Problem Solving Beyond the Classroom Primary 2

Question A school bus can carry only 45 children. It starts out empty. Then, one child gets on at the 1st stop, two children at the 2nd stop, three children at the 3rd stop, four children at the 4th stop and so on. After how many stops will the bus be full?



The bus will be full after 9 stops.

Focuses on specific problem solving strategies

Provides practice questions of varying difficulty

Includes detailed explanation for examples and solutions



Bernice Lau Pui Wah

Problem Solving Beyond the Classroom Auestion Carry only 45 children, It starts Duestion Carry only 45 children, It starts Primary 7

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Bernice Lau Pui Wah



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Problem Solving Beyond the Classroom Primary 2

is specially written for primary two pupils, to systematically develop competency in thinking skills and problem-solving heuristics.

This book will help the pupil to be a better problem-solver. Its approach will guide your child to acquire the necessary process skills for problem-solving. This includes thinking skills, heuristics application, reasoning, communication and connections in the learning of Maths.

Each unit of this book begins with a worked example. This is followed by a set of practice questions for the pupil to apply the concepts and heuristics learnt. This will help to consolidate what he or she has learned.

This series of books approaches Maths problems using 'The 4-Step Thinking Process':

- Step 1: Understand the problem
- Step 2: Decide on an approach
- Step 3: Solve problem using the selected approach
- Step 4: Check the solution

I am confident that you will find this book relevant and helpful in problem-solving.



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Addition of Whole Numbers (Heuristic: Find A Pattern)

I.I Part-Whole Model

Worked example

Aaron has 395 stickers. After buying another 78 stickers, he has the same number of stickers as Paul. How many stickers do they have now?





For more information on 'Addition of Whole Numbers', refer to the following section in My Pals are Here! Maths 2A (3rd Edition):

 Chapter 4, Using Models: Addition and Subtraction

Step 1: Understand the problem

How many stickers does Aaron have? 395 stickers.

How many stickers does Aaron buy? 78 stickers.

How many stickers does Paul have? He has the same number of stickers as Aaron after Aaron buys 78 stickers.

Step 2: Decide on an approach Use the 'Part-Whole' model approach.

Step 3: Solve the problem using the selected approach



Paul \rightarrow 395 + 78 = 473 Total \rightarrow 473 + 473 = 946

They have <u>946</u> stickers now.

Step 4: Check the solution

Paul → 473 946 - 78 = 868

Number of stickers Aaron has at first → 868 – 473 = 395

Practice I.I

I. In a contest, Brian blows 148 balloons. Derrick blows 187 balloons. How many balloons do they blow altogether?



They blow ______ balloons altogether.

2. Joyce has 259 beads. Her sister gives her another 175 beads. How many beads does Joyce have now?

lovce	has	beads	now.
, , , , , , ,	1140		

3. During a fund raising event, Fatimah sold 276 bracelets. Melawi sold 29 more bracelets than Fatimah. How many bracelets did they sell altogether?



Teaching Tip!
Who sold more bracelets?

The person selling more will have the longer bar in a comparison model.

They sold ______ bracelets altogether.

4. Train A has 238 passengers. There are 45 more passengers in Train B than in Train A. How many passengers are there in both trains?



There are _____ passengers in both trains.

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5. Sue had 180 game cards. After winning another 25 game cards, she had the same number of game cards as Adam. How many game cards do they have altogether now?



They have _____ game cards altogether now.

*6. A class of 42 pupils attends Maths and English enrichment lessons after school. Exactly 32 of them attend the Maths lesson, exactly 20 of them attend the English lesson and exactly 14 of them attend both lessons. How many pupils do not attend any lesson?

pupils do not attend any lesson.

1.2 Look For A Pattern

Worked example

John is counting by 3s starting with I. The following sequence is observed:

I, 4, 7, IO,

What is the 20th number in the sequence?

Step 1: Understand the problem

How did John count the numbers in the sequence? He counted by 3s.

What does this mean? Every time he counts, the next number will increase by 3.

What is the first number?

What is the difference between these two numbers? 4 - 1 = 3

What do you want to find? The 20th number in the sequence.

Step 2: Decide on an approach Make a table to 'look for a pattern' in the sequence.

Step 3: Solve the problem using the selected approach

Make a table to look for a patte

Order of numbers	st st	2 nd	3 rd	4 th	 20 th
Number	1	4	7	10	 ?
Multiples of 3	3	6	9	12	 (60)

Notice that each number of the sequence is 2 less than the corresponding multiple of 3 directly below it.

Hence, 60 – 2 =58

The 20th number in the sequence is <u>58</u>.

Step 4: Check the solution

One way to check is to manually count up to the 20th number in the sequence.

When counting, ensure that the pattern is consistent up to the 20th number.

Practice 1.2

1,

 Pauline has always celebrated her birthday with a cake decorated with the number of candles matching her age. She has, so far, blown out 45 candles. How old is Pauline now?



@ Teaching Tips! Number of candles blown: I candle ---- I year old 2 candles \rightarrow 2 years old $\rightarrow 1 + 2 = 3$ Total She had blown off a total of 3 candles by the time she was 2 years old.

Pauline is _____ years old.

2. A grandfather's clock chimes once at one o'clock, chimes twice at two o'clock, chimes thrice at three o'clock, and so on. How many times will the clock chime in a twelve-hour period?



The clock will chime ______ times in a twelve-hour period.

3. Two different candles of equal height are lit at the same time. Both burn at a constant rate.

Candle A takes 6 hours to burn out completely. Candle B takes 3 hours to burn out completely. How much time will Candle A take to be exactly twice as tall as Candle B?





Candle A will take ______ hours to burn and be twice as tall as Candle B.

4. Tanya tells a joke to two friends.

The next minute, each of her two friends tells the same joke to two other friends. The next minute, each of those friends tells the same joke to two other friends. This keeps going on until 5 minutes have passed and the teacher begins to pull her hair and yells "Stop"! How many pupils will know the joke after 5 minutes?



pupils will know the joke after 5 minutes.

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5. How many two-digit numbers are there in which the tens digit is greater than the ones digit?

Examples of two-digit numbers:

You can use the following table to help you to find out the answer.

List of numbers					Total		
10							I
20	21						2
30	31	32					3
40	41	42	43				4
50							
60							
70							
80							
90							

There are _____ numbers.

Put On Your Thinking Caps!

Addition Cross

 (a) Arrange the numbers 2 to 10 in the cross below so that the horizontal row and vertical column each equate to 32.



(b) Arrange the same set of numbers and make the horizontal row and vertical column each equate to 28.





Subtraction of Whole Numbers (Heuristic: Drawing A Diagram)

2.1 Comparison Model with Subtraction

Worked example

Emily bakes 36 cookies. She bakes 6 more chocolate cookies than butter cookies. How many chocolate cookies does Emily bake?





For more information on using models for subtraction, refer to the following section in My Pals are Here! Maths 2A (3rd Edition):

 Chapter 4, Using Models: Addition and Subtraction

Step 1: Understand the problem How many cookies does Emily bake? 36 cookies.

How many more chocolate cookies than butter cookies does Emily bake? 6 cookies.

What do you need to find? The number of chocolate cookies Emily bakes.

Step 2: Decide on an approach Use the 'Comparison Model' approach.

Step 3: Solve the problem using the selected approach



Number of butter cookies \rightarrow 15 Number of chocolate cookies \rightarrow 15 + 6 = 21

Emily bakes <u>21</u> chocolate cookies.

Step 4: Check the solution

Number of butter cookies \rightarrow 15 Number of chocolate cookies \rightarrow 21

Total \rightarrow 15 + 21 = 36

Practice 2.1

1. Cindy and David have 35 comic books altogether. David has 7 less comic books than Cindy. How many comic books does David have?

David has _____ comic books.

2. Peggy buys 40 pens and pencils altogether. There are 14 more pens than pencils. How many pens does Peggy buy?

Peggy buys _____ pens.

3. The total age of 2 brothers, Alex and Colin, is 45. Colin is 3 years younger than Alex. How old is Alex?

Alex is _____ years old.

4. The sum of two numbers is 100. Their difference is 20. Find the two numbers.

The two numbers are	and
---------------------	-----

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* 5. 100 pupils took an English and a Mathematics test. 5 pupils did not pass their English and Mathematics. 90 pupils passed English, and 92 pupils passed Mathematics. How many pupils passed both subjects?



Teaching Tip! 100 – 5 = 95

95 pupils passed either English or Mathematics or both.

pupils passed both subjects.

2.2 Drawing A Diagram

Worked example

A fireman who was standing on the middle step of a ladder moved up 4 steps. Due to the heat, he moved down 7 steps. Two minutes later, he went up another 5 steps and remained there until the fire was put out. He then went up 6 more steps to reach the top of the ladder to enter the building. How many steps did the ladder have?



Step 1: Understand the problem

Where was the fireman standing on the ladder at first? On the middle step.

How many steps did he move down due to the heat? 7 steps.

How many steps did he move two minutes later? He moved up 5 steps.

How many steps did he move to get to the top of the ladder? He moved up 6 steps.

What do you want to find? The number of steps on the ladder.

Step 2: Decide on an approach Use 'Drawing A Diagram' strategy: Start with the middle step. Draw the steps on the ladder based on the description given.

Step 3: Solve the problem using the selected approach



The top step is 8 steps above the middle step. Hence, there are also 8 steps below the middle step.

The ladder had 17 steps.

Step 4: Check the solution



4 + 5 + 6 - 7 = 8 steps above the middle step 17 - 8 - 1 = 8 steps below the middle step

Practice 2.2

 During recess, some pupils rush into line to queue up for noodles. Jenny is ahead of Kevin and is behind Leon. Leon is ahead of Siti and is behind Nathan. Siti is ahead of Jenny.

Who is the first in the line and who is the last?



___ is first in the line and ______ is last.

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There are 4 new plants in a school garden.
 Plant B is shorter than Plant A.
 Plant C is taller than Plant B but shorter than Plant A.
 Plant D is shorter than Plant C but taller than Plant B.
 Which plant is the tallest and which plant is the shortest?

Compare the height of the plants by drawing a simple diagram.

Plant _____ is the tallest and Plant _____ is the shortest.

3. Uncle Joe builds a fence around a square-shaped garden. He puts up 5 fence posts on each side. How many posts does Uncle Joe use?



Uncle Joe uses _ posts.

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4. Four classmates stay in the same block of flats in a housing estate. Level I is a void deck. Joanne lives on the middle level of the block. Melvin lives 4 levels above Joanne's flat. Cynthia lives 4 levels below Joanne's flat and 3 levels above the void deck. Lionel lives at the top level which is 3 levels above Melvin's flat. How many levels are there in this block of flats?

There are _____ levels in this block of flats.

5. Daniel enters a lift from a certain level. Then, the lift moves up 8 levels, down 5 levels and up 2 levels. He is then at level 9. From which level does Daniel enter the lift?



Daniel enters the lift on the ______ floor.





Multiplication (Heuristic: Systematic Listing)

3.1 Comparison Model with Multiplication

Worked example

Mr and Mrs Tan have 5 children. They have 3 times as many grandchildren as they have children. How many people are there in the Tan family?





For more information on 'Multiplication', refer to the following section in My Pals are Here! Maths 2A (3rd Edition):

 Chapter 8, Using Models: Multiplication and Division

Step 1: Understand the problem

How many children do Mr and Mrs Tan have? 5 children.

How many times as many grandchildren as children do Mr and Mrs Tan have? 3 times.

What do you need to find? The number of people in the Tan family.

Step 2: Decide on an approach Let us use the 'Comparison Model' approach for this question.

Step 3: Solve the problem using the selected approach



Grandchildren \rightarrow 5 × 3 = 15

2 + 5 + 15 = 22

There are <u>22</u> people in the Tan family.

Step 4: Check the solution $15 \div 3 = 5$ children 22 - 15 - 5 = 2 (Mr and Mrs Tan)
Practice 3.1

 Dawn makes 7 bead bracelets for a fund raising sale. Grace makes 5 times as many bracelets as Dawn. How many bracelets does Grace make?

Grace makes _____ bracelets.

- 2. There are 9 girls and thrice as many boys attending a swimming lesson on a Saturday.
 - (a) How many boys are there?
 - (b) How many more boys are at the swimming lesson?

1	(2)	Thore are	ha	10
Į	d)	There are		15.

(b) _____ more boys are at the swimming lesson.

3. Mabel buys 8 raisin cupcakes for her party. She buys 4 times as many as chocolate cupcakes as raisin cupcakes. How many cupcakes does Mabel buy?

Mabel buys _____ cupcakes.

4. There are 18 more apples than pears in a basket. The number of apples is 4 times the number of pears. How many apples and pears are there in the basket altogether?



There are ______ apples and pears in the basket.

5. Two boxes, A and B, contain the same number of cakes. If 7 pieces of cakes are transferred from Box A to Box B, Box B will have 3 times as many pieces of cakes as Box A. How many pieces of cakes are there in both boxes?



There are _____ pieces of cakes in both boxes.

*6. Bag A has 5 times as many strawberries as Bag B. After Lewis transfers 9 strawberries from Bag A to Bag B, Bag A has twice as many strawberries as Bag B. How many strawberries are there in Bag A at first?

There are _

_ strawberries in Bag A at first.

3.2 Systematic Listing

Worked example

2 pupils are needed to help in the Computer Room during recess every day. 5 pupils volunteer for this duty. The pair of pupils selected for each day will not be repeated. What is the maximum number of days in which these 5 pupils can be allocated for duty?



Step 1: Understand the problem

How many pupils are needed to help in the Computer Room during recess every day? 2 pupils.

How many pupils volunteer for this duty? 5 pupils.

What is the condition for selecting the volunteers? The pair of pupils selected will not be repeated.

What do you want to find? The maximum number of days in which these 5 pupils can be allocated for duty in the Computer Room. Step 2: Decide on an approach Let us use the 'Listing' strategy.

Step 3: Solve the problem using the selected approach

Make a list

A, B, C, D and E represent 5 pupils

AB BC CD DE AC BD CE AD BE AE 4 + 3 + 2 + 1 = 10

The maximum number of days is 10 days.

Step 4: Check the solution



Practice 3.2

1. Mei Lian must choose one Art activity for each term. Her choices can be made from the following lists for both terms:



List the choices that she can make for the two terms. How many sets of choices can Mei Lian choose from?

Mei Lian can choose from ______ sets of choices.

- Patrick numbers the toy aeroplanes in his collection according to the following conditions:
 - the number has to be a 3-digit number
 - the digit in the hundreds place is more than 8
 - the digit in the tens place is less than 4
 - the digit in the ones place can be divided by 2

Each toy aeroplane has a different number. If Patrick uses every possible number that satisfy the conditions above, how many toy aeroplanes does Patrick have in his collection?



@ Teaching Tips!

Only digit 9 can be used in the hundreds place.

Only digits 1, 2 and 3 can be used in the tens place.

Only digits 0, 2, 4, 6 and 8 can be used in the ones place.

Patrick has

toy aeroplanes in his collection.

3. A type of bug can reproduce rapidly and destroy stored grain. The bugs eat 2 grams of grain in the first hour. Then, they eat 2 grams more grain with each additional hour. How much grain could the bugs eat in 10 hours?



The bugs could eat ______ of grain in 10 hours.

4. Fariz has less than 40 computer games. He can arrange the computer games into groups of 3. If he arranges them into groups of 5, he will have 2 games remaining. How many computer games does Fariz have?

Fariz has _____ computer games.

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5. Michael has less than 35 game cards.

If he arranged them in stacks of 3, there are no leftovers.

If he arranged them in stacks of 4, there are no leftovers.

If he arranged them in stacks of 5, 4 cards remain.

How many game cards does Michael have?

Michael has _____ game cards.





Division (Heuristic: Working Backwards)

4.1 Comparison Model with Division

Worked example

Vivian read some books over the holidays. Evelyn read 3 times as many books as Vivian. Altogether they read 36 books. How many more books did Evelyn read than Vivian?



to Link

For more information on division, refer to the following section in My Pals are Here! Maths 2A (3rd Edition):

Chapter 8, Using Models:
Multiplication and Division

Step 1: Understand the problem

How many books did Vivian and Evelyn read altogether? 36 books

How many more books did Evelyn read than Vivian? 3 times as many books as Vivian.

What do you need to find? The difference in the number of books Vivian and Evelyn read.

Step 2: Decide on an approach Let us use the 'Comparison Model' approach.

Step 3: Solve the problem using the selected approach



 $Vivan \longrightarrow 36 \div 4 = 9$ 9 × 2 = 18

Evelyn read 18 more books than Vivian.

Step 4: Check the solution

Number of books read by Vivian \rightarrow 9 Number of books read by Evelyn \rightarrow 9 + 18 = 27

Total → 9 + 27 = 36



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Practice 4.1

 Jenny has twice as many teddy bears as her sister, Florence. They have 24 teddy bears altogether. How many teddy bears does Jenny have?



Jenny has ______ teddy bears.

2. The sum of two numbers is 45. The bigger number is 4 times that of the smaller number. Find the two numbers.

The	numbers are	and	•
-----	-------------	-----	---

3. A whole number has two digits. The 'ones' digit is 3 times as much as the 'tens' digit. The sum of the two digits is 12. What is the number?



The number is _____.

4. Susan baked 38 muffins. She baked 20 more chocolate muffins than blueberry muffins. How many blueberry muffins did Susan bake?

Susan baked ______ blueberry muffins.

.

5. There are 32 children in Mrs Lim's class. There are 8 more boys than girls. How many boys are there in her class?

There are _____ boys in her class.

6. There are a total of 20 children in Drama Club and Art Club. 3 children are transferred from Drama Club to Art Club, resulting in an equal number of children in both clubs. How many children were there in Drama Club before the transfer?

There were ______ children in Drama Club before the transfer.

4.2 Working Backwards

Worked example

Kenneth counted all the different animals when he visited the zoo. He counted twice as many zebras as elephants. The number of rabbits was 2 less than the number of zebras. There were five times as many monkeys as rabbits. Kenneth counted 30 monkeys. How many animals did Kenneth count altogether at the zoo?



Step 1: Understand the problem

How many types of animals did Kenneth count altogether? 4 types.

What were these animals? Elephants, zebras, rabbits and monkeys.

How many zebras were there as compared to elephants? There were twice as many zebras as elephants.

How many rabbits were there as compared to zebras? There were 2 less rabbits than zebras.

How many monkeys were there as compared to rabbits? There were five times as many monkeys as rabbits.

How many monkeys were there? 30 monkeys.

What do you need to find? Total number of animals at the zoo.

Step 2: Decide on an approach We shall use the 'Working Backward' strategy to solve this sum.

Step 3: Solve the problem using the selected approach



 $Total \rightarrow 4 + 8 + 6 + 30 = 48$

Kenneth counted <u>48</u> animals altogether at the zoo.

Step 4: Check the solution

Number of Elephants $\rightarrow 4$

Number of Zebras $\rightarrow 4 \times 2 = 8$

Number of Rabbits $\rightarrow 8 - 2 = 6$

Number of Monkeys $\rightarrow 6 \times 5 = 30$

Practice 4.2

 Whenever Pinocchio tells a lie, his nose will be twice its previous length. Pinocchio tells a total of 3 lies and his nose is 16 cm long now. What is the original length of Pinocchio's nose?





The original length of Pinocchio's nose is _____ cm.

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2. Sarah has some money in her piggy bank. She wants to save some more money to buy a present for her mother. Each day Sarah saves 5 cents more than she does the day before. After 4 days, she has a total of 110 cents in her piggy bank. How much money does Sarah have in her piggy bank originally?



Sarah has ______ cents in her piggy bank originally.



What is Carlene's mother's age?



Her mother is _____ years old.

4. Shuan Li has some beads in a box. She has twice as many white beads as red beads. The blue beads are 8 less than the white beads. She has 3 times as many green beads as blue beads. There are 6 more yellow beads than green beads. There are 24 yellow beads in the box. How many beads does Shuan Li have in the box?



Shuan Li has _____ beads in the box.

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Det On Your Thinking Caps!

Square Number Puzzle

Place the digits 1 to 9 in the boxes so that all the following statements are true.

You may use each digit only once.





Money (Heuristic: Guess and Check)

5.1 Part-Whole Model and Comparison Model on Money

Worked example

Alice and her sister Dawn wanted to open a lemonade stall during a school fair. Together, they spent \$100 to set up the stall. Alice spent \$30 more than Dawn. How much money did each of them spend?



🗠 Link

For more information on 'Money', refer to the following section in My Pals are Here! Maths 2B (3rd Edition): • Chapter 11, Money

Step 1: Understand the problem

How much did Alice and Dawn spend to set up the lemonade stall during the school fair? \$100

How much more did Alice spend than Dawn to set up the lemonade stall? \$30 What do you need to find? The amount of money that each of them spent to open the lemonade stall.

- Step 2: Decide on an approach Let us use a 'Comparison Model' for this question.
- Step 3: Solve the problem using the selected approach



100 - 30 = 70

Dawn \rightarrow \$70 ÷ 2 = \$35 Alice \rightarrow \$35 + \$30 = \$65

Alice spent <u>\$65</u> and Dawn spent <u>\$35</u>.

Step 4: Check the solution

Difference in amount of money spent by Alice and Dawn \rightarrow \$65 - \$35 = \$30



Practice 5.1

 Wei Fang had some money at first. She bought 3 pens at \$6 each. After that she had \$15 left. How much money did Wei Fang have at first?



Wei Fang had _____ at first.

 Jason had \$50. He bought 4 photo albums at \$7 each. How much had Jason left?



\$6 each

Jason had _____ left.

 Li-Ling and Li-Eng had \$100 altogether. After Li-Ling spent \$48 and Li-Eng spent \$36, both of them had the same amount of money left. How much did each of them have left?

Each of them had ______ left.

4. Jack paid a total of \$100 for a wallet and some magazines. The magazines cost \$60 less than the wallet. How much did Jack pay for the wallet?

Jack paid ______ for the wallet.

- 5. Eli bought two watches, a cheap one and an expensive one. Both watches cost her \$45. The expensive watch costs 4 times that of the cheap watch.
 - (a) How much did Eli pay for the expensive watch?
 - (b) Ian bought a watch which was \$28 more than Eli's expensive watch. How much did lan pay for his watch?

(a) Eli paid ______ for the expensive watch.

(b) lan paid _____ for his watch.

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5.2 Guess and Check

Worked example

In a Maths test of 10 questions, 5 points were given for each correct answer and 2 points were deducted for each incorrect answer. If Julie answered all 10 questions and scored a total of 29 points, how many correct answers did Julie have?



Step 1: Understand the problem

How many questions were there in the Maths test? 10 questions.

How many points were given for each correct answer? 5 points.

How many points were deducted for each incorrect answer? 2 points.

How many points were lost if one question was incorrect? 5 + 2 = 7 points.

How many points did Julie score? 29 points.

What do you need to find? The number of correct answers that Julie had.

Step 2: Decide on an approach

The '**Guess and Check**' strategy will come in handy for this question.



Step 3: Solve the problem using the selected approach

For every wrong answer, 7 marks will be lost.

Correct	Incorrect	Total Points	Check
10	0	50	×
9	I	× 7 = 7 50 – 7 = 43	×
8	2	2 × 7 = 4 50 - 4 = 36	×
7	3	3 × 7 = 21 50 - 21 = 29	1

Julie had 7 correct answers.

Step 4: Check the solution

7 correct answers \rightarrow 5 × 7 = 35 points

3 incorrect answers \rightarrow 2 × 3 = 6 points

Total points \rightarrow 35 – 6 = 29 points

Practice 5.2

1. At a funfair, Shuan Lih paid a total of \$26 for 10 different

types of rides. She paid either \$2 or \$3 for each ride. How many \$3-rides did Shuan Lih take?

@ Teaching Tip!

Start guessing from half the total number of rides taken.

Number of \$3-rides	Number of \$2-rides	Total amount	Check

Shuan Lih took ______ \$3-rides.

 At an aquarium, each angel fish costs \$3 and each guppy costs \$2. Bala pays \$30 for 9 fish and gets \$7 change. How many angel fish does Bala buy?

Number of angel fish (\$3 each)	Number of guppy (\$2 each)	Total amount	Check
		~	
	-		

Bala buys _____ angel fish.

3. In a school Maths Competition, pupils were asked to solve 10 questions. For each question answered correctly, pupils receive 5 points and for each question answered incorrectly pupils will lose 3 points. Vivien scored 34 points for the competition. How many questions did she answer correctly?

Correct	Incorrect	Total Points	Check
			_

_ questions were answered correctly.

4. Mabel baked 39 chocolate and corn cupcakes for her bakery. She puts the chocolate cupcakes into bags of 5 and the corn cupcakes into bags of 4. How many of each kind of cupcake did Mabel bake?



Chocolate Cupcakes	Corn Cupcakes	Chec	Check	
5	39 - 5 = 34	34 ÷ 4	X	

Mabel baked ______ chocolate cupcakes and

_____ corn cupcakes.

 Place the digits I to 9 in each space without repeating any of the digits. All the five digits in each diagonal line add up to 26. The digits in the four corners also add up to 26.







Fractions (Heuristic: Create A Table)

6.1 Part-Whole Model with Fraction

Worked example

A chocolate bar is broken into 12 equal parts. Adam eats 3 parts and Brenda eats 4 parts. What fraction of the chocolate bar is left?



De Link

For more information on 'Fractions', refer to the following section in My Pals are Here! Maths 2B (3rd Edition): • Chapter 12, Fractions

Step 1: Understand the problem

How many pieces of the chocolate are there? 12 equal pieces.

What fraction of the chocolate bar does Adam eat? $\frac{3}{12}$ of the chocolate bar.

What fraction of the chocolate bar does Brenda eat? $\frac{4}{12}$ of the chocolate bar.

What do you need to find? The fraction of the chocolate bar that is left.

Step 2: Decide on an approach

Draw a model that shows all parts of the chocolate bar.



By using this model, we can see the parts that have been eaten and that are left uneaten.

Step 3: Solve the problem using the selected approach



$$\frac{3}{12} + \frac{4}{12} = \frac{7}{12}$$
$$\frac{12}{12} - \frac{7}{12} = \frac{5}{12}$$
$$\frac{5}{12}$$
 of the chocolate bar is left.

Step 4: Check the solution

$$\frac{5}{12} + \frac{3}{12} + \frac{4}{12} = \frac{12}{12} = 1$$
 whole
Practice 6.1

1. Mother bakes a cake. She gives $\frac{5}{8}$ of the cake to Lisa and $\frac{3}{8}$ of it to Joanne. Who receives a bigger part of the cake? How much more?

Colour the model below to show each person's share.



_____ receives _____ more cake than

 Sandy baked a chicken pie. She cut it into 6 equal pieces. She ate 2 pieces and her 3 brothers ate 1 piece each. What fraction of the chicken pie did they eat?

-	 	 	

They ate	of	the	chicken	pie.

3. Mellissa cuts a pizza into 12 pieces. She gives 2 pieces of the pizza to her sister and 3 pieces to each of her two brothers. She keeps the rest of the pizza for herself.



Colour the model below to show each person's share and _ fill in the blanks that follow.

Her sister receives _____ of the pizza.

Each of her brothers receives ______ of the pizza.

Fraction of Mellissa's share

 $\rightarrow \frac{12}{12} - - =$

Mellissa receives ______ of the pizza.

_____ receives the biggest part of the pizza.

- 4. Look at the clock below.
 - (a) What fraction of the face of the clock is shaded?
 - (b) What fraction of the face of the clock is unshaded?
 - (c) Which region (shaded or unshaded) is less? How much less?





(b) _____ of the face of the clock is unshaded.

(c) The _____ region is _____ less than

the _____ region.

5. Mrs Wong cuts a cake into 10 equal pieces. Her 3 children eat a piece of cake each. She gives 4 pieces of cake to her neighbour. What fraction of the cake is left?



_____ of the cake is left.

*6. Look at the container of marbles and fill in the blanks below.



- (a) There are _____ marbles in the container.
- (b) Colour half of the marbles red and a quarter of the marbles blue. Colour the rest of the marbles green. What fraction of the marbles is green?

_____ of the marbles is green.

(c) What fraction of the marbles are red and blue?

_____ of the marbles are red and blue.

(d) If 3 red marbles are now removed from the container, what fraction of the marbles is now red?

_____ of the marbles in the container now is red.

6.2 Create A Table

Worked example

Ben and 8 of his friends spent a day at the amusement park. They decided to pair up for roller-coaster rides in such a way that each friend would ride with each of the other friends exactly once. How many rides must be taken in order for this to happen?



Step 1: Understand the problem How many children are there altogether?

8 children + Ben = 9 children

How do they pair up for the ride? Each child would pair up with each of the other friends exactly once.

How many rides are taken by I child? 0 ride.

How many rides are taken by 2 children? *I ride*.

How many rides are taken by 3 children? 3 rides.

How many rides are taken by 4 children? 6 rides.

Can you see a pattern? Yes; 0 + 1 = 1; 1 + 2 = 3; 3 + 3 = 6

Step 2: Decide on an approach Let us use the **'Tabulating'** strategy to show the number of rides taken by 9 children.

Step 3: Solve the problem using the selected approach

Number of children	I	2	3	4	5	6	7	8	9
Number of rides	0	I	3	6	10	15	21	28	36

36 rides must be taken.

Step 4: Check the solution

2 children \rightarrow AB 3 children \rightarrow AB AC BC 4 children \rightarrow AB AC AD BC BD CD 5 children \rightarrow AB AC AD AE BC BD BE CD CE DE

For 5 children \rightarrow 1 + 2 + 3 + 4 = 10 For 9 children \rightarrow 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 = 36

Practice 6.2

 A school bus can carry only 45 children. It starts out empty. Then, one child gets on at the 1st stop, two children at the 2nd stop, three children at the 3rd stop, four children at the 4th stop and so on. After how many stops will the bus be full?



Number of stop(s)	I	2	3	4	
Total number of children	I	3			

The bus will be full after ______ stops.

2. At a flower stop, Cynthia noticed that every time 3 customers came into the shop, I customer would leave. At first, there was only I other customer besides Cynthia. The customer left when 3 new customers came in. Later, one of the first three customers left when another 3 customers arrived. By a certain time, I3 customers have entered the shop. How many groups of three customers had entered the flower shop by then?



Groups of 3	0	I	2		
Number of customers	I				

groups of three customers had entered the flower shop by then.

3. Brian has taken up jogging. He jogs 500 m on the 1st day. Each day he jogs 20 m further than he did the day before. What is the distance that Brian jogs on the 7th day?



Brian jogs: 20 m more on the 2nd day. 40 m more on the 3rd day. 60 m more on the 4th day....

Day	st st	2 nd	3rd	4 th	5 th	6 th	7 th
Distance	500	520					

Brian jogs _____ on the 7th day.

4. Alex and Halik are throwing balls into the buckets below at a carnival.



Whoever scores exactly 22 points, 31 points or 43 points with the least number of throws wins the prize. @ Teaching Tip!

Get the maximum number of throws in bucket '5'.

(a) What is the least number of throws needed to score exactly 22 points?

Bucket	Bucket	Bucket	Total	Number of
'5'	'4'		Score	Throws

The least number of throws is _____.

(b) What is the least number of throws needed to score exactly 31 points?

Bucket	Bucket	Bucket	Total	Number of
	'4'	'3'	Score	Throws

The least number of throws is _____.

(c) What is the least number of throws needed to score exactly 43 points?

Bucket	Bucket	Bucket	Total	Number of
'5'	'4'		Score	Throws

The least number of throws is _____.

Put On Your Thinking Caps!

In The Zoo

At the Mandai Zoo, the zoo-keeper counted 36 feet in the crocodile and ostrich enclosures.



(a) If there were 5 crocodiles, how many ostriches were there?

There were _____ ostriches.

(b) If there were 12 ostriches, how many crocodiles were there?

There were _____ crocodiles.

(c) If there were the same number of crocodiles and ostriches, how many animals were there?

There were	animals.



Measurement (Heuristic: Problems Involving Separation)

7.1 Four Operations Involving Length, Mass and Volume

Worked example

2 pencils and 7 erasers weigh 289 g. 2 pencils and 4 erasers weigh 268 g. What is the mass of an eraser?

Step 1: Understand the problem

What is the difference between '2 pencils and 7 erasers' and '2 pencils and 4 erasers'? The difference is 3 erasers.

What do you need to find?

The mass of an eraser.

to Link

For more information on 'Mass, Length and Volume', refer to the following sections in My Pals are Here! Maths (3rd Edition):

2A

• Chapter 9, Length

- 2B
- Chapter 10, Mass
- Chapter 15, Volume

Step 2: Decide on an approach Let us draw a 'Comparison Model' to compare the weights.

Step 3: Solve the problem using the selected approach



3 erasers \rightarrow 289 - 268 = 21 g | eraser \rightarrow 21 ÷ 3 = 7 g

The mass of an eraser is <u>7 g</u>.

Step 4: Check the solution

The mass of 3 erasers \rightarrow 3 × 7 = 21 g 7 erasers \rightarrow 7 + 7 + 7 + 7 + 7 + 7 + 7 = 49 g 4 erasers \rightarrow 4 × 7 = 28 g

Weight difference between 7 erasers and 4 erasers \rightarrow 49 - 28 = 21 g

The weight difference between 7 erasers and 4 erasers is the same as the mass of 3 erasers.

Practice 7.1

 The total length of three wooden bars, A, B and C, is 36 cm. Bar B is 7 cm shorter than Bar A. It is also 5 cm shorter than Bar C.What is the length of Bar B?

The length of Bar B is ____

2. A plant is 12 cm tall. It grows 4 cm each day. How many days will it take to be 40 cm tall?



It will take _____ days to be 40 cm tall.

3. Nicholas jogged 438 m from his home to a park. He then jogged another 385 m from the park to the library. How much less would Nicholas jog if he jogged directly from his home to the library?



Nicholas would have jogged _____ less.

4. Irene had some flour. She used 6 kg to bake some cakes. Then, she poured the remaining flour equally into 4 containers. The mass of flour in each container is 3 kg. How much flour did Irene have at first?

Irene had _____ of flour at first.

5. Two fruit baskets have a total mass of 21 kg. One basket is 5 kg lighter than the other. What is the mass of the heavier basket?

The mass of the heavier basket is _____.

6. I toy key chain and 6 toy keys weigh 104 g.
I toy key chain and 2 toy keys weigh 68 g
What is the mass of a toy key?
(Assuming all toy keys have the same mass)

The mass of a toy key is _____.

7. Jamie buys 5 bottles of milk. Each bottle contains 4 *l* of milk. Her family drinks 2 *l* of milk each day. How many days will it take for her family to finish drinking the milk?

Her family will finish drinking the milk in _____ days.

*8. Jug A contains 23 ℓ of water. Jug B contains 9 ℓ of water. How much water must be poured from Jug A to Jug B so that the two jugs have the same amount of water?



of water must be poured from Jug A to Jug B.

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7.2 Problems Involving Separation

Worked example

On a road, trees are planted from one end of the road to the other end of the road. Trees are planted after every 5 m. If the road is 35 m long, how many trees are planted on one side of the road?



Step 1: Understand the problem How far apart are the trees from each other? 5 m

> How long is the road? 35 m

What do you need to find? The number of trees planted on one side of the road.

Step 2: Decide on an approach We need to 'plus I' to the number of intervals in between the trees. This one extra tree is the Ist tree before the Ist interval.

Remember that this is only applicable if the route is not continuous.

If the route is continuous or loops around, there is no need to 'plus I' since we will return to the start point.



Step 3: Solve the problem using the selected approach

The lite of the

Number of intervals \rightarrow 35 ÷ 5 = 7 Number of trees \rightarrow 7 + 1 = 8

8 trees are planted.

Step 4: Check the solution

8 × 5 m = 40 m (this incl

(this includes another 5 m of distance after the 35 m mark)

Length of each interval \rightarrow 40 m – 35 m = 5 m

Practice 7.2

I. On a stretch of road, lamp-posts are placed every 5 m from one end of the road to the other end of the road. The road is 50 m long, how many lamp-posts are there along the road?

There are _____ lamp-posts along the road.

2. 10 pupils are sitting in a row. 3 pots of plants are placed in between each pupil. How many pots of plants are there in the row?

There are _____ pots of plants in the row.

3. Flags are placed every 4 m on both sides of a road for National Day. If 20 flags are used, how long is the road?

The road is _____ long.

.

4. In a marathon, participants are to run 36 km starting from the stadium and back. 4 drink stations are situated along the way. There is an equal distance in between every two drink stations. How far apart are two drink stations from each other?

Two drink stations are _____ apart.

5. Renee needs to climb 8 steps to go up to the next level. How many steps does Renee need to climb to go to the 8th level from the 3rd level?

Renee needs to climb ______ steps.

6. In a building, William needs to climb 10 steps to go from one level the next level. Which level will William be at if he climbs 80 steps from the 2nd level?

and to prove with



William will be at the _____ level.

Det On Your Thinking Caps!

The Balance Scale

At the market, Mr Osman uses a balance scale to weigh his durians. He has some 5 kg and 8 kg masses. With these he can weigh the 3 kg durian as shown in the illustration below.



Complete the following table, showing how Mr Osman can weigh the durians from 1 kg to 6 kg.

Left side of the balance	Right side of the balance				
Mass	Mass	Durians			
		l kg			
		2 kg			
8 kg	5 kg	3 kg			
		4 kg			
		5 kg			
		6 kg			

BLANK

٠



8.1 Solving Problems Using Data from Picture Graphs

Worked example

The picture graph shows the number of pizzas sold in a restaurant on a Saturday.

Types of Pizzas Sold

	0			0
Hawaiian pizza	Pepperoni pizza	Veggie Lovers pizza	Chicken Supreme pizza	Bacon 'N' Mushroom pizza
	Each C	stands for 3	B pizzas.	

- (a) How many Chicken Supreme pizzas were sold on Saturday?
- (b) How many more Hawaiian pizzas than Veggie Lovers pizzas were sold?
- (c) What was the difference between the least number of pizzas sold and

tink 🗠

For more information on 'Graphs', refer to the following section in My Pals are Herel Maths 2B (3rd Edition): • Chapter 14, Graphs

- the most number of pizzas sold in the restaurant?
- (d) Which type of pizza sold was thrice as many as the Bacon'N' Mushroom pizzas sold in the restaurant?

Step 1: Understand the problem How many pizzas does each ○ stand for? 3 pizzas.

Step 2: Decide on an approach We shall use the data from the graph to answer the questions.

Step 3: Solve the problem using the selected approach

(a) $10 \times 3 = 30$

30 Chicken Supreme pizzas were sold.

(b) |8 - |2 = 6 **OR** $2 \times 3 = 6$

<u>6</u> more Hawaiian pizzas than Veggie Lovers pizzas were sold.

(c) Least \rightarrow 6 Bacon 'N' Mushroom pizzas Most \rightarrow 30 Chicken Supreme pizzas 30 - 6 = 24The difference was 24 pizzes

The difference was 24 pizzas.

(d) Bacon 'N' Mushroom $\rightarrow 2 \times 3 = 6$ 6 × 3 = 18

The number of <u>Hawaiian pizzas</u> was thrice as many as Bacon 'N' Mushroom pizzas.

Step 4: Check the solution

Ensure that all the information used from the graph is accurate and calculations are done correctly.

Practice 8.1

Study the picture graphs carefully and answer the questions below using the information from the respective graphs.

1. The picture graph below shows the types of food ordered by pupils at a school canteen for breakfast on Monday morning.

000				
Nasi Lemak	Sandwiches	Roti Prata	Cereal	Noodles
	Each O s	tands for 3 (children.	

Types of Food Ordered

- (a) _____ pupils ordered Roti Prata for breakfast.
- (b) 12 pupils ordered Cereal for breakfast. There should be ______ O on the graph. Draw the correct number of O on the graph.
- (c) There were _____ less orders for Nasi Lemak than Noodles.
- (d) _____ pupils were at the canteen on Monday morning.

 The picture graph shows the number of badges collected by 5 children.

\odot \odot \odot \odot Benedict $\odot \odot \odot \odot \odot \odot \odot$ Lewis \odot \odot Eileen \odot \odot \odot oseph $\odot \odot \odot \odot \odot \odot \odot \odot \odot$ (\bigcirc) Shuan Li Each 😳 stands for 5 badges.

Number of Badges Collected by Children

(a) _____ has least number of badges. He / She

has _____ badges.

(b) _____ has twice as many badges as Joseph,

He / She has _____ badges.

- (c) Shuan Li has _____ more badges than Benedict.
- (d) Shuan Li plans to share her badges with Eileen so that they will have the same number of badges.

She should give _____ badges to Eileen.

3. A musical instrument shop sells recorders, flutes, guitars and violins. The picture graph below shows the number of musical instruments sold in June.

Violins	$ \begin{array}{c} \triangle \land \triangle \land \triangle \\ \triangle \land \triangle \land \triangle \\ \end{array} \end{array} $
Guitars	
Recorders	$\triangle \triangle \triangle$
Flutes	$\triangle \triangle \triangle \triangle \triangle \triangle$
Ea	ch $ riangle$ stands for 2 musical instruments.

Types of Musical Instruments Sold in June

- (a) _____ guitars were sold in June.
- (b) _____ was the musical instrument most sold.

The shop sold ______ of this musical instrument.

(c) The shop had 20 flutes at the beginning of June. How many flutes were left at the end of June?

_____ flutes were left at the end of June.

(d) The shop sold thrice as many recorders in May as in June. How many recorders did the shop sell in May?

The shop sold ______ recorders in May.

 The picture graph below shows the types of activities a group of children like to do at home.

\mathbb{A}	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	3333 33333 33333	333	\ \ \ \ \ \ \ \ \ \ \ \ \ \
Playing Board Games	Drawing	Playing Electronic Games	Origami Folding	Making Bean Bracelets

Types of Activities

- (a) _____ children like to draw at home.
- (b) ______ fewer children like origami folding than making bean bracelets.
- (c) _____ more children like playing electronic games than board games.
- (d) The most popular activity is _____.

_____ children like this activity.

5. A bakery sells bread of different flavours. The picture graph below shows the number of different types of bread sold on one morning.



Types of Bread Sold

- (a) _____ ham bread were sold in the morning.
- (b) _____ more sausage bread than blueberry bread were sold.
- (c) 40 more ______ bread than corn bread were sold.
- (d) The bakery baked 65 loaves of blueberry bread. After

selling the blueberry bread, _____ loaves of blueberry bread were left.

8.2 Mathematical Investigation with Shapes

Worked example

Char Hong draws a series of triangles as shown in the figures below.



(a) How many triangles can you find in each figure? Complete the following table to find your answer.

Figure	Number of triangles	Pattern
I	I	1
2		
3		
4		
5		а. С. С. С

(b) How many triangles are there in Figure 8?

Step 1: Understand the problem

How many **types** of triangles are there in Figure 2? 2 types. They are the 1-based triangle and 2-based triangle.

How many triangles are there in Figure 2? 2-based triangle → 1 I-based triangle $\rightarrow 2$ Total \rightarrow 1 + 2 = 3

How many **types** of triangles are there in Figure 3? 3 types. They are the 1-based triangle, the 2-based triangle and 3-based triangle.

How many triangles are there in Figure 3? 3-based triangle $\rightarrow 1$ 2-based triangles $\rightarrow 2$ 1-base triangles $\rightarrow 3$ Total $\rightarrow 1 + 2 + 3 = 6$

Step 2: Decide on an approach

Investigate the pattern in the sequence.

Step 3: Solve the problem using the selected approach

Number of triangles

For Figure $| \rightarrow |$

For Figure $2 \rightarrow 1 + 2 = 3$

For Figure $3 \rightarrow 1 + 2 + 3 = 6$

For Figure 4 \rightarrow 1 + 2 + 3 + 4 = 10

For Figure $5 \rightarrow 1 + 2 + 3 + 4 + 5 = 15$

(a)	Figure	Number of triangles	Pattern
	1	I	1
	2	3	1 + 2 = 3
	3	6	I + 2 + 3 = 6
	4	10	I + 2 + 3 + 4 = 10
	5	15	+ 2 + 3 + 4 + 5 = 5

(b) Figure $8 \rightarrow 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 = 36$

There are <u>36</u> triangles in Figure 8.

Step 4: Check the solution

Ensure that the pattern is in sequence and all calculations are accurate.

Practice 8.2

1. Kerri is making a shelf for her tiny toy bears. She has 20 interlocking blocks and wants to make the largest shelf possible. If Kerri uses 5 blocks, she can make a shelf that holds 3 bears. 6 blocks will hold 4 bears. 7 blocks will hold 5 bears, and 8 blocks will hold 6 bears as shown in the following figures. If Kerri uses all 20 interlocking blocks, how many tiny toy bears will fit on the shelf?

X	X	X	X	X	X	X	X	×	×	X	×	×	X	X	X	X	X
												-					

Figure I Figure 2 Figure 3

Figure 4

Number of blocks	5	6	7	8	
Number of bears	3	4			

toy bears will fit on the shelf with 20 interlocking blocks.
2. Pauline has trapezium-shaped tables. Each table can seat 5 children.



Pauline now wants to arrange the trapezium-shaped tables in a row as shown below.



(a) If 5 trapezium-shaped tables are arranged in a row as shown, how many seats are there?



There are	_ seats.
-----------	----------

(b) How many tables does Pauline need to seat 20 children?

Complete the following table to help you find the answer.

Number of tables	I	2	3	4	5	6
Number of seats						

Pauline needs ______ tables.

(c) If 10 trapezium-shaped tables are arranged in a row, how many seats are there?

There are _____ seats.

3. Clement uses squares to form the following figures.



How many squares are needed to form Figure 8?

Figure	Number of Squares	Pattern
I	Ι	
2	4	
3	9	
4		
5		
6		
7		
8		

_ squares are needed to form Figure 8.

4. Small squares are used to form a series of big squares as shown below. Each figure is formed by shaded and unshaded squares.









Figure I

Figure 2

Figure 3

Figure 4

(a) How many shaded squares are in Figure 6? Complete the following table to find out the answer.

Figure	Number of Shaded Squares	Pattern
I	4	4 × 1
2		
3		
4		
5		
6		

shaded squares are in Figure 6.

(b) How many shaded squares are in Figure 8?

______ shaded squares are in Figure 8.

(c) There are 40 shaded squares in a figure. Which figure is it?

It is Figure _____.

.

Put On Your Thinking Caps!

Match-e-matics

Jenny makes 7 squares using 20 matchsticks as shown below.



She wants to reduce the number of squares from 7 to 5 by moving only 3 matchsticks.

The matchsticks cannot overlap one another or be removed.

Can you help Jenny? Show how you would in the space below.

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Answer Key

Unit 1

Practice 1.1



148 + 187 = 335

They blow 335 balloons altogether.



259 + 175 = 434

Joyce has <u>434</u> beads now.



Melawi \longrightarrow 276 + 29 = 305 Total \longrightarrow 276 + 305 = 581

They sold 581 bracelets altogether.



Train B \longrightarrow 238 + 45 = 283 Total \longrightarrow 238 + 283 = 521

There are <u>521</u> passengers in both trains.



Adam \rightarrow 180 + 25 = 205 Total \rightarrow 205 + 205 = 410

They have <u>410</u> game cards altogether now.

6.	Maths (32)	14		18
	Science (20)	14	6] .

32 + 20 - |4 = 38 42 - 38 = 4

4 pupils do not attend any lesson.

Practice 1.2

■ 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 = 45

OR

Pauline is <u>9</u> years old.

2. | + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 = 78

OR

$$\frac{12 \times 13}{2} = 78$$

The clock will chime <u>78</u> times in a twelve-hour period.

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Candle A will take $\underline{2}$ hours to burn and be twice as tall as Candle B.

4.

					(lan	iya)	
l st min			I						(2)
2 nd min		I		I		I	1	l	(4)
3 rd min	1	1	I	I	I	I	I	L	(8)

Hence,

| + 2 + 4 + 8 + |6 + 32 = 63

63 pupils will know the joke after 5 minutes.

L	ist o	f nui	mbe	rs	Total
10					<u>i en te</u> rreteren I
20	21				2
30	31	32			3
40	41	42	43		4
50	51	52	53	54	5
90	91	92		98	9



OR

 $\frac{9 \times 10}{2} = 45$

There are <u>45</u> numbers.

Put on Your Thinking Caps! Addition Cross

(a)



(b)

		4		
		9		
6	7	2	5	8
		3		
		10		

Unit 2

Practice 2.1



David has 14 comic books.

2. Pens Additional Pencils Additional Additi

40 - 14 = 26







45 - 3 = 42



Alex is 24 years old.

4. Big number Small number

100 - 20 = 80

Small number \rightarrow 40 Big number \rightarrow 40 + 20 = 60

The two numbers are <u>40</u> and <u>60</u>.

*5.100-5=95

Of the remaining 95 pupils: 95 – 90 = 5 failed English 95 – 92 = 3 failed Mathematics

Passed both English and Mathematics \rightarrow 95 - 5 - 3 = 87

87 pupils passed both subjects.

Practice 2.2

I. Front of the line N L S J K

Nathan is first in the line and Kevin is last.



Plant <u>A</u> is the tallest and Plant <u>B</u> is the shortest.



Uncle loe uses 16 posts.

4.



7 + 1 + 7 = 15

There are 15 levels in this block of flats.

5. Enter (?) \longrightarrow Up 8 \longrightarrow Down 5 \longrightarrow Up 2 -- Floor 9

Enter - Down 8 - Up 5 -Down 2 - Floor 9

9 - 2 + 5 - 8 = 4

Daniel enters the lift on the 4^{th} floor.

Put on Your Thinking Caps! **Find The Difference**

The possible solutions are:

	927	
-	341	_
	586	-
	945	
_	162	
	783	-
	936	
_	152	-

784

(Accept any of the above combinations)

Unit 3

Practice 3.1



 $7 \times 5 = 35$

Grace makes 35 bracelets.



 $9 \times 3 = 27$

(a) There are 27 boys.

27 - 9 = 18

(b) 18 more boys are at the swimming lesson.

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8 × 5 = 40

Mabel buys 40 cupcakes.



 $18 \div 3 = 6$ $6 \times 5 = 30$

There are 30 apples and pears in the basket.



 $7 \times 4 = 28$

There are <u>28</u> pieces of cakes in both boxes.



9 × 5 = 45

There are $\underline{45}$ strawberries in Bag A at first.

Practice 3.2

١. Drawing/ Sculpture Drawing/ Pottery Drawing/Weaving Drawing/ Ceramics Collage/ Sculpture Collage/ Pottery Collage/Weaving Collage/Ceramics Screen printing/ Sculpture Screen printing/ Pottery Screen printing/ Weaving Screen printing/ Ceramics Painting/ Sculpture Painting/ Pottery Painting/Weaving Painting/ Ceramics

$4 \times 4 = 16$

Mei Lian can choose from <u>16</u> sets of choices.

2. Since the digit in the hundreds place is more than 8, this digit has to be 9.

Make a list of 3-digit numbers which have the digit 9 in the hundreds place, a digit less than 4 in the tens place and a digit which can be divided by 2 in the ones place.

900	902	904	906	908
910	912	914	916	918
920	922	924	926	928
930.	932	934	936	938
	900 910 920 930 .	900902910912920922930932	900902904910912914920922924930932934	900902904906910912914916920922924926930932934936

 $5 \times 4 = 20$

Patrick has <u>20</u> toy aeroplanes in his collection.

3.
$$1^{\text{st}}$$
 hour 2 g
 2^{nd} hour 4 g
 3^{rd} hour 6 g
 4^{th} hour 8 g
 5^{th} hour 10 g
|
2 + 4 + 6 + 8 + 10 + 12 + 14 + 16
+ 18 + 20 = 110 g

The bugs could eat <u>110 g</u> of grain in 10 hours.

4. List of possible number of computer games:

Timetable of 3	3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39
Timetable of 5 (+2)	7, 12, 17, 22, 27 32, 37

27 appears in the timetables of 3 and 5(+2).

Fariz has <u>27</u> computer games.

5.

Timetable of 3	3, 6, 9, 12, 15, 18, 21, 24, 27, 30
Timetable of 4	4, 8, 12, 16, 20, 24, 28, 32

Numbers that appear in both lists and are less than 35:

12, 24,

From these two numbers, choose a number that when divided by 5, leaves a remainder of 4.

$$24 \div 5 = 4 (R 4)$$

Michael has <u>24</u> game cards.

Put on Your Thinking Caps!

What am I?

My tens digit is twice my hundreds digit.

Hundreds digit	Tens digit (× 2)
1	2
2	4
3	6
4	8

The sum of the digits is 9.

l st digit	2 nd digit	3 rd digit	Total
I	2	6	9
2	4	3	9
3	6	0	9

A 3-digit even number.

3-digit even number
126
360

I am either <u>126</u> or <u>360</u>.

Unit 4

Practice 4.1



Florence $\rightarrow 24 \div 3 = 8$ 8 × 2 = 16

Jenny has 16 teddy bears.



Smaller number \rightarrow 45 ÷ 5 = 9 Bigger number \rightarrow 9 × 4 = 36

The numbers are 9 and 36.

3. Ones Digit 12 Tens Digit

Tens digit \rightarrow 12 ÷ 4 = 3 Ones digit $\rightarrow 3 \times 3 = 9$

The number is 39.

4. Chocolate Muffins 38 Blueberry 20 Muffins

38 - 20 = 18 $18 \div 2 = 9$

Susan baked 9 blueberry muffins.

- 5. Boys 32 Girls
 - 32 8 = 24 $24 \div 2 = 12$ 12 + 8 = 20

There are 20 boys in her class.



There were 13 children in Drama Club before the transfer.

Practice 4.2



The original length of Pinocchio's nose is 2 cm.



Sarah has 60 cents in her piggy bank originally.



Her mother is <u>36</u> years old.



Total \rightarrow 7 + 14 + 6 + 18 + 24 = 69 Shuan Li has <u>69</u> beads in the box.

Put on Your Thinking Caps! Square Number Puzzle



Unit 5

Practice 5.1



 $$6 \times 3 = 18 \$18 + \$15 = \$33

Wei Fang had \$33 at first.



 $7 \times 4 = 28$ 50 - 28 = 22Jason had <u>\$22</u> left.



\$100 - \$48 - \$36 = \$16 $16 \div 2 = 88$

Each of them had <u>\$8</u> left.



100 - 60 = 40

Magazines --- \$40 ÷ 2 = \$20 Wallet \rightarrow \$20 + \$60 = \$80

Jack paid <u>\$80</u> for the wallet.





Cheap Watch → \$45 ÷ 5 = \$9 Expensive Watch \rightarrow \$9 × 4 = \$36

(a) Eli paid \$36 for the expensive watch.



\$36 + \$28 = \$64

(b) Ian paid <u>\$64</u> for his watch.

Practice 5.2

Number of \$3- rides	Number of \$2- rides	Total amount	Check	
\$3 × 4	\$2 × 6	\$12 + \$12	×	
= \$12	= \$12	= \$24		
\$3 × 5	\$2 × 5	\$15 + \$10	×	
= \$15	= \$10	= \$25		
\$3 × 6	\$2 × 4	\$18 + \$8	1	
= \$18	= \$8	= \$26		

Shuan Lih took 6 \$3-rides.

2. \$30 - \$7 = \$23

Number of angel fish (\$3 each)	Number of angel fish (\$3 each)		Check	
4 × \$3	5 × \$2	\$12 + \$10	×	
= \$12	= \$10	= \$22		
5 × \$3	4 × \$2	\$15 + \$8	1	
= \$15	= \$8	= \$23		

Bala buys 5 angel fish.

3.

Correct	Incorrect	Total Points	Check
10	0	10 × 5 = 50	×
9	I	$9 \times 5 = 45$ 45 - 3 = 42	X
8	2	$8 \times 5 = 40$ 2 × 3 = 6 40 - 6 = 34	~

8 questions were answered correctly.

 Put the chocolate cupcakes in groups of 5 and see how many left overs there are from 39.

Chocolate Cupcakes	Corn Cupcakes	Check
5	39 – 5 = 34	34÷4 X
10	39 - 10 = 29	29÷4 X
15	39 – 15 = 24	24 ÷ 4 = 6

Mabel baked <u>15</u> chocolate cupcakes and <u>24</u> corn cupcakes.

(Accept another possible solution: 35 chocolate cupcakes and 4 corn cupcakes) 5.

Sum of the 9 digits \rightarrow 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 = 45

Sum of the digits in two diagonal lines \rightarrow 26 + 26 = 52

Difference \rightarrow 52 - 45 = 7

Two lines share the digit 7. Place 7 in the centre.

Place 4 digits which have the sum of 26 at the 4 corners: 9 + 8 + 3 + 6 = 26

The digits left behind are 1, 2, 4 and 5.

9 + 7 + 3 = 19 26 - 19 = 7 2 + 5 = 7

Place 2 and 5 on the same line as 9, 7 and 3.

Similarly, place I and 4 on the same line as 8, 7 and 6.

Hence, the solution is:



Put on Your Thinking Caps!

Story-Telling — What is The Change?

I am buying $\underline{2}$ toys for $\underline{3}$ dollars and $\underline{6}$ dollars each.

I give the cashier a <u>10</u> dollar note. Since she needs to give me <u>1</u> dollar (s) change, she can give me <u>5</u> coins worth <u>20</u> cents each.

Unit 6

Practice 6.1





3.



Each of her brothers receives $\frac{3}{12}$ of the pizza.

Fraction of Mellissa's share

$$\rightarrow \frac{12}{12} - \frac{2}{12} - \frac{3}{12} - \frac{3}{12} = \frac{4}{12}$$

Mellissa receives
$$\frac{4}{12}$$
 of the pizza.

<u>Mellissa</u> receives the biggest part of the pizza.

- 4. (a) $\frac{5}{12}$ of the face of the clock is shaded.
 - (b) $\frac{7}{12}$ of the face of the clock is unshaded.
 - (c) The <u>shaded</u> region is $\frac{2}{12}$ less







- (a) There are <u>12</u> marbles in the container.
- (b) $\frac{1}{4}$ of the marbles is green.
- (c) $\frac{3}{4}$ of the marbles are red and blue.
- (d) $\frac{1}{3}$ of the marbles in the container

Practice 6.2

١.

Number of stop(s)	I	2	3	4	5	6	7	8	9
Total number of children	I	3	6	10	15	21	28	36	45

The bus will be full after 9 stops.

 When 3 customers entered the shop, I customer would leave.

Hence, there were 2 more customers when a group of 3 customers entered the shop.

Groups of 3	0	1	2	3	4	5	6
Number of customers	1	3	5	7	9	11	13

<u>6</u> groups of three customers had entered the flower shop by then.

 Jas
 J

Brain jogs <u>920 m</u> on the 7th day.

now is red.

4.

Strategy: Get maximum number of throws in bucket '5'.

(a)

Number Total Bucket Bucket Bucket of (5) ·4' (3) Score Throws 3 + 1 15 +5 × 3 4 × 1 3 × 1 4 + 3 + 1 = 15 = 4 = 3 = 22 = 5

The least number of throws is 5.

(b)

Bucket '5'	Bucket '4'	Bucket '3'	Total Score	Number of Throws
5 × 5 = 25	0	3 × 2 = 6	25 + 6 = 31	5 + 2 = 7

The least number of throws is 7.

(c)

Bucket '5'	Bucket '4'	Bucket '3'	Total Score	Number of Throws
5 × 7 = 35	4 × 2 = 8	0	35 + 8 = 43	7 + 2 = 9

The least number of throws is 9.

Put on Your Thinking Caps!

In The Zoo

(a) $4 \times 5 = 20$ 36 - 20 = 16 $16 \div 2 = 8$

There were 8 ostriches.

(b) $12 \times 2 = 24$ 36 - 24 = 12 $12 \div 4 = 3$

There were <u>3</u> crocodiles.

(c) I crocodile and I ostrich have:4 + 2 = 6 feet

 $36 \div 6 = 6$ animals each

 $6 \times 2 = 12$

There were <u>12</u> animals.

Unit 7

Practice 7.1



The length of Bar B is <u>8 cm</u>.



It will take 7 days to be 40 cm tall.



823 - 680 = 143

Nicholas would have jogged 143 m less.

4.
$$?$$

6 3 3 3 3
 $3 \times 4 = 12$
 $12 + 6 = 18$

Irene had 18 kg of flour at first.



$$21 - 5 = 16$$

 $16 \div 2 = 8$
 $8 + 5 = 13$

The mass of the heavier basket is <u>13 kg</u>.



The mass of a toy key is 9 g.



 $20 \div 2 = 10$

Her family will finish drinking the milk in <u>10</u> days.



23 - 9 = |4| $|4 \div 2 = 7$

 7ℓ of water must be poured from Jug A to Jug B.

Practice 7.2

■. Number of intervals \rightarrow 50 ÷ 5 = 10 Number of lamp-posts \rightarrow 10 + 1 = 11

There are <u>11</u> lamp-posts along the road.

2. Number of intervals $\rightarrow 10 - 1 = 9$ Number of pots of plants $\rightarrow 9 \times 3$ = 27

There are <u>27</u> pots of plants in the row.

Number of flags on one side of the road → 20 ÷ 2 = 10
 Number of intervals → 10 - 1 = 9

Length of the road \rightarrow 9 × 4 = 36

The road is <u>36 m</u> long.

4. $36 \div 4 = 9$

Two drink stations are <u>9 km</u> apart.

There are 5 intervals between the 3^{rd} level and the 8^{th} level.

$$5 \times 8 = 40$$

Renee needs to climb 40 steps.

6. Number of intervals \rightarrow 80 \div 10 = 8



William will be at the <u>10th</u> level.

Put on Your Thinking Caps!

The Balance Scale

Left side of the balance	Right s of the ba	ide Ilance
Mass	Mass	Durians
8 kg + 8 kg	5 kg + 5 kg + 5 kg	l kg
5 kg + 5 kg	8 kg	2 kg
8 kg	5 kg	3 kg
8 kg + 8 kg + 8 kg	5 kg + 5 kg + 5 kg +5 kg	4 kg
5 kg		5 kg
8 kg + 8 kg	5 kg + 5 kg	6 kg

Unit 8

Practice 8.1

- 1. (a) $6 \times 3 = 18$
 - (b) 12 ÷ 3 = <u>4</u> ○
 - (c) $5 \times 3 = 15$
 - (d) 9 + 12 + 18 + 12 + 24 = <u>75</u>
- **2.** (a) <u>Eileen;</u> 2 × 5 = <u>10</u> badges
 - (b) Lewis; $6 \times 5 = 30$ badges
 - (c) 40 20 = <u>20</u> more badges

OR

 $4 \times 5 = 20$ more badges

(d) The difference of ☺ between Eileen and Shuan Li is 6 ☺.

Shuan Li should give 3 😳 to Eileen.

 $3 \times 5 = 15$ badges

- **3.** (a) $2 \times 7 = 14$ guitars
 - (b) <u>Violin</u>; $2 \times 10 = 20$ violins
 - (c) $6 \times 2 = 12$ 20 - 12 = <u>8</u> flutes were left.
 - (d) $6 \times 3 = 18$ recorders
- **4.** (a) $4 \times 4 = 16$ children
 - (b) $2 \times 4 = \underline{8}$ children
 - (c) $3 \times 4 = \underline{12}$ children
 - (d) Electronic games; 9 × 4 = <u>36</u> children
- **5.** (a) 5 × 10 = 50 ham bread
 - (b) 6 × 10 = 60 more
 - (c) Corn bread → 2 × 10 = 20 20 + 40 = 60 raisin bread
 - (d) 65 40 = 25 blueberry bread

Practice 8.2

 The number of toy bears is 2 less than the number of blocks.

Number of blocks	5	6	7	8	 20
Number of bears	3	4	5	6	 18

<u>18</u> toy bears will fit on the shelf with 20 interlocking blocks.

2. (a) There are <u>17</u> seats.

Number of tables	1	2	3	4	5	6
Number of seats	5	8	11	14	17	20

- (b) Pauline needs 6 tables
- (c) (The rule is → 3 × ___ + 2) 3 × 10 = 30 30 + 2 = 32

There are <u>32</u> seats.

Figure	Number of Squares	Pattern
1	I	× =
2	4	2 × 2 = 4 or 2 + 2 = 4
3	9	3 × 3 = 9 or 3 + 3 + 3 = 9
4	16	$4 \times 4 = 16$ or 4 + 4 + 4 + 4 = 16
5	25	$5 \times 5 = 25$ or 5 + 5 + 5 + 5 + 5 = 25
6	36	6 × 6 = 36 or 6 + 6 + 6 + 6 + 6 + 6 = 36
7	49	7 × 7 = 49 or 7 + 7 + 7 + 7 + 7 + 7 + 7 = 49
8	64	8 × 8 = 64 or 8 + 8 + 8 + 8 + 8 + 8 + 8 + 8 = 64

64 squares are needed to form Figure 8.

4. (a)

Figure	Number of Shaded Squares	Pattern
I	4	4 × I = 4
2	8	4 × 2 = 8
3	12	4 × 3 = 12
4	16	4 × 4 = 16
5	20	4 × 5 = 20
6	24	4 × 6 = 24

24 shaded squares are in Figure 6.

- (b) $4 \times 8 = 32$ <u>32</u> shaded squares are in Figure 8.
- (c) $40 \div 4 = 10$ It is Figure <u>10</u>.

Put on Your Thinking Caps! Match-e-matics



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