write Hindu-Arabic numerals for these. Use the table above and the rules learnt.

   (a) VII XVII LXXIV XL XC

   (b) XXIX LXIII XXXII XCIX XLV

2. Here are numerals up to 100 written by tens.
   Arrange them in order beginning with 10.
   XL, XC, XX, LXXX, X, XXX, C, L, LXX, LX.

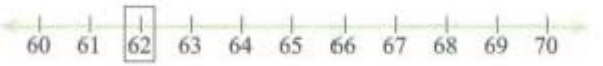
3. The clock shows the time using Roman Numerals.
   (a) What time is shown on the clock?
   (b) Write the time using the 24-hour clock time.

Round Numbers

Guessing Game

About how many seeds are in the jar?
We often estimate when we do not know the exact number.
We do so by rounding the number.
We can use a number line to help us round numbers.

Look at this number line.



62 is between 60 and 70.
Is it closer to 60 than 70?
We see it is closer to 60.
So 62 rounded to the nearest ten is 60.

Look again at the number line.
Is 67 closer to 60 or 70?
67 rounded to the nearest ten is 70.

Look at 65. Is 65 closer to 60 or 70?
65 rounded to the nearest 10 is 60.

We can round numbers to the nearest 10.
We can round to the next ten or to the ten before.

If the digit in the ones place is 0, 1, 2, 3 or 4 round to the ten before.
e.g. 64, 63, 62, 61 are rounded to 60.
If the digit in the ones place is 6, 7, 8 or 9 round to the next ten.
e.g. 66, 67, 68, 69 are rounded to 70.
65 is in the middle of two tens. It is neither closer to 60 or 70.
In such a situation, round to the **even** ten i.e. 6 tens or 60.
75 to the nearest ten is 80. 85 to the nearest ten is 80.

Exercise C

1. Round these numbers to the nearest 10:
   (a) 21; 68; 39; 47; 25; 54; 72; 16; 63; 85.
   134 comes between 130 and 140.
   Is it closer to 130 or 140?
   So 134 rounded to the nearest 10 is 130.
   (b) 135; 207; 331; 342; 256; 479; 128; 618; 564; 483.

We can also round numbers to the nearest 100.
You can use a number line to help you.

2. Round to the nearest 100.
   Use number lines to help you.
   620; 371; 450; 876; 712; 635; 792; 345; 560; 308

   We can round numbers to the nearest thousand.

   Example:
   3970 rounded to the nearest 1000 is 4000.
   1316 rounded to the nearest 1000 is 1000.
   4500 rounded to the nearest 1000 is 4000.

When rounding numbers to the nearest 1000,
the digit in the hundreds place helps us to decide
whether to round up or down.

Exercise D

1. Round to the nearest 1000.

   8276; 3009; 7821; 2347; 5006; 1798; 6240; 1814

2. Copy and complete the table. The first one is done for you.

Numerals	Rounded to the nearest		
	10	100	1000
1319	1320	1300	1000
2776			
3485			
6564			
4351			

Estimating answers using rounded numbers. Look at the problem:

```
  71
+ 52
____
```

without working it we can tell the sum. Let us round the addends.

```
  71 round      70          Now let us find the exact sum    71
+ 52          + 50                                        + 52
The sum is about 120                                      ____
                                                           123
```

We can also estimate differences.

```
     81 round →  80          The exact difference    81
   - 34      →  - 30                                - 34
The difference is about  50                        ____
                                                    47
```

Exercise E

1. Round each number to the nearest 10 and estimate the sum or difference. Find the actual sum or difference.

(a)

```
  83      58      61      93      267
+ 62    + 43    + 52      54    + 141
____    ____    ____    + 36    ____
                        ____
```

(b)

```
  52      93     732      72      556
- 13    - 24    - 119    - 54    - 108
____    ____    ____    ____    ____
```

2. Round each number to the nearest 100 and estimate the sum or difference. Find the actual sum or difference.

(a)

283	427	450	242	375
+ 319	+ 124	+ 547	+ 426	+ 180

(b)

623	712	967	404	382
+ 156	- 325	- 160	- 217	- 205

3. Round each number to the nearest 1000. Estimate the answer.

(a)

3347	4296	1978	6005	5192
- 2160	- 2312	- 1564	- 5269	- 3750

Estimating Products

31×47

Finding the answer. Rounding each factor and then multiply.

31 rounded to the nearest 10 is 30

47 rounded to the nearest 10 is 50

$30 \times 50 = 1500$

The product is about 1500.

Let us find the exact product

$$\begin{array}{r} 31 \\ \times\ 47 \\ \hline 217 \\ 1240 \\ \hline 1457 \end{array}$$

Exercise F

1. Try these. Estimate the products then find the exact product.

(a)

709	116	867	309	246
× 6	× 5	× 4	× 7	× 3

(b)

32	67	59	609	371
× 17	× 12	× 31	× 41	× 38

REVIEW

1. Write using Roman Numerals:
   (a) The number of children in your class.
   (b) Your age and the age of the members of your family.
   (c) The number of days in the month.
   (d) The year you were born.

2. Write from 1 to 100 using Roman Numerals.

3. Below are some items. Round the number of grams to the nearest ten.

454 g

85 g

336 g

4. Mrs. James has $1000. She wants to buy three items costing $465, $375 and $239. Round the price for each item then find the total cost. Does Mrs. James have enough money to purchase the three items?

5. How much money is needed to pay the shopkeeper for these purchases?

100 g sugar	$ 54.
1 tin of milk	$190.
1 box of biscuits	$245.

UNIT 19 SETS

Equal and Equivalent Sets

Look at these pairs of sets.
Describe each.

(a) {a, e, i, o, u} {o, u, e, a, i}

(b) {bat, ball, boy} {girl, doll, hat}

In (a) both sets show the set of vowels in the English Alphabet.
The members of both sets are the same.
So, the number of members in both sets is the same.

> If the two sets have exactly the same members, we say the sets are **equal.**

Are the sets in (b) equal?
Do they have the same members?
Do they have the same number of members?

> If two sets have the same number of members, we say the sets are **equivalent.**

Exercise A

1. Copy these sets. Write equal or equivalent in the space provided.

(a) {Monday, Tuesday, Wednesday, Thursday, Friday}
{Monday, Tuesday, Wednesday, Thursday, Friday} . .....

(b) {3, 6, 9, 12, 15, 18} {2, 4, 6, 8, 10, 12} .....

(c) { +, -, ×, / } { *, >, =, V} .....

(d) {red, yellow, blue} {red, yellow, blue} .....

(e) { } { } .....

(f) {10, 20, 30, 40, 50} {50, 40, 10, 20, 30} .....

> Equal sets are also equivalent sets.
> Equivalent sets are not necessarily equal sets.

2. (a) List 4 pairs of sets so that each pair is equal **and** equivalent.
   (b) List 4 pairs of sets that are equivalent but not equal.

Subsets

Look at these sets.

{i, o, a} {a, e, i, o, u}

All the members of {i, o, a} are also members of {a, e, i, o, u}.
So, {i, o, a} is a subset of {a, e, i, o, u}

Are all the members of {i, v, q} members of {a, e, i, o, u}?
Is {i, v, q} a subset of {a, e, i, o, u} ?

> If all the members of a set B are contained in another set A, then set B is a subset of set A.
> We write $B \subset A$. "$\subset$" means "is a subset of"

Exercise B

1. Which are subsets of {2, 4, 6, 8, 10}

   (a) {1, 2, 3} {5, 7, 9, 10}
   (b) {4} {2, 6, 8}
   (c) {10} {2, 4, 6, 8, 10}

List subsets of this set. Use the symbol $\subset$:

{10, 15, 20, 25, 30}

Here are two sets - A and B

A = {orange, mango, banana, cashew}, B = { }
Set B has 2 members.

(a) Which of these may be set B.

{orange}	{cashew}
{mango, apple}	{banana, mango}
{banana, mango, cashew}	{cashew, grape, orange}

(b) List members of set B in as many ways as is possible.

A set with no member is called the **empty set**. It is represented by { } or Ø

REVIEW

1. (a) Make these sets equal.

{pen, pencil, book, eraser} {eraser}

{tea, milk, coffee} { }

{4, 8, 12, 16, 20, 24} {24, 16, 8}

(b) Make equivalent sets

{ } { }
{1, 2, 3, 4, 5} { }
{ruler, paper, sharpener} { }

(c) Make sets equal and equivalent to each of these.

{a, b, c, d} { }
{100, 200, 300} { }
{hat, socks, gloves} { }
{>, <, = , x, /, +, x} { }

2. (a) List subsets of this set. Use the symbol $\subset$:

{ i, ii, iii, iv, v, vi, vii}

(b) Which cannot be a subset of the set in 2 (a)? Why?

{i, ii, iii} {1, 2, 3, 4, 5, 6, 7} { }

{1, 2, 3} {v, iv, vi, vii} {v, vi}

UNIT 20 MEASUREMENT

Litres and Millilitres

Collect containers like these and examine their capacities.

1 teaspoon = 5 millilitres

50 millilitres

1 litre

Know that 1 litre = 1000 millilitres.

Use your containers to check these.

(a)

(b)

Study these:

1 *l* = 1000 **m***l*

2 *l* = (1000 + 1000) **m***l*

or (1000 × 2) **m***l* = 2000 **m***l*

1 *litre* = 1000 **m***l*

6 *litres* = 1000 **m***l*
1000 **m***l*
1000 **m***l*
1000 **m***l*
1000 **m***l*
1000 **m***l*
1000 **m***l*
6000 **m***l*

or 1000 **m***l* × 6 = 6000 **m***l*

How many millilitres are there in 7 litres?

1 litre = 1000 **m***l*

7 litres = 1000 **m***l* × 7 = 7000 **m***l*

Exercise A

1. Change to millilitres:
   a) 4 litres, 3 litres, 6 litres, 5 litres, 12 litres
   b) 9 litres, 7 litres, 10 litres, 8 litres, 10 litres

1000 **m***l* = 1 litre

1 **millilitre** is a small part of a litre

1 **m***l* = $\frac{1}{1000}$ litre i.e. 1 **m***l* is a fraction of a litre

Study this:

(a) 1 **m***l* = $\frac{1}{1000}$ *l* Change 6000 **m***l* to litres

$\frac{1}{1000} \times 6000 = 6\ l$

(b) Change 5000 **m***l* to litres

$\frac{1}{1000} \times 5000 = 5\ l$

Exercise B

1. Change to litres:
   (a) 3000 **m***l*, 5000 **m***l*, 7000 **m***l*, 10 000 **m***l*,
   (b) 6000 **m***l*, 2000 **m***l*, 8000 **m***l*, 4000 **m***l*,

We can write the units in order:

litre (*l*);	**d**ecilitre (**d***l*);	**c**entilitre (**c***l*);	**m**illilitre (**m***l*)
1	0	0	0

The one thousand represents 1 litre or 1000 millilitres.

litre (*l*);	**d**ecilitre (**d***l*);	**c**entilitre (**c***l*);	**m**illilitre (**m***l*)
1	3	6	9

1369 **m***l* = 1 *l* 369 **m***l*
= 1.369 *l*

We can use a decimal point to separate the whole litres from the parts/fractions.

litre (*l*);	decilitre (**d***l*);	centilitre (**c***l*);	millilitre (**m***l*)
6	5	0	8

6508 **m***l* = 6 *l* 508 **m***l*
= 6.508 *l*

l	*dl*	*cl*	*ml*
3	8	9	0

3890 m*l* = 3 *l* 890 m*l*
= 3.890 *l*

Exercise C

Now try these:

(a) 5670 m*l* = 5 *l* 670 m*l* = 5.670 *l*
(b) 5003 m*l*
(c) 2136 m*l*
(d) 8325 m*l*
(e) 4121 m*l*
(f) 4216 m*l*
(g) 4639 m*l*
(h) 1001 m*l*
(i) 7653 m*l*

Study this.

Change 6 *l* to m*l*

l	*dl*	*cl*	*ml*	
6	0	0	0	= 6 *l* or 6000 m*l*

Change 7.536 *l* to m*l*

l	*dl*	*cl*	*ml*	
7	5	3	6	= 7.536 *l* or 7536 m*l*

Change 8.5 *l* to m*l*

l	*dl*	*cl*	*ml*	
8	5	0	0	= 8.5 *l* or 8500 m*l*

Exercise D

1. Change to millilitres:

(a) 6.543 *l*
(b) 8.504 *l*
(c) 7.532 *l*
(d) 0.425 *l*
(e) 5.5 *l*
(f) 7.003 *l*
(g) 8.981 *l*
(h) 0.516 *l*

2. Solve these problems:

(a) A bottle contains 1 litre of oil. How many millilitres is this? How many millilitres will 4 such bottles contain?

(b) Mother bought 1/2 litre of syrup. She used 38 m*l* to make some drink. How many millilitres of syrup remained?

(c) A bottle contained 2 litres of milk. The milk was poured into 20 glasses of equal capacities. How many millilitres of milk was in each glass?

(d) There were 650 m*l* of liquid in one container and 420 m*l* in another. These were poured into a litre bottle. How many millilitres of liquid remained?

(e) 6000 m*l* of oil were poured into litre containers. How many containers were filled?

Conversion of Foreign Currency

Some time ago, US$1.00 was equal to G$190
If US$1.00 = G$190, what would be the value of US$2.00 in Guyana dollars.

US$1.00 = G$190
US$2.00 = G$190
× 2
G$380

US$1.00 = G$190
US$3.00 = G$190
× 3
G$570

What would be the value of US$3.00 in Guyana dollars?

Exercise E

1. If US$ 1.00 = G$190, what is the value of these amounts in Guyana dollars?
   (a) US$4.00 (b) US$5.00 (c) US$6.00 (d) US$7.00
   (e) US$10.00 (f) US$12.00 (g) US$15.00 (h) US$25.00

At another time US$1.00 was equal to G$200

US$1.00 = G$200

So US$2.00 would be worth G$200 × 2 = G$400

2. If US $ 1.00 = G$195 find the equivalent in Guyana dollars for:

Now G$200 would give US$1.00, another G$200 would give another US$1.00 and repeat until the C$320 is finished. We are dividing $320 into parcels of $200
So G$320 will be

$$200\overline{)320}\quad 1.60$$

ie US$ 1.60

How much will G$480 be in US currency at the same rate.

$$200\overline{)480}\quad 2.40$$

G$ 480 = US$ 2.40

3. Change to US$ if US$1.00 =G$200. Now try these.

(a) G$120,	G$80,	G$200,	G$160,	G$360
(b) G$400,	G$440,	G$240,	G$400,	G$280

4. Change these to Canadian currency if the exchange rate is CDN$1.00 = G$140

G$416, G$208, G$520, G$1040, G$312

5. Solve these problems:
   (a) A bag was priced at G$750. If the exchange rate is US$1.00= G$200 What is the price of the bag in US$?
   (b) Harry took US$10.00 to change at the cambio. If the exchange rate is US$1.00 = G$275, how much Guyana dollars would Harry get in exchange for his US$10.00 ?
   (c) If $1.00 Barbadian is equal to $20 Jamaican, convert the following.
   B$3=J$; B$7=J$; B$=J$100; B$=J$250

6.

Exchange Rates

Stg £1 = G$ 335
US$1 = G$ 200
Bds$1 = G$ 100
TT$1 = G$ 36
Cdn$1 = G$ 140

Study the exchange rates above then complete these:
(a) Change the following to Guyana currency.
   (i) US$20 (iv) Stg £5
   (ii) TT$15 (v) US$4
   (iii) Cdn$10 (vi) Bds$10

(b) Change the following:

(i)	G$750 = £	(iv)	G$624 = Cdn$ .....
(ii)	G$390 = US$	(v)	G$396 = Cdn$ .....
(iii)	G$210 = Bds$.....	(vi)	G$192 = TT$ .....

REVIEW

1. Change to millilitres:
   6 *l*, 8 *l*, 3 *l* 25 *ml*, 6 *l* 300 *ml*, 3.110 *l*, 16.038 *l*

2. Change to litres:
   700 *ml*, 3649 *ml* 8000 *ml*, 3000 *ml*, 5803 *ml*, 3200 *ml*

3. How many 50 m*l* bottles can be filled from a container of 2 *l* oil?

4. If TT$1.00 =G$36

   (a) How many Guyana dollars can be exchanged for:
   TT$10.00 TT$8.00 TT$15.00

   (b) How many TT$ can be exchanged for:
   G$64 G$224 G$384

5. An article priced at Cdn.$ 15.00 was bought in Guyana currency. What is the value in G$. if Cdn$1.00 = G$140?

LET US LOOK BACK

1. Copy and complete this table.

Fraction	Mixed Number	Decimal
$\frac{36}{10}$	$3\frac{6}{10}$	3.6
$\frac{74}{10}$	---	---
$\frac{108}{100}$	---	---
$\frac{108}{100}$	---	---

2. (a) What is the place value of the 7 in the numeral 23.76?
   (b) What is the value of the 5 in the numeral 45.833?

3. Add these : (a) 4.5, 0.3, 2.65 (b) 3.7, 0.52, 6.41

4. (a) From 7.12 take 3.6 (b) From 30.84 take 9.99

5. At the school fair Shawn and Dawn ate cones and tarts.
Shawn ate 3 cones and 4 tarts. Dawn ate 5 cones and 2 tarts.
Draw a pictograph to show this information.

6. (a) Write 59 in Roman Numerals. (b) Write XLIV in Arabic Numerals.

7. Copy and complete this table.

Numbers	Round to the nearest:		
	10	100	1000
946			
1263			
2572			
4789			

UNIT 21 MEASUREMENT

Capacity

Look at these measures

Read then answer the questions.

Mrs Grant used a one-litre container, a $\frac{1}{2}$ litre container and a $\frac{1}{4}$ litre container of milk for her class.

Mrs Bassier used 2 one litre containers and a $\frac{1}{2}$ litre container of milk for her class.

(a) How many millilitres of milk was used by Mrs Bassier's class?
(b) How many millilitres of milk was used by Mrs Grant's class?
(c) Whose class used more milk?
(d) If Mrs Grant had used 3250 m*l* instead, how many 1-litre containers would she have taken to her class?

Remember
1000 m*l* = 1 *l*

$1\,l + \frac{1}{4}\,l$ = 1000 m*l* + 250 m*l*
= 1250 m*l*
or 3250 m*l* = 3 times (1000 m*l* or 1*l*) + 250 m*l*
= 3 *l* 250 m*l*

Exercise A

1. Copy and complete these:

(a) $1\frac{1}{4}\,l$ = ☐ m*l* (d) $1\frac{1}{2}\,l$ = ☐ m*l* (g) $2\frac{3}{4}\,l$ = ☐ m*l*

(b) $4\frac{1}{2}\,l$ = ☐ m*l* (e) 3*l* 450 m*l* = ☐ m*l* (h) 4*l* 320 m*l* = ☐ m*l*

(c) 2*l* 760 m*l* = ☐ m*l* (f) 2650 m*l* = ☐ *l* m*l* (i) 3765 m*l* = ☐ *l* m*l*

To change litres to millilitres we multiply by 1000.
Hence 2 *l* = 1000 × 2 = 2000 m*l*

To change millilitres to litres we divide by 1000.
We can divide like this:

$$
\begin{array}{r}
3.250 \\
1000\overline{)\,3250.00} \\
-3000 \\
\hline
2500 \\
-\,2000 \\
\hline
5000 \\
5000 \\
\hline
0
\end{array}
$$

Here is a shorter way
We can use decimals
We know that the decimal point comes after the ones digit.
Take the decimal point 3 places to the left.

$3250 \div 1000 = 3.250$

> To change millilitres to litres divide by 1000.
> When we divide by 1000, the decimal point goes 3 places to the left.

Exercise B

1. Copy and complete:

   (a) 1625 ml = ☐ l 3270 ml = ☐ l 2962 ml = ☐ l

   (b) 6320 ml = ☐ l 4783 ml = ☐ l 5154 ml = ☐ l

2. Andre drank 3 half litre bottles of fruit punch at the school party.
   How many millilitres of fruit punch did he drink?

3. Mother bought 2 one litre and one half litre cartons of milk.
   How many millilitres was this?

4. Mr Gomes poured 2 litres of gasolene into his car. After driving for sometime, he noticed that he had 750 ml left. How many millilitres did he use so far?

5. Pam mixed 65 ml of water with 635 ml of juice. How many litres of beverage did she make?

6. Mrs Brown bought 3 litres of kerosene on Monday. At the end of the week she had 926 ml left. How much did she use?

Currency Conversion

A visit to a popular Cambio in Water Street revealed the following exchange rates:

Foreign Currency	Local Currency
Stg £1.00	G$340
US$1.00	G$204
Cdn$1.00	G$145
Bds$1.00	G$102
TT$1.00	G$39

Now look at these:

1. The exchange rate is G$335 to Stg £1.00
   How many G$ can one get in exchange for Stg £6 ?
   Stg £1.00 = G$335
   Stg £6.00 = G$335 × 6
   = G$2010

2. G$200 is equivalent to US$1.00. How many US$ can be bought with G$1950?

$$
\begin{array}{r}
9.75 \\
200\overline{)1950} \\
-1800 \\
\hline
1500 \\
-1400 \\
\hline
1000 \\
-1000 \\
\hline
0
\end{array}
$$

= US$9.75

Exercise C

1. Now do these:
   (a) The exchange rate at a Cambio for US$1.00 is G$204. How many G$ can be bought with US$9.00?
   (b) Shawn received Stg £3 for his birthday. How many G$ can he get for this amount?
   (c) How many G$ can you get for:
   Bds$8.00 TT$13.00 Cdn$9.00?

2. Use the rates given then use the current rate for each currency. Calculate these.

For	How Many				
G$	US$	Stg £	Bds$	Cdn$	TT$
2210	____				
2280		____			
966			____		
1440				____	
3744					____

REVIEW

1. Express as millilitres:
   (a) 2 *l* 650 m*l*
   (b) 5 *l* 725 m*l*
   (c) 6 *l* 937 m*l*
   (d) 8 *l* 542 m*l*

2. Write as litres:
   (a) 3976 m*l*
   (b) 4621 m*l*
   (c) 7563 m*l*
   (d) 9278 m*l*

3. A crate contains 16 half litre bottles of milk. How many litres of milk are there in:
   (a) 1 crate? (b) 7 crates? (c) 15 crates?

4. There are 24 pupils in a class. If each pupil receives 1/4 litre of milk each day? How many litres of milk will serve the whole class for :
   (a) 1 day ? (b) 1 week? (c) 1 month?

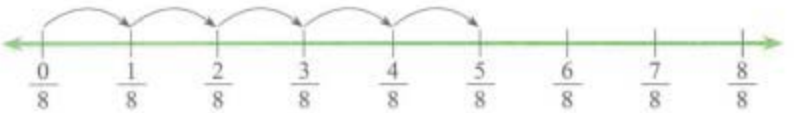
5. Use the current exchange rates.
   How many G$ will you get for:
   Cdn$7.00? US$11.00? TT$23.00? Bds$15.00?

6. (a) Anthony bought a pair of jeans for G$ 1950. If he paid in US$, what was the cost in that currency?
   (b) A television set costs G$120 000. What would be the cost of this set in:
   (i)Stg £? (ii) TT$? (iii) Bds$?

UNIT 22 FRACTIONS

Multiplication

We can use a number line to multiply a whole number by a fraction.



The number line shows a repeated addition

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

We can write this as a multiplication.

Think of 5 moves of $\frac{1}{8}$

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

Exercise A

1. Use a number line to do these.
   Show each as repeated addition and as a multiplication.

   (a) $3 \times \frac{1}{4}$ (b) $4 \times \frac{1}{5}$ (c) $2 \times \frac{1}{3}$ (d) $7 \times \frac{1}{8}$

   (e) $5 \times \frac{1}{8}$ (f) $2 \times \frac{1}{9}$ (g) $3 \times \frac{1}{3}$ (h) $7 \times \frac{1}{10}$

> To multiply a whole number by a fraction, multiply the numerator of the fraction by the whole number.

Look at this:

$$4 \times \frac{2}{5} = \frac{8}{5}$$

$\frac{8}{5}$ is an improper fraction.

We can change an improper fraction to a mixed number.
To do so we divide the numerator by the denominator.

$8 \div 5 = 1\frac{3}{5}$

2. Multiply these:

(a) $7 \times \frac{4}{5}$ $\quad \frac{1}{4} \times 5$ $\quad 5 \times \frac{2}{9}$ $\quad \frac{2}{3} \times 7$

(b) $4 \times \frac{3}{5}$ $\quad 5 \times \frac{1}{3}$ $\quad 3 \times \frac{1}{2}$ $\quad 4 \times \frac{2}{7}$

Look at the diagram.
Read and find out what Pattie did.
In Cookery Class Pattie baked 6 buns.
She removed $\frac{1}{2}$ of them from the pan.
How many buns did she remove?

We can show this on a number line.

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

Both the diagram and the number line show the same problem.

$\frac{1}{2}$ of 6 is the same as $\frac{1}{2} \times 6$

$\frac{1}{2} \times 6$ or $\frac{1}{2}$ of $6 = \frac{1}{2} \times \frac{6}{1}$

$= \frac{6}{2}$ $\qquad = \frac{6}{2}$

$= 3$ $\qquad = 3$

3. Work these:

(a) $\frac{1}{6}$ of 12 $\quad \frac{2}{5}$ of 30 $\quad \frac{1}{7}$ of 7 $\quad \frac{9}{10} \times 100$

(b) $\frac{4}{5}$ of 20 $\quad \frac{1}{2}$ of 24 $\quad \frac{2}{3}$ of 9 $\quad \frac{5}{9}$ of 180

Let us multiply a fraction by a proper fraction

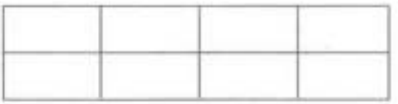
(a) Take a rectangular piece of paper.

(b) Fold it twice vertically to show fourths.

(c) Fold again, this time in half, horizontally.

(d) Shade $\frac{1}{2}$ of $\frac{1}{4}$

What fraction of the rectangle is shaded?

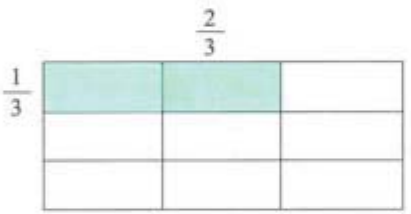


$\frac{1}{2}$ of $\frac{1}{4}$

Replace "of" with '×' and multiply $\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$

Exercise B

1. Write multiplication sentences for each then find the product.
The first is done for you.



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

$\frac{1}{3} \times \frac{2}{3} = \times \frac{2}{9}$

$\frac{3}{4} \times \frac{2}{3}$ multiply the numerators 3×2

multiply the denominators 4×3

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

Write $\frac{6}{12}$ in its lowest terms.

A product of two fractions may not always be in its lowest terms

Example: $\frac{3}{5} \times \frac{1}{2} = \frac{3}{10}$

2. Multiply.
Write the products in lowest terms:

(a) $\frac{2}{5} \times \frac{1}{3}$ $\quad \frac{1}{4} \times \frac{5}{7}$ $\quad \frac{2}{7} \times \frac{7}{8}$

(b) $\frac{1}{2} \times \frac{4}{5}$ $\quad \frac{1}{4} \times \frac{1}{4}$ $\quad \frac{1}{6} \times \frac{5}{8}$

(c) $\frac{5}{9} \times \frac{3}{10}$ $\quad \frac{1}{6} \times \frac{3}{7}$ $\quad \frac{2}{3} \times \frac{1}{4}$

(d) $\frac{3}{10} \times \frac{2}{3}$ $\quad \frac{5}{7} \times \frac{1}{4}$ $\quad \frac{1}{2} \times \frac{2}{5}$

3. Copy and complete these:

The first one is done for you.

$\frac{2}{5} \times \frac{1}{3} = \boxed{\frac{1}{3}} \times \boxed{\frac{2}{5}}$

$\frac{2}{5} \times \frac{1}{3} = \frac{2}{15}$ or $\frac{1}{3} \times \frac{2}{5} = \frac{2}{15}$

Therefore $\frac{2}{5} \times \frac{1}{3} = \frac{2}{15}$ or $\frac{1}{3} \times \frac{2}{5} = \frac{2}{15}$

(a) $\frac{2}{5} \times \frac{1}{3} = \square \times \square$ $\quad$ (b) $\frac{2}{5} \times \frac{1}{2} = \square \times \square$

(c) $\frac{3}{7} \times \frac{1}{4} = \square \times \square$ $\quad$ (d) $\frac{5}{12} \times \frac{1}{3} = \square \times \square$

(e) $\frac{2}{9} \times \frac{1}{3} = \square \times \square$ $\quad$ (f) $\frac{1}{3} \times \frac{3}{4} = \square \times \square$

Multiplying with Mixed Numbers

Change the mixed number $3 \times 2\frac{1}{2}$

to an improper fraction $= 3 \times \frac{5}{2}$

$= \frac{15}{2}$

$= 7\frac{1}{2}$

Exercise C

1. Multiply these:

(a) $3 \times 4\frac{1}{2}$ $\quad 8\frac{1}{2} \times 4\frac{5}{12}$ $\quad 3 \times 1$ $\quad 10 \times 1\frac{1}{2}$

(b) $1\frac{1}{3} \times 36$ $\quad 5 \times 1\frac{2}{3}$ $\quad 20 \times 1\frac{4}{5}$ $\quad 4\frac{2}{5} \times 2$

(c) $8 \times 2\frac{1}{4}$ $\quad 4\frac{2}{3} \times 5$ $\quad 2 \times 3\frac{1}{2}$ $\quad 3\frac{1}{5} \times 6$

Here is another way.
Follow it very carefully.

Remember to change all mixed numerals to improper fractions before multiplying.

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

$\frac{5}{3} \times \frac{5}{4} = \frac{25}{12} = 2\frac{1}{12}$

2. Try these:

(a) $6\frac{2}{3} \times 1\frac{1}{10}$ $\quad$ (b) $1\frac{1}{4} \times 2\frac{1}{5}$ $\quad$ (c) $3\frac{1}{6} \times 2\frac{2}{3}$

(d) $3\frac{1}{2} \times 4\frac{2}{5}$ $\quad$ (e) $2\frac{1}{3} \times 2\frac{1}{7}$ $\quad$ (f) $1\frac{5}{6} \times 1\frac{1}{8}$

(g) $1\frac{1}{3} \times 1\frac{1}{2}$ $\quad$ (h) $2\frac{1}{2} \times 3\frac{1}{5}$ $\quad$ (i) $2\frac{1}{4} \times 2\frac{1}{4}$

Cancellation

Study this:

$24 \times \frac{4}{6}$

$\frac{24 \times 4}{6} =$

$\frac{96}{6} = 16$

Look at it this way

$24 \times \frac{4}{6}$

$\frac{\overset{4}{\cancel{24}} \times 4}{\underset{1}{\cancel{6}}}$

$= 16$

3. Use the cancellation method to do these.

(a) $3\frac{3}{4} \times \frac{2}{5}$ (b) $5 \times 4\frac{2}{5}$ (c) $4\frac{1}{6} \times 2\frac{2}{5}$

(d) $1\frac{3}{10} \times 5$ (e) $\frac{7}{12} \times 24$ (f) $12 \times \frac{1}{4}$

(g) $4\frac{1}{2} \times 4\frac{2}{3}$ (h) $3\frac{1}{5} \times \frac{1}{8}$ (i) $\frac{1}{16} \times 20$

4. Solve these problems:

(a) In a bread bin there were 5 loaves of bread. If father ate $\frac{1}{4}$ of the number of loaves how many loaves remain?

(b) $\frac{2}{3}$ of a class of 30 pupils paid for a magic show. How many pupils paid for the show? How many pupils did not pay?

(c) A seamstress has $2\frac{1}{2}$ metres of ribbon. If she uses 2 times that amount to decorate a dress. How many metres of ribbon will she need?

REVIEW

1. Multiply by: 1, 6, 3, 4
2. Find these products:

(a) $\frac{5}{6} \times \frac{3}{5}$ (b) $\frac{1}{12} \times 24$ (c) $\frac{7}{16} \times \frac{8}{9}$

3. If a bag contains $4\frac{1}{4}$ kg of flour, how many kg of flour will there be in 5 such bags?
4. The newspaper boy rides $2\frac{1}{2}$ km from home to the printery. How many kms will he ride if he does this twice a day?
5. A car tank has $1\frac{1}{4}$ litres of gasolene. The owner purchases $2\frac{1}{2}$ times this amount at the fuel station. How many litres did he purchase? How many litres are there in the tank after the purchase?
6. A count of the 30 vehicles that passed by a school in a day revealed:

$\frac{2}{5}$ were minibuses; $\frac{1}{2}$ were motor cars; and $\frac{1}{10}$ were motorcycles.

How many of each type passed by?

UNIT 23 PERIMETER

Use pieces of string to measure the lengths around the edges of each of these objects in your classroom:

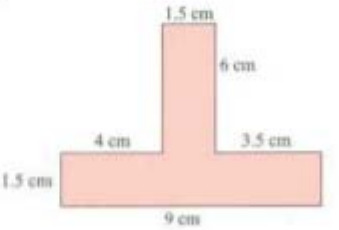
Check the length of each edge on a ruler.
Record the length of each edge.
Find the total length around this book.
The lengths around the edges of this book are
8 cm + 4 cm + 8 cm + 4 cm = 24 cm

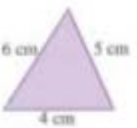
The distance or length around any shape is its perimeter.
The perimeter of this book is 24 cm.
Find the perimeter of other shapes around you.
Use cardboard cut-outs and pieces of string to measure the lengths around their edges.
Check the lengths on a ruler and record each in centimetres.
Find the perimeter of each shape you worked with.

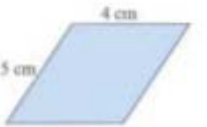
> Remember
> Perimeter is the distance around a closed shape.

Exercise A

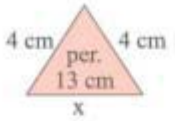
1. Find the perimeter of each shape.

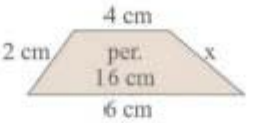


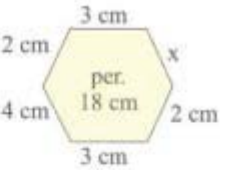




2. Find the length of the side marked X





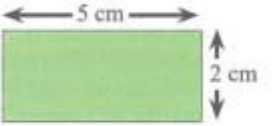


3. Read and work:
   (a) What is the perimeter of a triangle with sides 5 cm, 6 cm and 3 cm?
   (b) What is the perimeter of a square with sides 4 cm long?

4. (a) Tom ran 3 times around a playground with length 14 m and width 12 m. How many metres did he run?
   (b) Find the cost of putting 1 row of wire around this playground, if the wire costs $100 a metre.

Perimeter of Rectangles

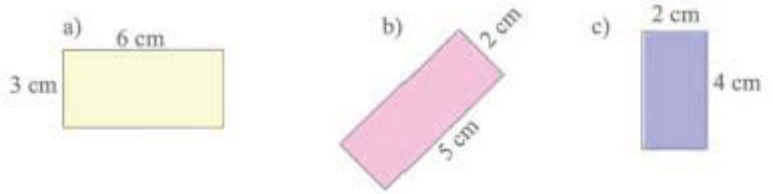
In a rectangle, the opposite sides are equal.
A rectangle has 2 long and 2 short sides.
Here is a rectangle.



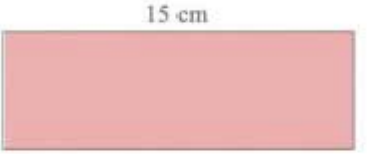
Can you find the long sides and the short sides?
Are the measures on the long and short sides equal? Why?
Let us find the perimeter of the rectangle.
Length of long side = 5 cm
2 long sides = 5 × 2 cm
Length of short side = 2 cm
2 short sides = 2 × 2 cm
So Perimeter = 2 long sides and 2 short sides
Perimeter (i) = (2 × 5) + (2 × 2)
= 10 + 4
= 14 cm
or (ii) = 2 times the sum of the long sides plus 2 times the sum of the short sides.
= 2 × (5 + 2)
= 2 × 7 = 14 cm
Can you think of a formula for finding the perimeter of rectangles?

Exercise B

1. Use your formula. Find the perimeter of these:



Look at this shape.



The perimeter of this shape is 40 cm.
The longer side is 15 cm. What is the length of the shorter side?
We know that the perimeter is 2 long sides + 2 short sides = 40 cm
Long side = 15 cm
2 long sides = 15 × 2 = 30 cm
If long sides + short sides = perimeter
Then perimeter minus long sides = short sides
40 - 30 = 10 cm ,
2 short sides = 10 cm
Short side = 10 ÷ 2 = 5 cm

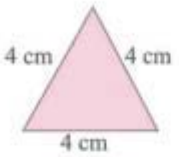
2. Find the length of the side marked x on each shape.

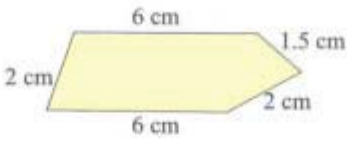
3. (a) The perimeter of a rectangular lawn is 36 m, if the opposite sides are equal and the length of one side is 10 m, what is the length of the other side?

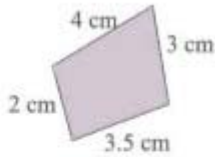
   (b) A rectangular field has 2 sides 16 m each. If the perimeter is 56 m, what is the length of the other pair of sides?

REVIEW

1. What is the perimeter of each of these?



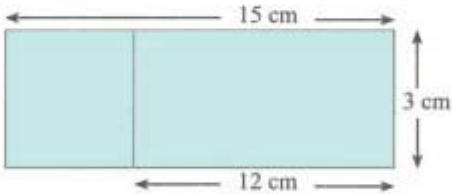




2. Find the perimeter of a rectangle with sides 10 cm and 8 cm.

3. The perimeter of a square is 44 cm, calculate the length of its sides.

4. The perimeter of the square in the diagram below is one-third that of the rectangle.
   What is the perimeter of:
   the rectangle; the square; the total shape?



UNIT 24 FRACTIONS; DECIMALS

Fractions as Decimals

Can you remember?
Factors of 10 are: 1, 2, 5 and 10.
Factors of 100 are: 1, 2, 4, 5, 10, 20, 25 and 100.
Some multiples of 10 are : 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
Some multiples of 100 are: 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000.
Look at these fractions

$$\frac{1}{2} \quad \frac{2}{5} \quad \frac{3}{10} \quad \frac{5}{20} \quad \frac{6}{25} \quad \frac{7}{100} \quad \frac{300}{400}$$

Read the denominators. What do you notice about them?
The denominators are all factors or multiples of 10.
We can write these fractions as decimals like these:

(a) $\frac{1}{10} = 0.1$ $\frac{1}{100} = 0.01$ $\frac{1}{1000} = 0.001$

(b) $\frac{2}{10} = 0.2$ $\frac{2}{100} = 0.02$ $\frac{2}{1000} = 0.002$

(c) $\frac{3}{10} = 0.3$ $\frac{3}{100} = 0.03$ $\frac{3}{1000} = 0.003$

(d) $\frac{4}{10} = 0.4$ $\frac{4}{100} = 0.04$ $\frac{4}{1000} = 0.004$

Exercise A

1. Write these fractions as decimals:

$$\frac{5}{10}, \frac{6}{10}, \frac{7}{10}, \frac{8}{10}, \frac{9}{10}, \frac{10}{10}, \frac{11}{10}, \frac{12}{10}, \frac{13}{10}, \frac{14}{10}, \frac{15}{10}, \frac{132}{10}, \frac{164}{10}$$

Look at this:

Change $\frac{1}{5}$ to decimal

To change $\frac{1}{5}$ to decimal we first change it to tenths.

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

Now $\frac{2}{10} = 0.2$ So $\frac{1}{5} = 0.2$

To change $\frac{5}{10}$ to a decimal, we first change it to hundredths.

So $\frac{5}{20} = \frac{25}{100} = 0.25$

2. Change these to equivalent fractions of denominators 10, 100 or 1000.

(a) $\frac{4}{5}$, $\frac{10}{100}$, $\frac{20}{50}$

(b) $\frac{1}{2}$, $\frac{6}{25}$, $\frac{8}{10}$

(c) $\frac{9}{20}$, $\frac{13}{50}$, $\frac{3}{5}$

Now look at this:

Change $\frac{6}{20}$ to a decimal.

We can reduce the denominator 20 to 10 by dividing by 2.
So we also divide the numerator by 2.

$\frac{6}{20} = \frac{3}{10}$ Now $\frac{3}{10} = 0.3$ So $\frac{6}{20} = 0.3$

3. Reduce these to equivalent fractions of denominators 10, 100, 1000, then change to decimals.

(a) $\frac{6}{60} = \frac{1}{10} = 0.1$ (b) $\frac{10}{50}$ (c) $\frac{20}{40}$

(d) $\frac{36}{120}$ (e) $\frac{16}{40}$ (f) $\frac{16}{20}$

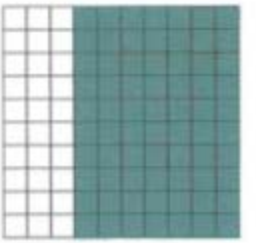
(g) $\frac{12}{60}$ (h) $\frac{5}{50}$ (i) $\frac{14}{70}$

Decimal Tenths and Hundredths

Use 10 strips of paper. Divide each into 10 equal parts.
Shade 7 parts on each strip.

One strip shows $\frac{7}{10}$ shaded

$\frac{7}{10} = 0.7$



10 strips show $\frac{70}{100}$ shaded

$\frac{70}{100} = 0.70$

Exercise B

1. Copy and complete these.
   The first is done for you.

   (a) $\frac{1}{2} = \frac{5}{10} = 0.5$

   $\frac{1}{2} = \frac{50}{100} = 0.50$

   (b) $\frac{4}{5} = \square = \square$

   $\frac{4}{5} = \square = \square$

   (c) $\frac{1}{5} = \square = \square$

   $\frac{1}{5} = \square = \square$

   (d) $\frac{3}{5} = \square = \square$

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

2. Write True or False:

   (a) $0.7 = 0.70$ (b) $2 = 2.00$ (c) $5.50 = 55.0$

   (d) $0.4 = 0.04$ (e) $1.30 = 1.3$ (f) $4.6 = 4.60$

3. Copy and complete the table:

Decimal written with:	
Tenths	Hundredths
0.5	
	0.70
0.9	
3.5	
	6.30
34.6	
	10.80
15.2	

Grams and Kilograms

The gram is the basic unit for measuring mass. It is a very small measure.
There are 1000 grams in 1 kilogram

1000 g = 1 kg

The kilogram is more commonly used.
To change kilogram to grams multiply by 1000.
e.g. How many grams are there in 5 kilograms?
5 × 1000 = 5000 g

Exercise C

1. Change to grams:
   (a) 7 kg (b) 3 kg (c) 8 kg (d) 6 kg (e) 4 kg (f) 12 kg (g) 10 kg

Now look at this:
How many grams are there in 5.8 kg?
5.8 × 1000 = 5800 g

When we multiply a decimal by 1000,
the point is shifted 3 places to the right.
In 5.8 × 1000, zeros are added to show the movement of the point
and the increase in value of each digit.

2. Change to grams:
   (a) 5.6 kg (b) 16.48 kg (c) 123.9 kg (d) 4.86 kg
   (e) 415.1 kg (f) 3.07 kg (g) 8.42 kg (h) 3.612 kg

To change grams to kilograms we divide by 1000.
For example:

$$8000 \text{ g} = \frac{8000}{1000} \text{ kg} = 8 \text{ kg}$$

$$8000 \text{ g} = 8 \text{ kg}$$

3. Change to kilograms.
   (a) 750 g (b) 320 g (c) 500 g (d) 800 g
   (e) 32000 g (f) 1200 g (g) 10000 g (h) 75000 g (i) 160000 g

Study this:
Change 62.3 g to kg.
To change grams to kilograms, we divide by 1000.
To divide a decimal by 1000 the point goes 3 places to the left.
So $62.3 \div 1000 = 0.0623$ kg

4. Change grams to kilograms.
   (a) 5.3 g (b) 632.8 g (c) 8001.9 g (d) 567 g (e) 590.6 g
   (f) 15.062 g (g) 126.562 g (h) 1934 g (i) 17.5 g (j) 322.25 g

5. Solve these problems.
   (a) Peter weighed three parcels and found that they had 3451 g; 1260 g; and 5011 g. What is their total mass in kilograms?
   (b) How many bags of peanuts each containing 220 g can be filled from 11 kg?
   (c) Mother uses 500 g of flour to make a pie. How many kilograms of flour will be needed to make 20 such pies?
   (d) If 6.8 g of clay is needed to make an ornament, how many kilograms of the same clay will be needed to make 100 of these ornaments?

REVIEW

1. Change these fractions to decimals:

$$\frac{1}{5}, \quad \frac{1}{2}, \quad \frac{8}{10}, \quad \frac{20}{40}, \quad \frac{5}{50}, \quad \frac{60}{100}$$

2. Copy and complete this table:

Decimals Written in:	
Tenths	Hundredths
0.7	
	0.50
	6.20
25.5	
18.9	
	17.60
	12.40

3. (a) Change to grams:
7 kg 12 kg 16.4 kg 18.32 kg 38.61 kg

(b) Change to kilograms:
15000 g 12000 kg 155.6 g 28.4 g 2 g

4. How many packets of curry, 500 g each, can we get from a sack of 16 kg?

UNIT 25 GEOMETRY

Line Segments

Place two dots or points some distance apart on your page
like this • •
Use other points to fill up the space between them
• .....•
You now have a series of points.
What does it look like?
This series of points form a line segment which is part of a line.
A line is a series of points.

Exercise A

1. Here are some line segments.
   Copy and measure each with a ruler.
   Record each length in centimetres.

   (a)  (b)  (c)  (d) 

2. List the number of points and name each point on these line segments:

   (a) 

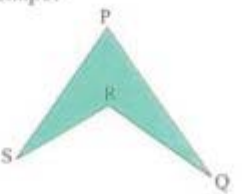
   

   Line segments are marked by points and labelled using capital letters.
   This line has 4 segments:

3. What are the line segments used in each shape?

4. Copy and complete:

(a)  (b)  (c) 

Which shows: point, line, line segment?

Lines

Lines may be drawn in different positions.
Each position tells the purpose for which the line is used.

Parallel Lines

Look at these pairs of lines:

(a) (b) (c) (d)

Which pair shows:
Lines in the same direction?
Lines meeting each other?
What can you say about the lines in (c)?
Lines like those in (c) are called **parallel lines.**

Parallel lines
- extend in the same direction.
- are equal distance apart.
- never meet.

Horizontal Lines

Look at the line that seems to touch the sun at sunrise or sunset.
This line is across the horizon.
Lines that are drawn across like this are called **horizontal lines.**

AB is a horizontal line. A _____ B

Find horizontal lines in your classroom.

Vertical Lines

Imagine this is a plumb line.

Do you think it can be held in a horizontal position? Why?
Lines in this position are called **vertical lines.**
Vertical lines are drawn from top to bottom.
Are there vertical lines in your classroom?

Sloping Lines

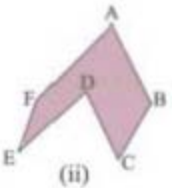
Look at these lines.

What name can we give to these lines?
Have you ever seen lines in this position? Where?
Lines like these are called **sloping lines.**
Sloping or slanting lines are usually seen on hillsides or mountain sides.
Try finding sloping lines elsewhere.
Say where you found it and what was its use.

Exercise B

1. (a) Look around your classroom and identify pairs of parallel lines.
   (b) Identify and name the parallel lines in each of these.

(i)

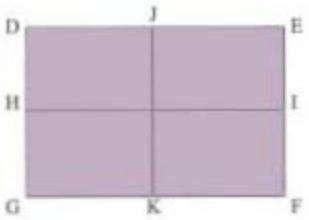


(ii)

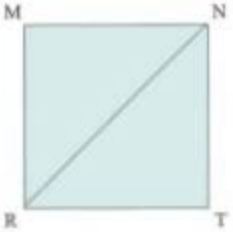
(iii)

2. Name the horizontal lines in these:

(a)



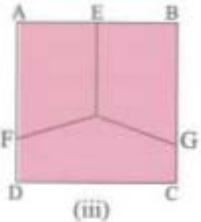
(b)



3. Identify and name the vertical lines in each of these:

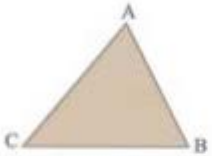
(i)

(ii)

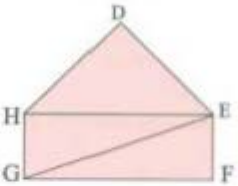


(iii)

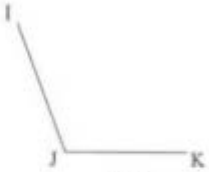
4. Which are the sloping lines in these. Name them:



(i)



(ii)



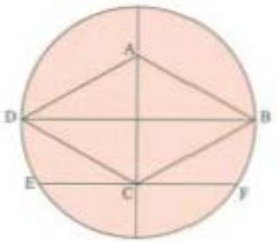
(iii)

REVIEW

1. Copy and complete this table:

Lines	Names of lines
	

2. Identify and name the different types of lines in this diagram.



LET US LOOK BACK

1. (a) Change to millilitres.
   6 *l* 8.56 *l* 8 *l* 326 *ml*
   (b) Change to litres.
   5000 *ml* 4352 *ml* 9306 *ml*

2. Study these exchange rates:
   Cdn$1 = G$145 TT$1 = G$39 Stg £1 = G$340
   Bds$1 = G$102 US$1 = G$204

3. How many Guyana dollars must be exchanged to obtain:
   Cdn$8 TT$10 Bds$5 US$12 Stg £3?

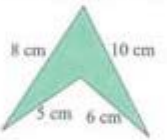
4. Multiply these:

   $\frac{1}{6} \times \frac{6}{7}$ $1\frac{1}{2} \times \frac{4}{9}$ $\frac{1}{8}$ of 24

5. A sack of rice contains $4\frac{3}{4}$ kg. How many kg will $3\frac{1}{2}$ sacks contain?

6. Of a basket containing 48 fruits, $\frac{1}{12}$ are mangoes; $\frac{1}{3}$ are oranges; $\frac{5}{12}$ are bananas and $\frac{1}{6}$ are pears. How many of each type are there?

7. (a) Find the perimeter of the shape.



   (b) The perimeter of a piece of cardboard is 50 cm. If one side is 15 cm what is the length of the other side?

8. Copy and complete this table:

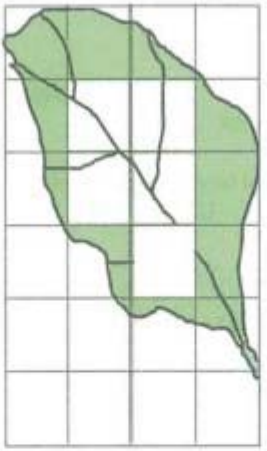
Fractions	Decimals
$\frac{1}{4}$	——
——	0.2
$\frac{3}{8}$	
——	0.45

9. How many packets of butter each 40 g can be obtained from 8 kg?

UNIT 26 AREA

Area of Irregular Shapes

Look at the leaf on the squared paper.



The surface of the leaf does not cover all the squares on the paper.
Let us count to find out the number of squares covered by the leaf.
Are all the squares covered, whole squares?

1. Let us count the whole squares (5)
   Now count the part squares (12)
   Are all the parts equal?

Let us count those parts that are half or greater than half (6)
We count each part that is half or greater as 1 whole square.
So we have 5 + 6 = 11 squares

2. Let us look at the leaf again
   Whole squares = 5
   All part squares =12

We can treat part squares another way.
If we use all the part squares, some are very small parts, some very large.
So we take all and divide by 2 (to even up the parts)

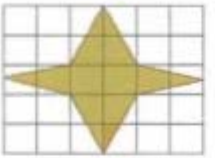
12 ÷ 2 = 6
5 whole squares + 6 part squares = 11 squares.

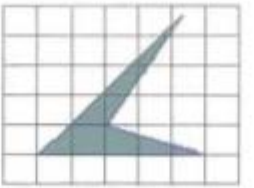
The result in both is the same.
If each square is 1 sq cm then the area is 11 sq cm.

Area is measured in square units

Exercise A

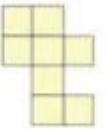
1. Find the area of these irregular shapes.
   Remember to check the part squares.
   Record the area as squares.

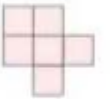
(i) 

(ii) 

2. Here are some other irregular shapes.
   Find the area of each. Record as cm^2

(i) 

(ii) 

(iii) 

3. Draw your hand and your foot on a piece of squared paper then find the area of each.

Area of Rectangles

Here is a square.
Its sides are 1 cm. It is called a 1 cm square.
The surface of this rectangle is covered with 1cm squares.

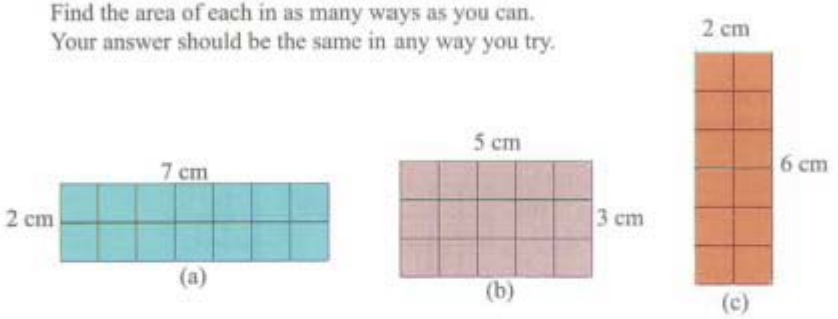
How many squares are there in the top row?
How many rows of 6 squares are there?
How many squares are there in all?
Let us suppose this was a piece of carpet.
What is the length of each side?
What area will it cover?
How can you find out?

1. We can count all the squares.
2. We can count the squares in one row and multiply it by the number of rows.

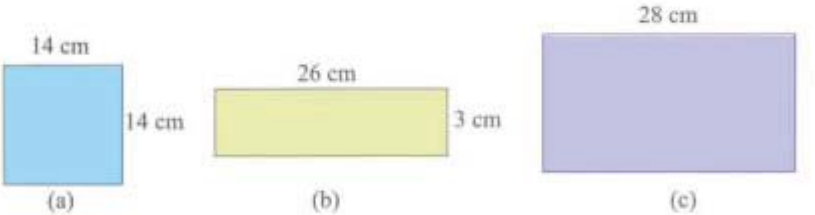
3. The number of squares in one row tells us the length of that side;
the number of rows tells us the length of the other side.
So when we multiply as in (2) we are really multiplying
the length of one side by the other.
This rectangle has sides 6 cm and 4 cm
So its area = 6 × 4 = 24 cm²

Exercise B

1. Count the squares.
Find the length of each side.
Find the area of each in as many ways as you can.
Your answer should be the same in any way you try.



2. Copy these in your books.
Find the area of each. Write the area as cm²



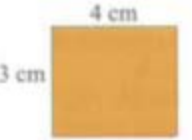
Remember

Area is the amount of surface space in any shape.
Area is measured in square units.
When the measurements are given in cm the area is written as cm² and read as square centimetres.
Area of a square or a rectangle is the length of one side multiplied by the length of the other or one measurement by the other.

Example:

(a) Find the area of the square:

(b) Find the area of the rectangle:



The sides are 4 cm each. All the sides of a square are equal.
So $4 \times 4 = 16$ cm^2 In the case of a rectangle we take one of each
i.e. $3 \times 4 = 12$ cm^2

4. The table shows the lengths of the sides of squares and rectangles. Copy and complete:

Measurements	Area
6 cm and 7 cm	
8 cm and 5 cm	
5 cm and 5 cm	
9 m and 9 m	
15 m and 12 m	
25 m and 9 m	

5. Solve these problems:
   (a) A postage stamp measures 42 mm by 24 mm. What is its area?
   (b) Mr Munroe is a member of a Co-operative Housing Scheme. He owns a plot of land 38 m by 22 m. What area of land does he own?
   (c) A plaque 10 cm by 15 cm was presented to the winner of a competition. She hung it on the wall.What area of the wall does it occupy?
   (d) Alvin wants to make a table 7 m by 5 m. What is the smallest space the table can fit exactly into?

REVIEW

1. Find the area of the squares with sides
   12 cm; 16 cm; 20 cm; 35 cm; 56 cm

2. Use these measurements to find the area of each rectangle
   (a) 5 mm by 3 mm; (b) 12 cm by 6 cm; (c) 25 cm by 10 cm

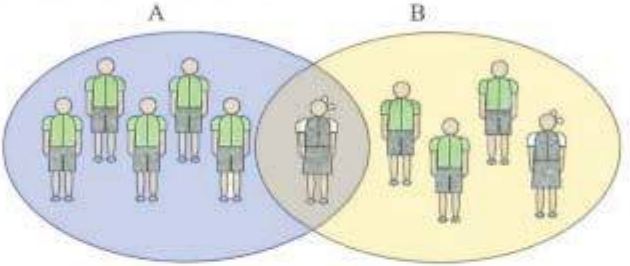
3. What is the area of a rectangular lawn with sides 20 m by 15 m?

4. A piece of carpet 3 m by 5 m is placed on the floor. What is the area of the carpet?

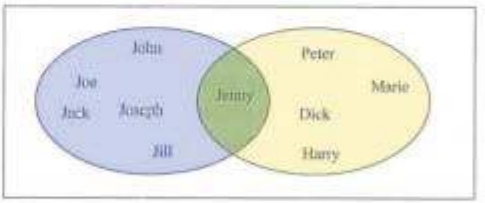
UNIT 27 SETS

Venn Diagrams

Joe, John, Jack, Joseph, Jill and Jenny are pupils of the same class.
What do they have in common?
What difference is there between them?
Let us place them in Set A.
A = {Joe, John, Jack, Joseph, Jill, Jenny}
Some children in this class belong to a Bible Club.
Let us place them in Set B
B = {Peter, Harry, Dick, Marie, Jenny}
We can show these sets in another way.



Who is the child in the middle?
Why is the child placed in that position?
Let us represent these sets in a Venn Diagram

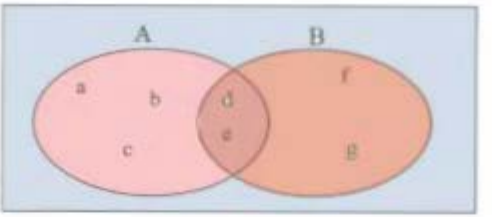


The rectangle represents all pupils in the class.
Loop A represents the pupils whose names begin with J.
Loop B represents the pupils in the Bible Club.

The shaded part represents the pupil whose name begins with J and is also a member of the Bible Club.
Jenny is in that position. She is in both sets.
She is in the shaded part of this Venn Diagram.

The shaded part is called the **intersection**.
Elements that are in both sets are shown in the intersection.

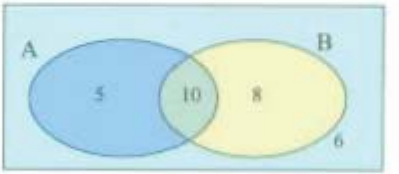
Study this Venn Diagram.



List all the elements in :
Set A, Set B, Set A alone, Set B alone, Both sets A and B.
Those elements in both sets A and B are called the intersection of A and B.
We say A intersects B.
The intersection is indicated by the shaded part of the Venn Diagram.
The symbol ∩ is used for intersection.
The intersection of A and B is written:
A ∩ B and read A intersects B.

Exercise A

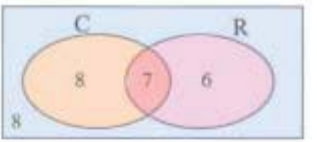
1. The Venn Diagram shows the number of girls in a class.



Set A {girls with long hair}
Set B {girls with blue ribbons}
How many girls have:
(i) long hair but not blue ribbons?
(ii) blue ribbons but not long hair?
(iii) blue ribbons and long hair?
(iv) How many girls do not have long hair nor blue ribbons?

2. Draw a Venn Diagram to show all the whole numbers from 1 to 20.
Let Set A = {even numbers from 1 to 20}
Set B = {multiples of 3 from 1 to 20}
What is A ∩ B?

3. Primary Three made this Venn Diagram to show those who like cricket and those who like rounders.
Set C{cricket} Set R{ rounders}



How many pupils like:
(i) cricket only?
(ii) rounders only?
(iii) cricket and rounders?
(iv) neither cricket nor rounders?
(v) How many children are there in the class?
(vi) What is C ∩ R?

4. Draw a Venn Diagram to represent the following:
A={a, b, c, d, e, f} B = {d, e, f, g, h}
Show A ∩ B.

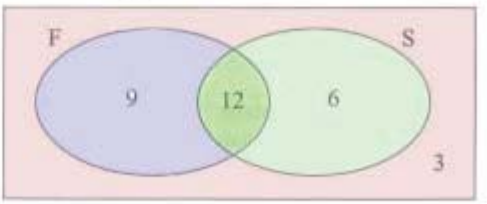
5. Study the table.

Names	Girls Who Like:	
	Dancing	Singing
Betty	✓	✓
Simone		✓
Rohini	✓	
Sarika	✓	✓
Sue		✓
Janet	✓	

Using D for Dancing and S for singing, place this information on a Venn Diagram. Clearly show D ∩ S.

REVIEW

1. The Venn Diagram below shows students who study French(F) and Spanish(S). Study it carefully then answer the questions which follow.



(a) How many students study:
French; Spanish; French only; Spanish only; French and Spanish; Neither French nor Spanish?
(b) How many students are there in the class?
(c) What is F ∩ S?

2. Represent the following information on a Venn Diagram:
   A = {1, 8, 3, 6, 4}
   B = {2, 3, 8, 9, 1}
   What is A ∩ B?

3. Study this information:
   In a class of 20, 7 pupils excel in Mathematics, 4 in English, 8 in Mathematics and Science, and 6 in Science and English. Represent this on a Venn Diagram. Show the intersections.

UNIT 28 GRAPHS

Tally Charts

The children in Primary Three started a tally chart to show the number of vehicles that passed by their school in a given time.
Remember 𝍸 = 5

Vehicles	Tallies	Number
Mini-bus	𝍸 𝍸 𝍸 111	18
Car	𝍸 𝍸 1111	14
Bicycle	𝍸 11	7
Tractor	111	3
Truck	𝍸	5

Do all the vehicles show the same number?
Which shows the smallest number? Why do you think this is so?
Which vehicle is most seen by the school? How can you tell?
We can say that the minibus is the most popular vehicle in the school area.
On a table like this, the most popular or most frequently occurring thing is called the **mode**.
The mini-bus has 18 occurrences.
18 is the mode.

Exercise A

1. This tally chart shows the number of children in a club who like certain games.

Games	Tallies	Number
Cricket	𝍸 𝍸 111	
Tennis	𝍸 111	
Rounders	𝍸 𝍸 1111	
Football	𝍸 11	
Badminton	𝍸	

Copy and complete the table and from it, find the mode.

2. Twenty-one boys made this tally chart to show the number of each flavour soft drink they had at the May Fair.

Flavour	Tallies	Number
Banana	111	
Grape	𝍸 𝍸 11	
Ginger	1111	
Punch	11	

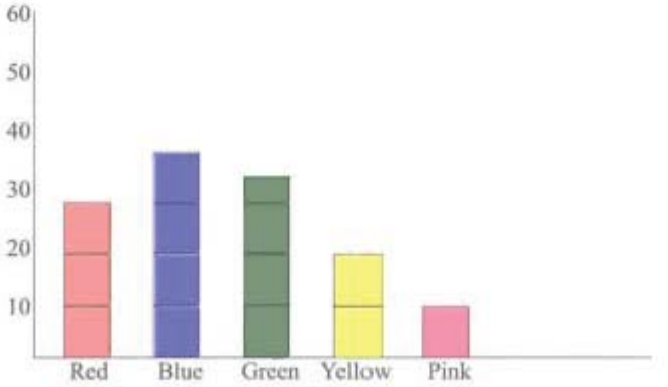
Copy and complete the tally chart.
What is the mode?
What can you say about the flavour that gives the mode?

3. Now use pictures of corks so that 1 cork represents one boy and make a pictograph to tell the same story.
What can you say about the mode?

4. The numbers represent the scores of 33 children in a Mathematics test

9	7	2	3	5	6	6
5	8	6	8	1	6	5
9	3	6	4	7	5	9
6	8	4	9	5	10	4
1	4	5	4	6		

(a) Show this on a tally chart. Compare the scores and identify the mode.
(b) Use the information on the tally chart to make up a bar graph. Shade the bars that shows the mode.



5. The graph above shows the favourite colours of a group of children.
From the information make up a tally chart.
Say how many children were represented by 1 square on the bar graph.

Study the tally chart below:

Subjects	Tallies	Number
Art	𝍸 𝍸 𝍸 1	16
Singing	𝍸 𝍸 𝍸 𝍸	20
Mathematics	𝍸 𝍸 𝍸 𝍸 𝍸	30
English	𝍸 𝍸 𝍸 𝍸 1111	24

Now draw a bar graph to show this information.
Use 1 unit to represent 4 persons.

REVIEW

1. The following scores were obtained by 20 pupils in a test:

   1, 8, 3, 4, 8, 7, 6, 5, 2

   8, 3, 9, 6, 10, 4, 7, 7, 8

   (a) Make up a tally chart for the scores above.

   (b) Use the information on your tally chart to make a bar graph.

   (c) What is the mode?

UNIT 29 GEOMETRY

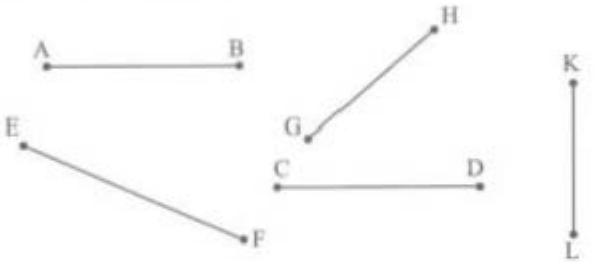
Congruency

What can you remember about line segments?
Let us work together.
Mark 2 points on your paper. Name them E and F e.g. E F
Use your ruler. Draw a line to join the two points like this.

How many straight lines can you draw from point E to point F?
We call a straight line between two end points a line segment.
We write the name for a line segment like this $\overline{EF}$
It is read line segment $\overline{EF}$

Exercise A

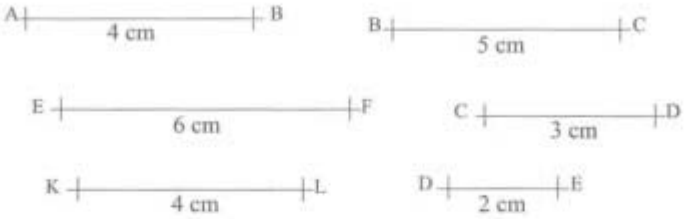
1. Look at these line segments:



(a) Fold a piece of paper.
(b) Place the folded edge under each line segment.
(c) Mark off the end points.

Are there any two line segments with the same length?
If so, name them.
If two line segments have the same length, they are equal and congruent.
The symbol $\cong$ means is **congruent to.**

2. Measure these line segments with a ruler and record the measurements on a table.



Congruent Polygons and Angles

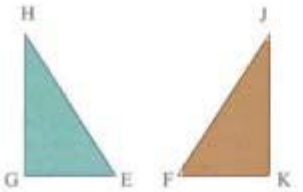
Look at this:

Trace along the sides of the triangle ABC.
Cut it out and try to fit it on triangle ACD.
Does it fit exactly?
Then the two triangles are congruent.
Triangle ABC $\cong$ Triangle ACD.
Let us find out if there are congruent line segments and angles in these triangles.
Examine and fit the cut out triangle ABC again.
AB $\cong$ CD and BC $\cong$ AD
Therefore the angle B $\cong$ angle D

Exercise B

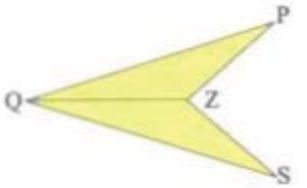
Here are pairs of congruent triangles.
Complete the statements.

1.



(a) HG $\cong$ _____ (d) $\angle$ ZH $\cong$ _____
(b) HE $\cong$ _____ (e) $\angle$ Z G $\cong$ _____
(c) GE $\cong$ _____ (f) $\angle$ E $\cong$ _____

2. (a) QP ≅ _____ (d) ∠ PQZ ≅ _____
(b) QZ ≅ _____ (e) ∠ QPZ ≅ _____
(c) ZP ≅ _____ (f) ∠ QZP ≅ _____



(a) MN ≅ _____ (d) ∠ NMT ≅ _____
(b) NT ≅ _____ (e) ∠ MNT ≅ _____
(c) MT ≅ _____ (f) ∠ NTM ≅ _____

Symmetry

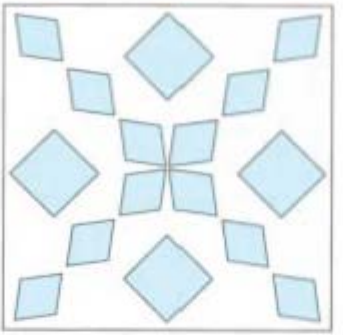
Look at this:

Cut a rectangle this size. Fold it so that you obtain a line across the middle like the one above.
Do the two parts fit exactly on each other?
Are they congruent?
Fold to show two congruent parts in another way.
Trace along the line formed at each fold.
Lines like these which separate a shape so that the two parts contain exactly the same images, are called **lines of symmetry.**
How many lines of symmetry are there on your rectangle?

Exercise C

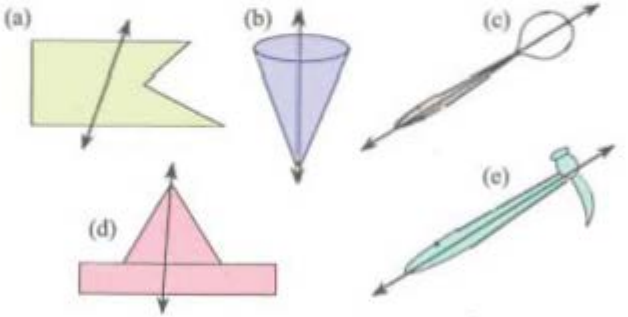
1. In each figure below, a line of symmetry and a part of a pattern are drawn. Complete the pattern. The first is done for you.

2. Look at this design made by folding and cutting paper.
How many lines of symmetry are there?



3. Now draw patterns with two, three and four lines of symmetry.

4. Which of these show symmetry?



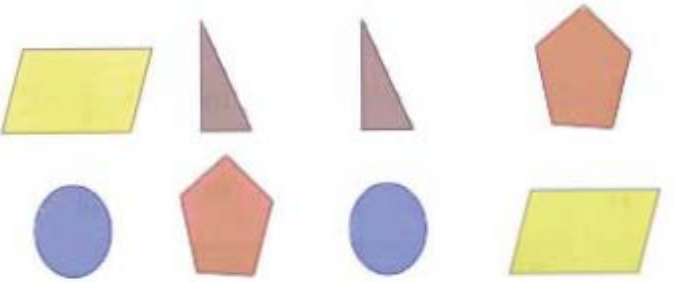
REVIEW

1. Name the pairs of line segments that are congruent.
Measure to verify and record the lengths.

C _____ D Q _____ R D _____ E

S _____ T A _____ B X _____ Y
4 cm 3 cm 2 cm

2. Identify and name the shapes that are congruent.



UNIT 30 FRACTIONS

Reciprocals

Write the products to complete these:

(a) $\frac{1}{8} \times 8 = \square$ (b) $\frac{3}{2} \times \frac{2}{3} = \square$ (c) $\frac{5}{16} \times 3\frac{1}{5} = \square$

(d) $12 \times \frac{1}{12} = \square$ (e) $\frac{3}{4} \times \frac{4}{3} = \square$ (f) $1\frac{1}{2} \times \frac{2}{3} = \square$

(g) $15 \times \frac{1}{15} = \square$ (h) $\frac{5}{16} \times \frac{16}{5} = \square$ (i) $4\frac{3}{4} \times \frac{4}{19} = \square$

> If the product of two numbers is equal to 1, each number is the reciprocal of the other.

So $\frac{1}{9} \times 9 = 1$ and $9 \times \frac{1}{9} = 1$

Therefore 9 is the reciprocal of $\frac{1}{9}$ and $\frac{1}{9}$ is the reciprocal of 9.

Exercise A

1. By what number would you multiply each of these to get 1 as an answer?

(a) 15 (b) 16 (c) 28 (d) 95

(e) $\frac{1}{10}$ (f) $\frac{1}{21}$ (g) $\frac{1}{32}$ (h) $\frac{3}{8}$

2. Complete these:

(a) $\frac{1}{12} \times 12 = \square$ (b) $\square \times \frac{1}{100} = 1$

(c) $\frac{1}{5} \times \square = 1$ (d) $\square \times \frac{2}{5} = 1$

(e) $\frac{1}{20} \times \square = 1$ (f) $\square \times \frac{1}{8} = 1$

3. Write the reciprocals of these:

(a) $\frac{1}{8}$, 9, $3\frac{1}{2}$, 18, $\frac{1}{11}$

(b) $\frac{5}{8}$, $\frac{2}{5}$, $7\frac{1}{4}$, $3\frac{1}{9}$, $\frac{6}{11}$

(c) $\frac{2}{7}$, $4\frac{1}{4}$, 14, $\frac{3}{8}$, $\frac{3}{16}$

We can use reciprocals to do division.
Study these:

(a) $16 \div 4 = 4$ or $16 \times \frac{1}{4} = 4$

(b) $18 \div 3 = 6$ or $18 \times \frac{1}{3} = 6$

(c) $112 \div 4 = 28$ or $112 \times \frac{1}{4} = 28$

Instead of dividing by a number, we can multiply by its reciprocal.

Exercise B

1. Now try these

(a) $15 \div 5 = \square$ (b) $15 \times \frac{1}{3} = \square$ (c) $21 \div 3 = \square$

(d) $81 \div 9 = \square$ (e) $81 \times \frac{1}{9} = \square$ (f) $42 \div 6 = \square$

(g) $105 \div 5 = \square$ (h) $105 \times \frac{1}{5} = \square$ (i) $124 \div 4 = \square$

To divide any number by a fraction, multiply the number by the reciprocal of the fraction.

e.g. $8 \div \frac{1}{4} = 8 \times 4 = 32$

$9 \div \frac{1}{8} = 9 \times 8 = 72$

2. Do these:

(a) $50 \div \frac{1}{5} = 50 \times 5 = 250$

(b) $36 \div \frac{1}{3} =$ _____ = _____

(c) $20 \div \frac{1}{2} =$ _____ = _____

(d) $4 \div \frac{1}{12} =$ _____ = _____

(e) $5 \div \frac{1}{6} =$ _____ = _____

(f) $64 \div \frac{1}{8} =$ _____ = _____

(g) $12 \div \frac{1}{5} =$ _____ = _____

(h) $15 \div \frac{1}{3} =$ _____ = _____

(i) $26 \div \frac{1}{2} =$ _____ = _____

(j) $40 \div \frac{1}{4} =$ _____ = _____

Study this:

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

We are dividing by $\frac{2}{3}$

So we can multiply by the reciprocal of $\frac{2}{3}$ which is $\frac{3}{2}$

So $\frac{5}{3} \div \frac{2}{3}$ is $\frac{5}{3} \times \frac{3}{2} = \frac{5}{2} = 2\frac{1}{2}$

Here is another example

$$\frac{1}{3} \div \frac{2}{5} \text{ is } \frac{1}{3} \times \frac{5}{2} = \frac{5}{6}$$

Exercise C

1. Now do these:

(a) $\frac{7}{9} \div \frac{1}{3}$ (b) $\frac{2}{3} \div \frac{4}{9}$ (c) $\frac{1}{2} \div \frac{3}{4}$ (d) $\frac{2}{9} \div \frac{6}{6}$

(e) $\frac{3}{4} \div \frac{2}{5}$ (f) $\frac{8}{9} \div \frac{2}{3}$ (g) $\frac{3}{4} \div \frac{1}{4}$ (h) $\frac{3}{2} \div \frac{3}{4}$

Study this:

1. $5 \div 1\frac{2}{3}$

First we change the mixed number to an improper fraction

So $5 \div 1\frac{2}{3} = 5 \div \frac{5}{3}$

Now $5 \div \frac{5}{3} = 5 \times \frac{3}{5}$

$= 3$

2. $6\frac{2}{5} \div 8$

Change the mixed numbers to improper fractions.

So $6\frac{2}{5} = \frac{32}{5}$

So $6\frac{2}{5} \div 8$ is $\frac{32}{5} \div 8$

Instead of dividing by 8
we can multiply by the reciprocal of 8

$\frac{32}{5} \div 8 = \frac{32}{5} \times \frac{1}{8}$

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

Exercise D

1. Do these:

(a) $4 \div \frac{1}{3}$; $9 \div \frac{1}{6}$; $20 \div \frac{4}{5}$; $8 \div \frac{3}{10}$; $11 \div \frac{3}{5}$

(b) $\frac{8}{13} \div \frac{3}{5}$; $\frac{2}{9} \div \frac{9}{4}$; $\frac{3}{7} \div \frac{3}{5}$; $\frac{1}{3} \div \frac{5}{9}$; $\frac{3}{8} \div \frac{7}{12}$

(c) $2\frac{2}{5} \div 10$; $3\frac{3}{4} \div 1\frac{1}{8}$; $2\frac{2}{3} \div 1\frac{1}{2}$; $6\frac{5}{9} \div 3\frac{1}{3}$; $1\frac{1}{9} \div \frac{5}{6}$

Inverse Operations

Study these:

$$\frac{7}{8} \times \frac{1}{3} = \frac{7}{24}$$

$$\frac{7}{24} \div \frac{1}{3}$$

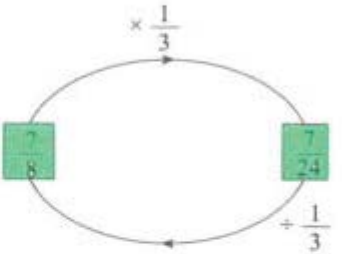
$$= \frac{7}{24} \times \frac{3}{1}$$

$$= \frac{7}{\cancel{24}_{8}} \times \frac{\cancel{3}^{1}}{1}$$

$$= \frac{7}{8}$$

So $\frac{7}{8}$ multiplied by $\frac{1}{3}$ is equal to $\frac{7}{24}$

$\frac{7}{24}$ divided by $\frac{1}{3}$ is equal to $\frac{7}{8}$



Multiplying and dividing by the same number brings us back to the number with which we started.

Also, dividing and multiplying by the same number brings us back to the number with which we started.

We say that multiplication and division are **inverse operations**.

So $\frac{7}{8} \times \frac{1}{3} \div \frac{1}{3} = \frac{7}{8}$ and

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

Exercise E

1. Write answers for these:

(a) $\frac{9}{11} \times \frac{2}{11} \div \frac{2}{11} = \square$

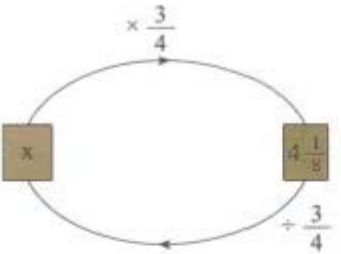
(b) $\frac{5}{6} \times \frac{7}{8} \div \frac{7}{8} = \square$

(c) $\frac{5}{23} \times \frac{9}{15} \div \frac{9}{15} = \square$

(d) $1\frac{3}{4} \times \frac{1}{3} \div \frac{1}{3} = \square$

(e) $\frac{7}{20} \times \frac{7}{10} \div \frac{7}{10} = \square$ (f) $2\frac{1}{2} \times \frac{1}{5} \div \frac{1}{5} = \square$

Now look at this:



x is a number that we do not know, but which we can find.

We know that $x \times \frac{3}{4} = 4\frac{1}{8}$

We also know that $4\frac{1}{8} \div \frac{3}{4} x$

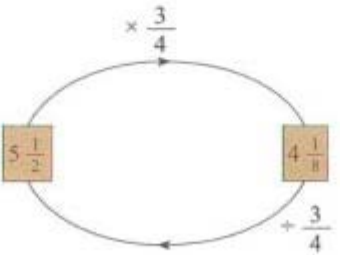
that is $\frac{33}{8} \div \frac{3}{4} = x$

$$\frac{\overset{11}{\cancel{33}}}{\underset{2}{\cancel{8}}} \times \frac{\cancel{4}}{\cancel{3}} = x$$

$$\frac{11}{2} = x$$

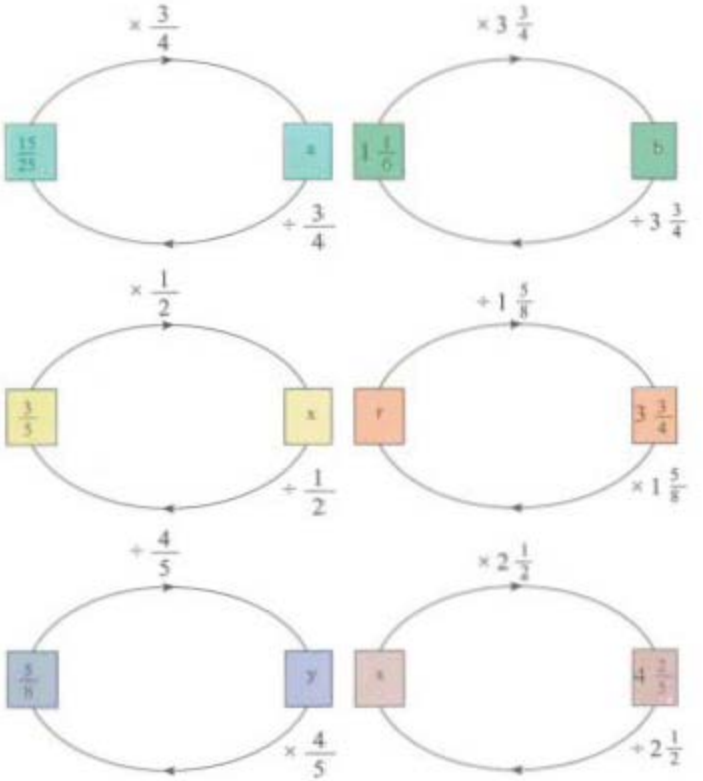
$$5\frac{1}{2} = x$$

therefore



Exercise F

1. Find the missing letters in these diagrams.



2. If $x \times \frac{1}{8} = \frac{3}{4}$

Then $\frac{3}{4} \div \frac{1}{8} = x$

$\frac{3}{4} \times \frac{8}{1} = x$

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

Now try these:
Find the missing number in each case:

(a) $\square \times \frac{2}{3} = \frac{4}{15}$ (b) $\square \times \frac{4}{5} = \frac{8}{15}$

(c) $\square \times \frac{3}{7} = 1\frac{5}{7}$ (d) $\frac{3}{5} \times \square = \frac{6}{35}$

(e) $\frac{3}{4} \times \square = \frac{9}{16}$ (f) $3\frac{1}{2} \times \square = \frac{7}{8}$

Order Of Operations

Study these:

(a) $(3\frac{1}{2} \times 2\frac{1}{4}) \div 5\frac{1}{4}$

This problem has brackets.
We always do what is in the brackets first.

$= (\frac{7}{2} \times \frac{9}{4}) \div 5\frac{1}{4}$

$= \frac{63}{8} \div \frac{21}{4} \quad = \frac{63}{8} \times \frac{4}{21}$

$= \frac{9}{6} = \frac{3}{2}$

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

(b) $1\frac{1}{2} \div \frac{3}{4}$ of $\frac{8}{9}$

After brackets we do 'of' if this is in the problem. "Of" means to multiply. If there are no brackets, do "of" first.

$= 1\frac{1}{2} \div \frac{3}{4}$ of $\frac{8}{9}$

$= 1\frac{1}{2} \div \frac{3}{4} \times \frac{8}{9}$

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

$= \frac{3}{2} \times \frac{3}{2} = \frac{9}{4}$

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

We usually do Division before Multiplication.
Study these:

(a) $\frac{1}{2} \div \frac{3}{4} \times 1\frac{1}{5}$

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

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

$= \frac{2}{3} \times \frac{6}{5} = \frac{4}{5}$

(b) $1\frac{1}{2} \div 1\frac{1}{3} \times \frac{5}{9}$

$= 1\frac{1}{2} \times 1\frac{1}{3} \times \frac{9}{5}$

$= 1\frac{1}{2} \times \frac{4}{3} \times \frac{9}{5}$

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

Exercise G

1. Try these:

(a) $1\frac{1}{8} \div \frac{3}{4}$ (b) $3\frac{1}{5} \times \frac{5}{8}$ (c) $\frac{3}{4}$ of $2\frac{1}{4}$

(d) $7\frac{2}{5} \times \frac{3}{8} \div 3\frac{7}{10}$ (e) $4\frac{3}{8} \times 1\frac{3}{4} \times \frac{8}{25}$ (f) $\left(\frac{1}{2} \times \frac{1}{2}\right) \div \frac{3}{4}$

(g) $\left(\frac{5}{6} \times \frac{9}{20}\right) \div 4\frac{4}{7}$ (h) $5\frac{1}{7} \div \frac{1}{4} \times 1\frac{5}{9}$ (i) $1\frac{1}{2} \div \left(\frac{3}{4} \times \frac{1}{2}\right)$

Exercise H

Problems to solve:

1. John bought 6 pieces of string. Each piece was $2\frac{1}{4}$ metres long. How many metres of string did he buy?
2. Mr. Dash spent 3 days repairing his car. Each day he worked for $8\frac{1}{2}$ hours. How many hours did he work altogether?
3. A 10-metre length of rope is cut into $\frac{1}{8}$ metre lengths. How many pieces were obtained?
4. How many pieces of board, length $\frac{1}{10}$ metres, can be cut from a longer piece of 3 metres?
5. A tailor bought 12 metres of cloth. How many shirts can he make from this cloth if each takes $1\frac{1}{2}$ metres?
6. Mr. Baksh has 45 chickens. If each chicken uses $\frac{3}{5}$ kilogram of feed each week. How much feed is needed for the chickens for a week ?
7. Mr. Smith has a farm of $3\frac{1}{2}$ acres. If 1 bag of fertiliser is used on $\frac{3}{8}$ of an acre. How many bags would he need for his farm?
8. A recipe calls for $1\frac{1}{2}$ cups of milk. How many cups of milk would you use for $\frac{1}{2}$ the recipe?

9. A fence is 20 metres long. If you start at one end and put fence posts $\frac{4}{5}$ metre apart, how many fence posts do you need?

10. I think of a number, multiply it by $\frac{2}{3}$ and the answer is $1\frac{1}{6}$. What is the number?

REVIEW

1. Write the reciprocal of each

$\frac{1}{9}$; $\frac{4}{16}$; $\frac{3}{8}$; $2\frac{1}{2}$; $4\frac{1}{4}$

2. Divide these numbers by multiplying by the reciprocals.

(a) $12 \div 3$ (b) $21 \div 7$ (c) $144 \div 12$

(d) $\frac{1}{12} \div \frac{3}{4}$ (e) $5\frac{1}{3} \div 1\frac{1}{3}$ (f) $\frac{3}{8} \div 2\frac{7}{10}$

3. Copy and complete:

(a) $8 \times \square = 1$ (b) $2\frac{4}{5} \times \square = 1$ (c) $\square \times 3\frac{1}{8} = 1$

4. Find the value of:

(a) $(\frac{1}{2} + \frac{2}{3}) \times \frac{3}{14}$ (b) $7\frac{2}{5} \times \frac{3}{8} \div 3\frac{7}{10}$ (c) $\frac{3}{4}$ of $5\frac{1}{3} \div 1\frac{1}{3}$

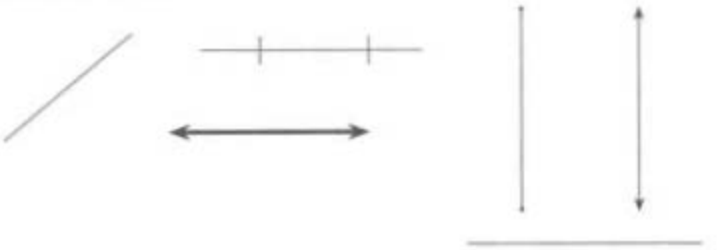
5. A button weighs $\frac{1}{4}$ gram. What will be the weight of 12 such buttons?

6. A man spent $\frac{4}{7}$ of his money in one shop and $\frac{1}{3}$ of the remainder in a second shop. What fraction of his money was left?

7. I thought of a number then multiplied it by $4\frac{1}{2}$, the answer was $10\frac{1}{8}$. What was the number?

LET US LOOK BACK

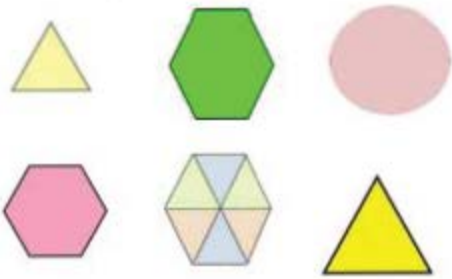
1. (a) Look at these:



Which are: - lines; line segments; points?

(b) Draw to show 2 of each:
horizontal lines; vertical lines; sloping lines; parallel lines

2. (a) Find the congruent polygons:



(b) How many lines of symmetry can you find on each?

3. Find the area of each:

4. The children of Class 5 discussed their preferences for soft drinks. Each child marked a tally on their chart.
(a) Copy and complete the tally chart.

Drink	Tally	Number
Orange	𝍸 𝍸 11	
Banana	𝍸 111	
Grape	1111	
Cherry	𝍸 1111	
Guava	111	

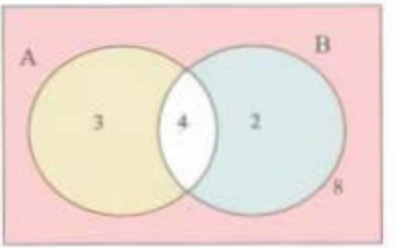
(b) Use this information to make a - (i) pictograph; (ii) block graph.

5. Use reciprocals.
Multiply to find the answers:

(a) $20 \div \frac{1}{4}$ (b) $36 \div \frac{1}{6}$ (c) $75 \div \frac{1}{5}$

(d) $63 \div \frac{1}{9}$ (e) $72 \div \frac{1}{8}$ (f) $91 \div \frac{1}{9}$

6. Study the Venn diagram then answer the questions which follow:



Set A represents children who like cricket (C)

Set B represents children who like football (F)

(a) How many children like both cricket and football?

(b) How many children like neither cricket nor football?

(c) —— children like cricket alone?

(d) —— children like football alone?

(e) How many children make up the sample?

(f) How many children do not like football?

Let's Do Mathematics
comprises Pupil's Books and Teachers' Manuals
for the six levels of Primary School

At each level, the activities are so designed as to facilitate a reinforcement of the basic concepts, skills and understanding necessary to proceed to higher levels of Mathematics learning.

Features of each book include:

1. A suggested teaching sequence.
2. A review lesson at the end of each unit.
3. An evaluative exercise after each five units.
4. Worked examples which are highlighted for focus.
5. An activity approach for Mathematics.
6. Easy to follow instructions.

NOT FOR SALE
PRINTED FOR THE MINISTRY OF EDUCATION
GOVERNMENT OF GUYANA

www.education.gov.gy