

Pupil's Book

**MY
PALS
ARE HERE!**



Maths 6A
3rd Edition




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Preface

My Pals Are Here! Maths (3rd Edition) is a comprehensive, task-based and learner-centred programme designed to provide pupils with a solid foundation in mathematics and opportunities to become efficient problem solvers.

My Pals Are Here! Maths (3rd Edition) continues to make learning mathematics fun and rewarding through the use of engaging illustrations, photographs, hands-on activities and interactives that help reinforce and consolidate learning for pupils of different abilities.

A calculator may be used when  appears.

For the Pupil:

Challenge yourself to solve non-routine questions by applying relevant heuristics and thinking skills in **Put On Your Thinking Cap!**

NEW!

Practise new concepts learnt in parallel questions with help from your teacher in **TRY!**

Share your thoughts with your teachers, create your own mathematics questions and become aware of your own mathematical thinking in **Maths Sharing!**

Become active learners and collaborate with your classmates in **Hands-On Activity!**

NEW!

Master the concept you have learnt through engaging and interactive applets in **App-tivity!**

Chapter Wrap-Up

Algebra

Algebraic Expressions

- $x + 2$, $2y - 4$, $3z$ and $\frac{w}{5}$ are examples of algebraic expressions.
- We can find the value of an algebraic expression if we know the value of the letter in the expression.

Example:
When $x = 4$,
 $2x + 6 = 2 \times 4 + 6$
 $= 8 + 6$
 $= 14$

The value of $2x + 6$ is 14 when $x = 4$.

Simplifying Algebraic Expressions

- We can simplify algebraic expressions.

Examples:

- $x + x + x = 3x$
- $2x + 5x = 7x$
- $4x + 1 = 2x + 3 = 2x + 4$

Solving Algebraic Equations

- $x + 3 = 6$, $3x = 12$ and $4x + 3 = 15$ are examples of algebraic equations.
- Solving an algebraic equation such as $3x + 6 = 9$ means to find the value of x such that the value of $3x + 6$ is 9.

$3x + 6 = 9$
 $3x = 9 - 6$
 $= 3$
 $x = 3 \div 3$
 $= 1$

$x = 1$ is the answer to the equation $3x + 6 = 9$.

Solving Word Problems

You may want to revisit the following TOPICS:

- PS Whole Numbers, Word Problems
- PS Operations of Whole Numbers
- PS Fractions and Division

Chapter 1 Algebra

Put On Your Thinking Cap!

1 The bar graph shows the monthly amount of rain from January to April in Singapore in a particular year. Between which two months was there the greatest percentage decrease in the amount of rain?

Amount of Rain in Singapore Over Four Months

TRY!

1c Miss Tan cut $\frac{3}{4}$ of a block of clay into 6 equal pieces. What fraction of the block of clay was each smaller piece?

Method 1

$\frac{3}{4} \div 6 = \frac{3}{4} \times \frac{1}{6}$
 $= \frac{3}{24}$
Each smaller piece was $\frac{1}{8}$ of the block of clay.

Method 2

$\frac{3}{4} \div 6 = \frac{3}{4} \times \frac{1}{6}$
 $= \frac{3}{24}$
Each smaller piece was $\frac{1}{8}$ of the block of clay.

TRY!

b Divide. Express each answer as a fraction in its simplest form.

a $\frac{1}{5} \div 4 = \frac{\quad}{\quad}$ b $\frac{2}{3} \div 8 = \frac{\quad}{\quad}$
c $\frac{3}{4} \div 12 = \frac{\quad}{\quad}$ d $\frac{5}{9} \div 9 = \frac{\quad}{\quad}$

Maths Sharing! Explore the relationship of dividing two whole numbers and a fraction by a whole number.

- Share 6 apples equally among 3 children. How many apples does each child receive?
- What is 6 fifths \div 3?
- What is 6 sevenths \div 3?

What do you notice from your answers in 1, 2 and 3?
Discuss and explain.

Dividing a proper fraction by a proper fraction

Before you learn ...
Aisyah says that there are 2 quarters in $\frac{1}{2}$. Do you agree? Explain.

LEARN!

1c Devi had $\frac{2}{3}$ of a pizza. She cut it into equal pieces. Each piece was $\frac{1}{6}$ of the pizza. How many equal pieces did Devi cut it into?

$\frac{2}{3} \div \frac{1}{6} = 4$

Devi cut it into 4 equal pieces.

LEARN!

Hands-On Activity! Divide a proper fraction by a proper fraction.

Work in pairs.

- Fold the rectangular strip of paper provided by your teacher into halves, then quarters. Use your model to find how many quarters there are in $\frac{1}{2}$. Then, find $\frac{1}{2} \div \frac{1}{4}$.
- Your partner finds $\frac{1}{2} \times 4$.
- Compare your answers in 1 and 2. What do you notice?
- Switch roles. Repeat 1 to 3 to find $\frac{1}{2} \div \frac{1}{8}$.

App-tivity! www.nceduca.gov.sg/sbstudent/mapp

Lesson 2 Dividing by a Proper Fraction 45

NEW!

Use the list of suggested topics from earlier levels to revisit related concepts with your parents.

NEW!

Consolidate the concepts you have learnt in each chapter in **Chapter Wrap-Up!**

For the Teacher:

CHAPTER 5 Circles

Lessons

1. Radius, Diameter and Circumference
2. Area of a Circle
3. Composite Figures

Big Idea
 π is the ratio of the circumference of a circle to its diameter.

NEW!

Use scenarios pupils can relate to in the chapter openers to capture their interest, provide an engaging introduction to the topics and jump-start learning.

NEW!

Introduce concepts through context-based tasks in **Before you learn**. At the end of each task, a question is posed to develop pupils' creative and critical thinking skills.

Teach concepts in concise steps using real-life contexts, manipulatives and meaningful visuals in **LEARN**.

NEW!

Use suggested questions to facilitate classroom discussions that promote mathematical reasoning.

Bernard is standing at point O on the ground. He walks 1 m from that point in a straight line. His friends do the same, but in different directions. Together, they form a circle.

(a) What does the distance of 1 m represent?
 (b) If two children directly opposite each other hold a string that passes through the start point, what does the string represent?

LEARN
Hands-On Activity Describe circles, explore the relationships between different lengths in a circle and relate the sizes of circles to their diameters.

Work in groups.

- 1 Use the circle cut-outs provided by your teacher. Fold a circle into quarters. Mark the centre of the circle as O.
- 2 Mark three points, A, B and C on the circle. Measure the length between each of these three points and the centre O. What do you notice?
- 3 Measure the diameter of the circle. Compare it with the lengths in 2. What do you notice about the diameter of the circle and its radius?
- 4 Switch roles. Repeat 1 to 3 with other circle cut-outs.

Lesson 3 Solving Word Problems

Solving word problems
Before you learn ...
 The number of playing cards Mariano had was $\frac{8}{9}$ of the number of playing cards Ben had. They had 26 playing cards altogether. Find the ratio of the number of playing cards Ben had to the total number of playing cards they had altogether. Use to show how many playing cards Ben had.

1 Belinda's salary is $\frac{3}{2}$ of Cindy's salary. Belinda earns \$2100. How much do they earn altogether?

Step 1 What have I gathered from the problem?
Step 2 How do I solve it? I can draw a model.
Step 3 What do I need to find? I need to find the ratio of Belinda's salary to Cindy's salary. Then, I need to find their total salaries.

Belinda:
 Cindy:
 Total number of units = 3 + 2 = 5
 3 units = \$2100
 1 unit = \$2100 ÷ 3 = \$700
 5 units = \$700 × 5 = \$3500
 They earn \$3500 altogether.

Step 4 How can I check my answer? I can work backwards to check my answer.

84 Chapter 3 Ratio

NEW!

Assess understanding when pupils apply concepts learnt in **Review**.

Summative Review 1

- 1 Simplify $3a + 5 - 2a + 9$.
- 2 ABCD is a parallelogram. EAB is a straight line. $\angle BCD = 130^\circ$. Find $\angle EAD$.

- 3 How many sixths are there in $\frac{2}{3}$?
- 4 Find the value of $\frac{2}{5} \times \frac{8}{9}$.
- 5 3 oranges cost \$p. Find the cost of 47 oranges in terms of p.
- 6 During a sale, Nathan bought a wallet that cost \$45 after a 10% discount. What was the usual price of the wallet?
- 7 The figure shows a circle in a square of side 10 cm. Find the area of the shaded region. (Take $\pi = 3.14$.)

176 Summative Review 1

NEW!

Summative Review provides more practice to do a cumulative consolidation of concepts learnt.

NEW!

Understanding of related concepts from earlier levels is also assessed with **LOOK BACK** questions.

Chapter 1 Review

- 1 Give an algebraic expression for the following.
 A strawberry cake recipe needs w eggs for every 200 g of flour. How many eggs are needed for 1000 g of flour?
- 2 Find the value of each expression when $n = 8$.
 a $3n - 9$ b $5 + \frac{n}{2}$ c $\frac{n+7}{3}$
- 3 Simplify.
 a $7y + 3y$ b $9x + 6 - 8x - 1$
- 4 Find the missing numbers. Draw models to help you.
 a + 12 = 21 b $5 \times$ = 40 c + 8 = 7
- 5 Pam has 3 friends. Pam and her friends share \$x equally.
 a How much will each person get? Express your answer in terms of x.
 b If $x = 28$, how much will each of them receive?
- 6 The length of a square is w cm.
 a Find the perimeter of the square in terms of w.
 b Find the length of the square when its perimeter is 36 cm.
- 7 Sam's father is 3 times as old as Sam. Sam's mother is 5 years younger than Sam's father. Sam's mother is 31 years old. How old is Sam?

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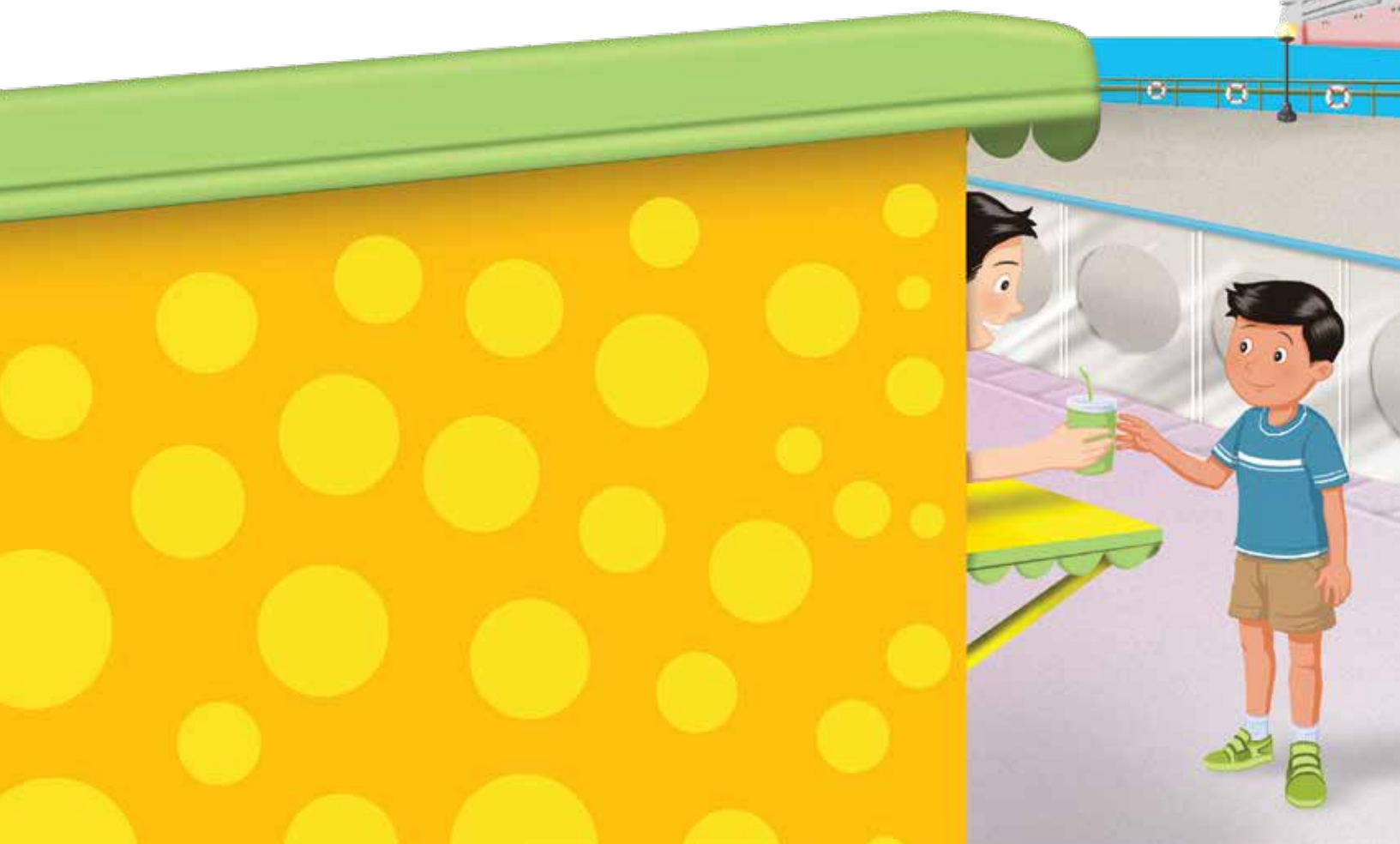
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1111 **1112** **1113** **1114** **1115**

CONTENTS

1	Algebra	6
	Lesson 1 Using Letters to Represent Numbers	7
	Lesson 2 Evaluating Algebraic Expressions	15
	Lesson 3 Simplifying Algebraic Expressions	17
	Lesson 4 Solving Word Problems	21
2	Fractions	32
	Lesson 1 Dividing a Fraction by a Whole Number	33
	Lesson 2 Dividing by a Proper Fraction	39
	Lesson 3 Solving Word Problems	49
3	Ratio	68
	Lesson 1 Ratio and Fraction	69
	Lesson 2 Comparing Ratios	77
	Lesson 3 Solving Word Problems	84

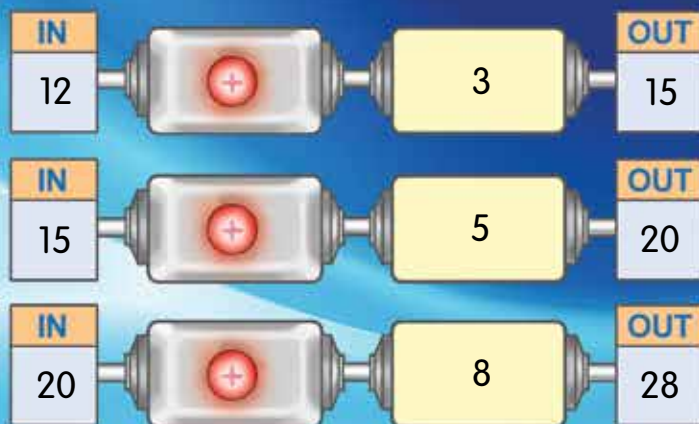


4	Percentage	106
	Lesson 1 Finding Percentages	107
	Lesson 2 Percentage Change	110
	Lesson 3 Solving Word Problems	122
5	Circles	137
	Lesson 1 Radius, Diameter and Circumference	138
	Lesson 2 Area of a Circle	147
	Lesson 3 Composite Figures	152
6	Angles in Geometric Figures	164
	Lesson 1 Finding Unknown Angles in Geometric Figures	165
	Summative Review 1	176



The first machine adds 3 to 12 to get 15.
What do the other machines do?

What happens if I replace 12 with 30?



Lessons

- 1 Using Letters to Represent Numbers
- 2 Evaluating Algebraic Expressions
- 3 Simplifying Algebraic Expressions
- 4 Solving Word Problems

Big Idea

In algebra, a letter is used to represent an unknown number.

Using Letters to Represent Numbers

Before you learn ...

Ryan has some pencils. Ben has 5 more pencils than Ryan. Use the letter x to represent the number of pencils Ryan has. Write an expression in terms of x for the number of pencils Ben has.

LEARN 1A

Rani has 3 sweets.

- a She gets 1 more sweet. How many sweets does she have now?

$$3 + 1 = 4$$

Rani has 4 sweets now.

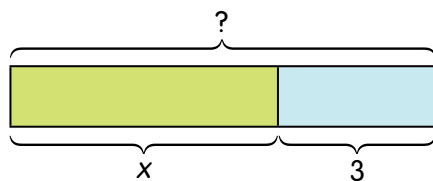
- b She gets 4 more sweets. How many sweets does she have now?

$$3 + 4 = 7$$

Rani has 7 sweets now.

- c Her friend gives her some sweets. How many sweets does she have now?

Her friend gave her an unknown number of sweets. We can use the letter x to represent the unknown number. The letter x can represent any number.



Rani has $(x + 3)$ sweets now.

$x + 3$ is an example of an **algebraic expression** in terms of x .

LEARN
1B

a **i** Add 0 to 6
 $6 + 0 = 6$

ii Add 0 to x
 $x + 0 = x$

$$6 + 0 = 0 + 6 = 6$$

$$x + 0 = 0 + x = x$$

b **i** Sum of 11 and 3
 $11 + 3 = 14$

ii Sum of n and 3
 $n + 3$

c **i** 4 more than 8
 $8 + 4 = 12$

ii 4 more than y
 $y + 4$



Is $x + 5$ the same as $5 + x$?



TRY
1A

Mr Tan is the form teacher of Primary 6B. The pupils do not know his age.

Let Mr Tan be x years old now. Find Mr Tan's age in terms of x .

Description	Mr Tan's Age (Years)
Mr Tan's age now	x
Mr Tan's age 3 years from now	<input type="text"/>
Mr Tan's age 5 years from now	<input type="text"/>
Mr Tan's age 10 years from now	<input type="text"/>

TRY
1B

Give an algebraic expression for each of the following.

a Add 5 to x

b Sum of z and 8

c 3 more than p

LEARN
2A

Aiden has 20 cookies.

- a Tom has 5 cookies. How many more cookies does Aiden have than Tom?

$$20 - 5 = 15$$

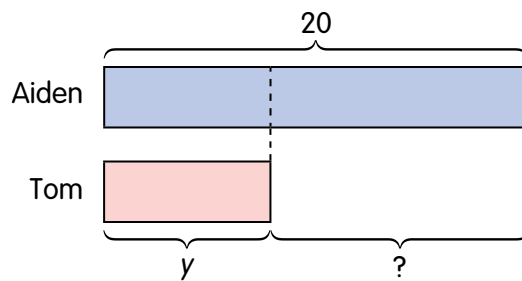
Aiden has 15 more cookies than Tom.

- b Tom has 12 cookies. How many more cookies does Aiden have than Tom?

$$20 - 12 = 8$$

Aiden has 8 more cookies than Tom.

- c Tom has y cookies. How many more cookies does Aiden have than Tom?



Aiden has $(20 - y)$ more cookies than Tom.

$20 - y$ is another example of an algebraic expression.



Is $20 - y$ the same as $y - 20$?



LEARN
2B

- a i Subtract 3 from 7

$$7 - 3 = 4$$

- ii Subtract 3 from a

$$a - 3$$

- b i 1 less than 12

$$12 - 1 = 11$$

- ii 1 less than x

$$x - 1$$