

math

# MAMMOTH

## Grade 2-A Worktext South African Version

**S**ome review, even and odd numbers, and doubling

**R**ead the clock

**A**ddition and subtraction facts within 0-18

**A**dding two-digit numbers

**G**eometry and fractions



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## Foreword

**Math Mammoth Grade 2-A and Grade 2-B** worktexts comprise a complete maths curriculum for the second grade mathematics studies. This South African version has been **customised to South Africa** in the following manners:

- The names used are South African names (instead of Jack and Jill, there are Ansie and Mampho).
- The currency used in word problems is rand. The money chapter teaches both rand and cents.
- The material is “all metric”. In other words, the US customary measuring units are not used.
- Spelling is British English instead of American English.
- Paper size is A4.
- Geographic locations used emphasise South African locations (such as Pretoria, Johannesburg).

Please note that the curriculum is not following the South African official syllabus for 2nd grade maths. Instead, it simply is a copy of the US version of Math Mammoth Grade 2, aligned to the US Common Core Standards. This decision was made because of the great amount of work that would be involved in writing new lessons and reorganising old ones to match all the standards in the South African syllabus.

For the most part, Math Mammoth is exceeding South African standards. Some standards are not covered (e.g. “Sorts physical objects according to one attribute chosen by the teacher,” “Positions self within the classroom or three-dimensional objects in relation to each other,” “Recognises and describes different calendars used in different cultures,” “Describes and illustrates various ways of writing numbers in different cultures (including local) throughout history,” “Describes and illustrates ways of representing time in different cultures throughout history” and some others.

The four main areas of study for second grade are:

1. Understanding of the base-ten system within 1 000. This includes place value with three-digit numbers, skip-counting in fives, tens, and multiples of hundreds, tens, and ones (within 1 000). (chapters 6 and 8);
2. Develop fluency with addition and subtraction within 100, including solving word problems, regrouping in addition, and regrouping in subtraction (chapters 1, 3, 4, and 8);
3. Using metric units of measure (chapter 7);
4. Describing and analysing shapes (chapter 5).

Additional topics we study are time (chapter 2), money (chapter 9), introduction to multiplication (chapter 10), and bar graphs and picture graphs (in various chapters).

This book, 2-A, covers reading the clock (chapter 2), the basic addition and subtraction facts within 18 (chapter 3), regrouping in addition (chapter 4), and geometry (chapter 5). The rest of the topics are covered in the 2-B student worktext.

When you use these two books as your only or main mathematics curriculum, they are like a “framework,” but you still have a lot of liberty in planning your child's studies. While addition and subtraction topics are best studied in the order they are presented, feel free to go through the geometry, clock, and money sections in a different order. This might even be advisable if your child is “stuck” on some concept, or is getting bored. Sometimes the brain “mulls it over” in the background, and the concept he/she was stuck on can become clear after a break.

For the chapter on measuring, the child should be familiar with three-digit numbers.

Math Mammoth aims to concentrate on a few major topics at a time, and study them in depth. This is totally opposite to the continually spiralling step-by-step curricula, in which each lesson typically is about a different topic from the previous or next lesson, and includes a lot of revision problems from past topics.

This does not mean that your child would not need occasional revision. However, when each major topic is presented in its own chapter, this gives you more freedom to plan the course of study *and* choose the revision times yourself. In fact, I totally encourage you to plan your mathematics school year as a set of certain topics, instead of a certain book or certain pages from a book.

For revision, the download version includes an html page called *Make\_extra\_worksheets\_grade2.htm* that you can use to make additional worksheets for computation or for number charts. You can also simply reprint some previously studied pages. Also, chapter 3, which practises addition and subtraction facts within 18, contains a lot of pages with problems, so you can choose to “save” some of them for later revision.

*I wish you success in your maths teaching!*

*Maria Miller, the author*

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# Chapter 1: Some Old, Some New

## Introduction

The first chapter of the *Math Mammoth Grade 2* contains some revision and some new topics.

In the first two lessons, there is revision of adding and subtracting two-digit numbers from first grade. Then students get revision of skip-counting using the 100-chart.

Next, we revise Fact Families and the connection between addition and subtraction, and it introduces a new strategy for missing subtrahend problems (of the type  $\_\_ - 5 = 4$ ). In these problems, the student can *add* to find the missing total. This is an early prelude to algebraic thinking.

Then we go on to the “new”, starting with ordinal numbers, which are probably familiar from common language. Then, in the lesson Subtracting Whole Tens, students subtract *mentally* any number of whole tens from a two-digit number, such as  $72 - 40$ .

Even and odd numbers are presented in the context of equal sharing: if you can share that many objects evenly (equally), then the number is even. Students may need to use manipulatives (objects you can handle) to grasp this idea.

Then we study doubling and halving. Do not skip the simple word problems included in these lessons—they are very important. Children need to learn to apply the concepts they have just learned. Also, if the student cannot solve simple word problems that involve doubling or halving, there is a good chance he/she did not actually learn those concepts.

### The Lessons in Chapter 1

	page	span
Some Revision .....	10	2 pages
The 100-Chart and More Revision .....	12	3 pages
Fact Families.....	15	2 pages
Ordinal Numbers .....	17	2 pages
Even and Odd Numbers .....	19	2 pages
Doubling .....	21	3 pages
One-Half .....	24	2 pages
Adding With Whole Tens .....	26	3 pages
Subtracting Whole Tens .....	29	2 pages
Revision, Chapter 1 .....	31	2 pages

## Helpful Resources on the Internet

Use these free online resources to supplement the “bookwork” as you see fit.

**Disclaimer:** These links were valid at the time of writing this book, and to the best of our knowledge we believe these websites to have what is described. However, we cannot guarantee that the links have not changed. Parental supervision is recommended.

### Number Cracker

Help Mr. Cracker obtain the secret code before the insidious Prof. Soup catches him by guessing what number comes next in a series of numbers.

<http://www.funbrain.com/cracker/index.html>

### Squigly

Squigly is hiding in one of the apples. Click on the ordinal number that tells the order of Squigly's apple.

<http://www.primarygames.com/squigly/start.htm>

### Number Jump

Move the ball along the number line to smash the flies.

<http://www.carstensstudios.com/mathdoodles/numberjump.htm>

### Connect Sums

Click on the neighbouring die-faces/numbers/coins so that the points add up to the given target sum.

<http://www.carstensstudios.com/mathdoodles/connectsums.html>

### Sum Stacker

Drag dies from stack to stack until the sums of each stack equal the sums given.

<http://www.carstensstudios.com/mathdoodles/sumstacker.html>

### Froggy Hop

Find 10 more or 1 more of a given number.

<http://www.ictgames.com/frog.html>

### Fruit Shoot

Shoot a fruit with an even or odd number, whichever one your aim tells you. Three levels: 1-10, 1-20, and 1-100.

[www.sheppardsoftware.com/mathgames/earlymath/Fruit\\_shoot\\_odd\\_even.htm](http://www.sheppardsoftware.com/mathgames/earlymath/Fruit_shoot_odd_even.htm)

### Odd or Even?

Drag and drop the number cards to their correct place in the diagram (even or odd). Three difficulty levels (numbers 1-10, 1-30, or 1-100).

[www.crickweb.co.uk/ks2numeracy-properties-and-ordering.html#](http://www.crickweb.co.uk/ks2numeracy-properties-and-ordering.html#)

### Story of Odd and Even

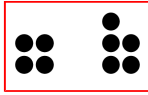
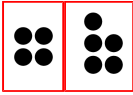
A simple story about two ladybugs named Odd and Even. It teaches even and odd within 1-10.

[www.primarygames.com/storybooks/even\\_odd/1.htm](http://www.primarygames.com/storybooks/even_odd/1.htm)








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# Fact Families

<p>When two addition and two subtraction facts use the same numbers, it is called a “<i>fact family</i>.”</p>	 $4 + 5 = 9$ $5 + 4 = 9$ $9 - 5 = 4$ $9 - 4 = 5$ <p>Notice the <b>TOTAL</b>. The subtraction sentences <u>start</u> with the total.</p>	 $4 + 5 = 9$ $5 + 4 = 9$ $9 - 5 = 4$ $9 - 4 = 5$ <p>Notice the <b>PARTS</b>. The two parts make up the total.</p>
<p>Remember that a subtraction starts with the <u>total</u>. This is how it looks if the <u>total</u> is missing in a subtraction:</p> $\square - 8 = 20$ <p>To find the total, just add the “parts” 20 and 8. We get <math>20 + 8 = 28</math>. So the subtraction was <math>28 - 8 = 20</math>.</p>		

1. Write two addition and two subtraction sentences—a fact family!

<p>a.  </p> $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $\underline{\quad} - \underline{\quad} = \underline{\quad}$ $\underline{\quad} - \underline{\quad} = \underline{\quad}$	<p>b. <span style="border: 1px solid black; padding: 2px;">T</span>  </p> $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $\underline{\quad} - \underline{\quad} = \underline{\quad}$ $\underline{\quad} - \underline{\quad} = \underline{\quad}$	<p>c. <span style="border: 1px solid black; padding: 2px;">T</span> <span style="border: 1px solid black; padding: 2px;">T</span>  <span style="border: 1px solid black; padding: 2px;">T</span> <span style="border: 1px solid black; padding: 2px;">T</span></p> $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $\underline{\quad} - \underline{\quad} = \underline{\quad}$ $\underline{\quad} - \underline{\quad} = \underline{\quad}$
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2. Fill in the missing numbers. The four problems form a fact family.

<p>a. <math>2 + \square = 8</math></p> $\square + 2 = 8$ $8 - 2 = \square$ $8 - \square = 2$	<p>b. <math>\underline{\quad} + \underline{\quad} = 10</math></p> $\underline{\quad} + \underline{\quad} = 10$ $10 - 7 = \square$ $10 - \square = 7$	<p>c. <math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math></p> $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $9 - \square = 6$ $\underline{\quad} - \underline{\quad} = \underline{\quad}$
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3. Write a matching addition for the subtraction. There are two possibilities.

a. $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $8 - 2 = 6$	b. $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $20 - 7 = 13$	c. $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $60 - 20 = 40$
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When the first number is missing in a subtraction, it is the TOTAL that is missing. You can find the TOTAL by adding the two numbers (those are the “parts”).	$\square - 6 = 2$ The total is missing. 6 and 2 are the “parts”. So we add them. $2 + 6 = 8$ . The missing number is 8!
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It's like “adding backwards”:

$\begin{array}{r} \text{Add.} \\ \leftarrow \\ \square - 6 = 2 \\ \quad + \\ \hline 8 \end{array}$	$\begin{array}{r} \text{Add.} \\ \leftarrow \\ \square - 3 = 20 \\ \quad + \\ \hline 23 \end{array}$
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4. The total is missing from the subtraction sentence. Solve.

a. $\square - 5 = 4$	b. $\square - 7 = 2$	c. $\square - 7 = 10$
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5. Find the missing numbers.

a. $\square - 2 = 4$ $\square - 50 = 50$ $\square - 8 = 20$	b. $\square - 7 = 80$ $60 + 4 = \square$ $16 + \square = 20$	c. $9 - \square = 5$ $77 + \square = 78$ $\square - 9 = 60$
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<b>Puzzle Corner</b>	Find the missing numbers. This time adding backwards will NOT work!	
a. $50 - \square = 10$	b. $100 - \square = 91$	c. $10 - \square - 2 = 1$
$33 - \square = 31$	$76 - \square = 72$	$9 - \square - 5 = 2$

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## Chapter 2: Clock

### Introduction

The second chapter of *Math Mammoth Grade 2* deals with reading the clock to the five-minute intervals, and finding simple time intervals.

It is helpful to have a practice clock, such as an alarm clock, where the student can turn the clock hands.

First, we practise telling time in the *hours:minutes* form (such as 10:20), and then using the colloquial phrases “to” and “past.”

Also studied are simple time intervals, or how many whole hours pass. When practising these, tell the student to imagine moving the hour hand on a clock. He/she can initially use a practice clock for this.

The section also has one lesson about the calendar. Of course, the calendar and the months are best learned just in the context of everyday life, as the months pass. Hang a wall calendar on the wall and instruct your child to look at it every day, and to cross out days as they pass.

### The Lessons in Chapter 2

	page	span
Revision—Whole and Half Hours .....	36	1 page
The Minutes .....	37	3 pages
The Minutes, Part 2 .....	40	2 pages
Past and To in Five-Minute Intervals .....	42	3 pages
How Many Hours Pass? .....	45	2 pages
The Calendar: Weekdays and Months .....	47	3 pages
The Calendar: Dates .....	50	3 pages
Revision, Chapter 2 .....	53	1 page

### Helpful Resources on the Internet

Use these free online resources to supplement the “bookwork” as you see fit.

**Disclaimer:** *These links were valid at the time of writing this book, and to the best of our knowledge we believe these websites to have what is described. However, we cannot guarantee that the links have not changed. Parental supervision is recommended.*

### Analogue and Digital Clocks

These clocks show you the current time, side by side. Useful for illustration.

[http://nlvm.usu.edu/en/nav/frames\\_asid\\_316\\_g\\_2\\_t\\_4.html](http://nlvm.usu.edu/en/nav/frames_asid_316_g_2_t_4.html)

### What Time Will it Be?

Move the hands on the clock to show what time it will be after a certain amount of minutes.

[http://nlvm.usu.edu/en/nav/frames\\_asid\\_318\\_g\\_2\\_t\\_4.html](http://nlvm.usu.edu/en/nav/frames_asid_318_g_2_t_4.html)

Sample worksheet from  
[www.mathmammoth.com](http://www.mathmammoth.com)

### **Match Clocks**

Make the digital clock to show the time given with the analogue clock.

[http://nlvm.usu.edu/en/nav/frames\\_asid\\_317\\_g\\_2\\_t\\_4.html](http://nlvm.usu.edu/en/nav/frames_asid_317_g_2_t_4.html)

### **Flashcard Clock**

Read the analogue and type in the time in digital form. Good graphics and fast response!

[http://www.teachingtreasures.com.au/maths/FlashcardClock/flashcard\\_clock.htm](http://www.teachingtreasures.com.au/maths/FlashcardClock/flashcard_clock.htm)

### **Telling Time Practice**

Interactive online practice: you drag the hands of the clock to show the correct time.

<http://www.worsleyschool.net/socialarts/telling/time.html>

### **Teaching Time**

Analogue/digital clock games and worksheets. Also an interactive “class clock” to demonstrate time.

<http://www.teachingtime.co.uk/>

### **Time-for-time**

Resource site to learn about time: worksheets, games, quizzes, time zones.

<http://www.time-for-time.com/default.htm>

### **A Matter of Time**

Lesson plans for telling time, interactive activities, and some materials to print.

<http://www.fi.edu/time/Journey/JustInTime/contents.html>

### **Elapsed Time Line**

This interactive tool shows two clocks where you can drag the fingers to set a “from” and “to” time, and a number line. You can demonstrate how to use a number line to calculate elapsed time.

<http://www.teacherled.com/2008/10/05/elapsed-time-line/>

### **Clockwise**

Plug in a time, and the clock runs to it, or the clock runs to a time and you type it in.

<http://www.shodor.org/interactivate/activities/clock2/index.html>

### **The Right Time**

A couple of interactive exercises about reading the clock.

<http://www.pitara.com/activities/math/time/time.asp?QNum=3>

### **What Time Is It?**

Look at the analogue clock and pick the digital clock that shows the same time.

<http://www.primarygames.com/time/start.htm>

### **That Quiz: Time**

Online quizzes for all time-related topics: reading the clock, time passed, adding/subtracting with time, conversion of time units, and time zones practice. The quizzes have many levels, can be timed or not, and include lots of options for customisation. Easy to use and set up.

<http://www.thatquiz.org/tq-g/math/time>

**Sample worksheet from**

[www.mathmammoth.com](http://www.mathmammoth.com)

### **Elapsed Time Worksheets**

Generate printable worksheets for elapsed time. You can practise the elapsed time, finding the starting time, or finding the ending time. The time interval can be to the accuracy of 1 minute, 5 minutes, 10 minutes, 15 minutes, 30 minutes, or whole hours.

<http://www.mathnook.com/elapsedtimegen.html>

### **On Time**

Set the clock's hands to the given time. Four different levels.

[http://www.sheppardsoftware.com/mathgames/earlymath/on\\_time\\_game1.htm](http://www.sheppardsoftware.com/mathgames/earlymath/on_time_game1.htm)

### **Clock Shoot**

A game where you need to click on the clock with the matching time (analogue/digital).

Three different levels: whole hours, half hours, or quarter hours.

[http://www.sheppardsoftware.com/mathgames/earlymath/clock\\_shoot.htm](http://www.sheppardsoftware.com/mathgames/earlymath/clock_shoot.htm)

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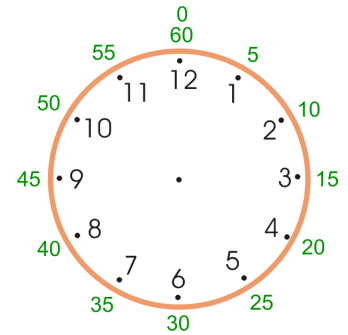


# The Minutes

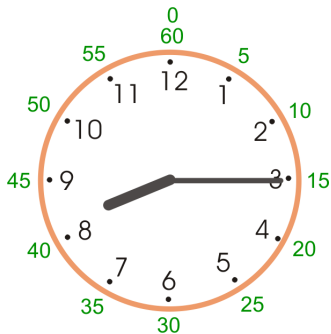
When the hour hand moves from one number to the next (from 1 to 2, or from 6 to 7, etc.), it takes one hour to do so.

In that same one hour of time, the *minute hand* travels **from 0 to 60 minutes**. So one hour is 60 minutes. A half-hour is 30 minutes.

When you read the minute hand, you use the green numbers (marked outside the clock face of the clock on the right). They go in fives, and are not normally marked on clocks. You need to know them. Just skip-count in fives!



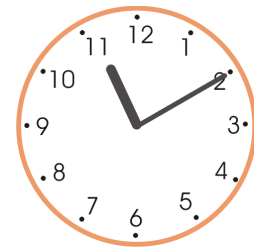
1 hour = 60 minutes.  
1/2 hour = 30 minutes.



The hour hand is past 8.  
The minute hand is at 15.  
The time is 8:15.

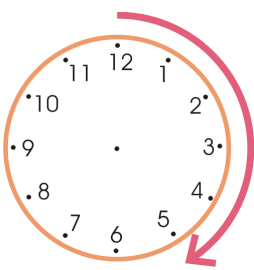
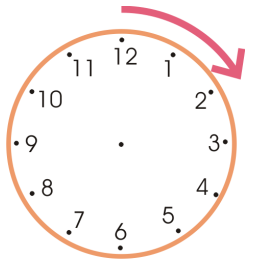
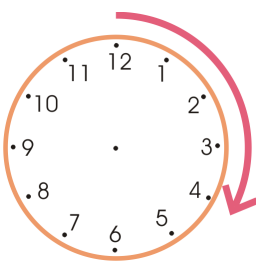
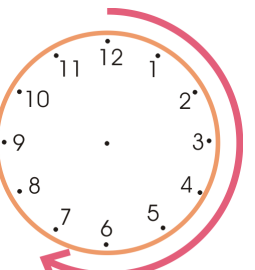


The hour hand is past 2.  
The minute hand is at 25.  
The time is 2:25.

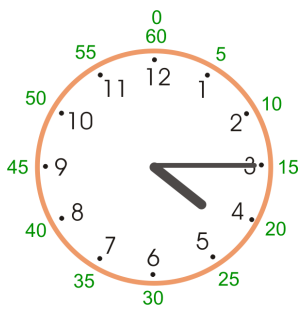
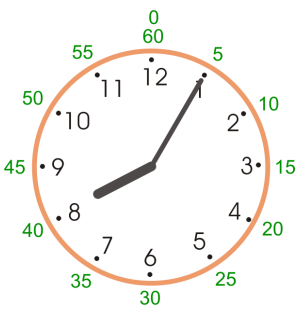

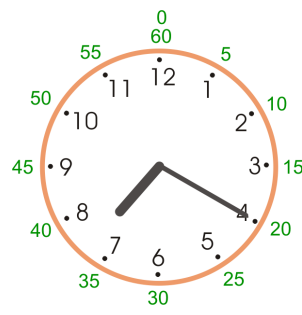



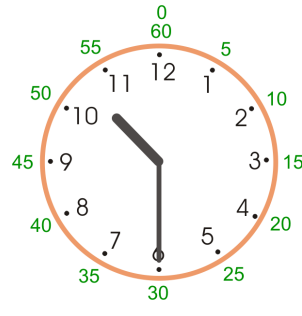


The hour hand is past 11.  
The minute hand is at 10.  
The time is 11:10.

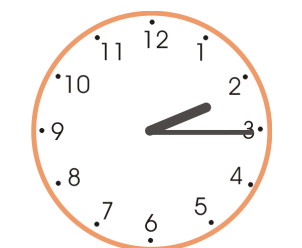
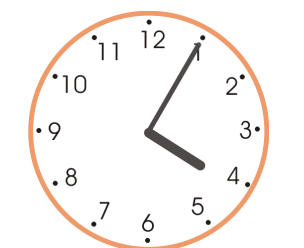
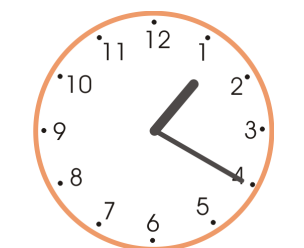
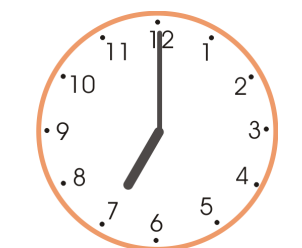

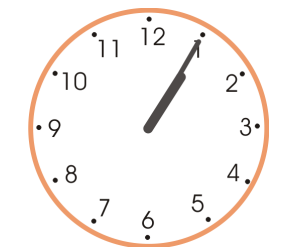

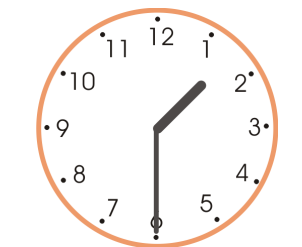
1. The arrow shows how much the minute hand travels. How many minutes pass?

 <p>a. _____ minutes</p>	 <p>b. _____ minutes</p>	 <p>c. _____ minutes</p>	 <p>d. _____ minutes</p>
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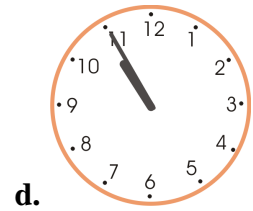
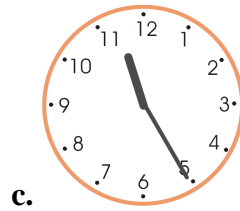
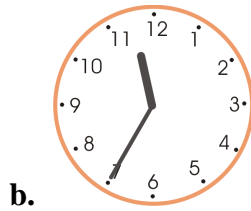
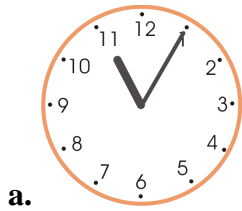
2. Write the time using the special clock that shows the numbers for hours and for minutes.

 <p><b>a.</b> _____ : _____</p>	 <p><b>b.</b> _____ : _____</p>	 <p><b>c.</b> _____ : _____</p>	 <p><b>d.</b> _____ : _____</p>
 <p><b>e.</b> _____ : _____</p>	 <p><b>f.</b> _____ : _____</p>	 <p><b>g.</b> _____ : _____</p>	 <p><b>h.</b> _____ : _____</p>





3. Write the time using the normal clock. Remember, the numbers for the minute hand are not shown, and they go in fives!

 <p><b>a.</b> _____ : _____</p>	 <p><b>b.</b> _____ : _____</p>	 <p><b>c.</b> _____ : _____</p>	 <p><b>d.</b> _____ : _____</p>
 <p><b>e.</b> _____ : _____</p>	 <p><b>f.</b> _____ : _____</p>	 <p><b>g.</b> _____ : _____</p>	 <p><b>h.</b> _____ : _____</p>


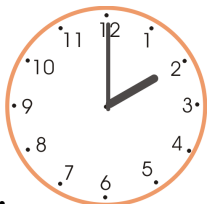
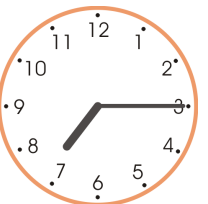


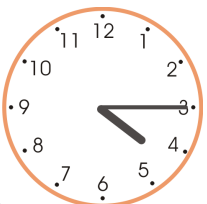
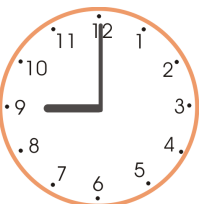

4. Find the clock that shows 11:25 and the clock that shows 11:05.



5. Write the time.

			
<b>a.</b> _____ : _____	<b>b.</b> _____ : _____	<b>c.</b> _____ : _____	<b>d.</b> _____ : _____

6. Write the time that the clock shows, and the time 5 minutes later. Imagine the minute hand moving one “step” further. You can use your practice clock.

				
	<b>a.</b> _____ : _____	<b>b.</b> _____ : _____	<b>c.</b> _____ : _____	<b>d.</b> _____ : _____
5 min. later →	_____ : _____	_____ : _____	_____ : _____	_____ : _____
				
	<b>e.</b> _____ : _____	<b>f.</b> _____ : _____	<b>g.</b> _____ : _____	<b>h.</b> _____ : _____
5 min. later →	_____ : _____	_____ : _____	_____ : _____	_____ : _____

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# Chapter 3: Addition and Subtraction Facts

## Within 0-18

### Introduction

The third chapter of *Math Mammoth Grade 2* provides lots of practice for learning and memorising the basic addition facts of single-digit numbers where the answer is between 10 and 18.

This chapter includes lots of repetition, drill, and practice. Therefore, you are welcome to mix the lessons from this chapter with some geometry, place value, clock, or measuring, in order to prevent boredom. The goal is to memorise these facts, or at least become so fluent with them that an outsider cannot tell if the student remembers the answer or uses some mental maths strategy to get the answer.

Some students will accomplish this quicker, needing less practice. Some will need more practice. You can also add in some internet-based games (a list of online games is provided on the next page).

Learning addition and subtraction facts is very important for later study. For example, we will soon study regrouping (carrying/borrowing) in addition and in subtraction, which requires that the student be able to recall all the sums of single-digit numbers and corresponding subtraction facts efficiently and fluently.

We will start the chapter by revising how to complete the next whole ten. This concept is very important. For example, what number do you add to 23 to get 30? As an equation, we write:  
 $23 + \underline{\quad} = 30$ .

In the next lesson, we study sums that go over ten, doing these sums in two parts. For example, in the sum  $9 + 7$ , the student first completes 10 by adding  $9 + 1$ . Then, the student adds the rest, or 6, to 10. Learning this prepares the student for addition facts where the sum is more than 10.

The next lessons, *Adding with 9*, *Adding with 8*, *Adding with 7*, and *Adding with 6*, provide lots of practice for learning and memorising the basic addition facts. There are 20 such facts:

$9 + 2$  to  $9 + 9$ : 8 facts

$8 + 3$  to  $8 + 8$ : 6 facts

$7 + 4$  to  $7 + 7$ : 4 facts

$6 + 5$  to  $6 + 6$ : 2 facts

After those lessons, we study subtraction. First, the student subtracts to ten. This means subtracting from 14, 15, 16, etc. so that the answer is 10, for example  $16 - \underline{\quad} = 10$ . In the next step, we study subtractions with an answer less than 10, such as  $16 - 7$ . The student practises these by subtracting in two parts: First subtracting to ten, then the rest. For example,  $16 - 7$  becomes  $16 - 6 - 1$ , or  $14 - 6$  becomes  $14 - 4 - 2$ .

The last part of this chapter includes various lessons titled *Number Rainbows* and *Fact Families with ...*, which give lots of practice and reinforcement for the basic addition and subtraction facts. These lessons also include many word problems. They emphasise the connection between addition and subtraction to solve basic subtraction facts such as  $13 - 8$  or  $15 - 6$ . Alongside them, you can also use games or flashcards to reinforce the learning of the facts.

Please see also my videos at [http://www.youtube.com/watch?v=XSVlrkBf\\_Ns](http://www.youtube.com/watch?v=XSVlrkBf_Ns) and <http://www.youtube.com/watch?v=jdIzuGPRhRQ> (Or go to [www.youtube.com/mathmammoth](http://www.youtube.com/mathmammoth) and find the videos about addition and subtraction facts). These two videos explain several strategies for learning addition and subtraction facts, many of which are studied in this chapter.

### The Lessons in Chapter 3

	page	span
Revision: Completing the Next Whole Ten .....	58	2 pages
Revision: Going Over Ten .....	60	2 pages
Adding with 9 .....	62	2 pages
Adding with 8 .....	64	2 pages
Adding with 7 .....	66	2 pages
Adding with 6 .....	68	2 pages
Revision—Facts with 6, 7, and 8 .....	70	2 pages
Subtract to Ten .....	72	2 pages
Difference and How Many More .....	74	3 pages
Number Rainbows—11 and 12 .....	77	2 pages
Fact Families with 11 .....	79	1 page
Fact Families with 12 .....	80	2 pages
Number Rainbows—13 and 14 .....	82	1 page
Fact Families with 13 and 14 .....	83	3 pages
Fact Families with 15 .....	86	2 pages
Fact Families with 16 .....	88	2 pages
Fact Families with 17 and 18 .....	90	3 pages
Mixed Revision, Chapters 1-3 .....	92	2 pages
Revision, Chapter 3 .....	94	3 pages

## Helpful Resources on the Internet

Use these free online resources to supplement the “bookwork” as you see fit.

**Disclaimer:** These links were valid at the time of writing this book, and to the best of our knowledge we believe these websites to have what is described. However, we cannot guarantee that the links have not changed. Parental supervision is recommended.

### Video: Strategies for Subtraction Facts

I recommend the usage of FACT FAMILIES in order to learn the basic subtraction facts. That way, when students have a subtraction problem, such as  $7 - 5 = \underline{\quad}$ , they will learn to think through addition and fact families: 5 and 2 and 7 form a fact family, OR that  $5 + 2 = 7$ , so  $7 - 5 = 2$ .

[http://www.youtube.com/watch?v=XSVlrkBf\\_Ns](http://www.youtube.com/watch?v=XSVlrkBf_Ns)

### Video: Strategies for Addition Facts

I list several strategies to learn addition facts for first and second grade maths. I show the pattern of “Sums with 7”, which also is used with other sums, then the 9-trick, the 8-trick, the doubles, doubles plus one more, and how to do random drill using the structure of the addition table.

<http://www.youtube.com/watch?v=jdIzuGPRhRQ>

### Number Jump

Move the ball along the number line to smash the flies.

<http://www.carstensstudios.com/mathdoodles/numberjump.htm>

### Connect Sums

Click on the neighbouring dice-faces/numbers/coins so that the points add up to the given target sum.

<http://www.carstensstudios.com/mathdoodles/connectsums.html>

### Space Jumps

Adding two single-digit numbers, first jump to ten, then the rest to the spaceship. Practises addition that goes over ten.

<http://www.ictgames.com/spacejumps.html>

### Bridging Shuttle

Bridging Through Ten means the same as adding to ten first, then the rest. Get a “flight plan”, then first add to ten by typing the number needed in the oval, and press the red button. Then type the rest that the shuttle needs to go in the other oval, and press the red button.

<http://www.ictgames.com/bridging.html>

### Speedy Sums

Click on numbers that add to the target sum. The more numbers you use, the higher your score will be.

<http://www.schooltimegames.com/Mathematics/AddLikeMad.html>

### Math Magician Games

Flashcard problems in all 4 operations, including subtraction. Answer 20 questions in 1 minute.

<http://www.oswego.org/ocsd-web/games/Mathmagician/mathssub.html>

### Aplus Math Games

Matho (maths and bingo combined), concentration, hidden picture, and Planet Blaster games for the basic operations.

<http://www.aplusmath.com/games/>

**Sample worksheet from**  
[www.mathmammoth.com](http://www.mathmammoth.com)

### **Addition Surprise**

Draw the answer square in the addition table.

<http://www.hbschool.com/activity/add/add.html>

### **Fun 4 the Brain**

Practise your basic facts with these kid-appealing simple games.

<http://www.fun4thebrain.com/>

### **Power Lines Puzzle**

Arrange the numbers into the pattern so that the numbers on the “lines” add up to the given sum.

<http://www.primarygames.co.uk/pg2/powerlines/powerlines1.html>

### **Online Addition Flashcards**

<http://www.thegreatmartinicompany.com/additionfill.html>

### **Number Bond Machines**

Practise which two numbers add up to a given number. Set the number to be 11, 12, ... 18 to practise basic facts.

<http://www.amblesideprimary.com/ambleweb/mentalmaths/numberbond.html>

### **Number Cracker**

Help Mr. Cracker obtain the secret code before the insidious Prof. Soup catches him by guessing what number comes next in a series of numbers.

<http://www.funbrain.com/cracker/index.html>

### **Math Carts**

A downloadable racing game for young students to memorise addition and subtraction facts. Students choose various animal themed carts and unlock new carts and race tracks as they progress through the facts. There are three difficulty levels.

**Price: Free**

<http://sandbox.yoyogames.com/games/163070-math-carts>

### **Tux Math**

A versatile arcade game for maths facts with many options. Includes all operations. You need to shoot falling comets that can damage penguins' igloos.

See also my review: <http://homeschoolmath.blogspot.com/2011/05/tux-math.html>

**Price: Free**

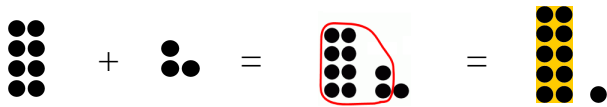
<http://sourceforge.net/projects/tuxmath>



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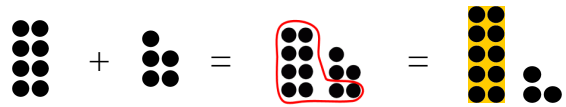
## Adding with 8

Imagine that 8 wants to be a 10! It takes two from the other number (from 3).  
So, 8 becomes 10, and only 1 is left over.



$$8 + 3 = 10 + 1 = 11$$

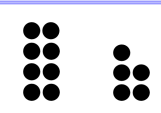
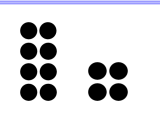
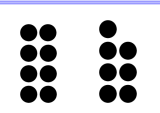
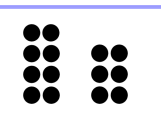
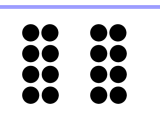
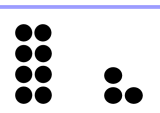
8 wants to be a 10! So, it takes two from the other number (from 5).  
So, 8 becomes 10, and 3 are left over.



$$8 + 5 = 10 + 3 = 13$$

Use the list on the right to practise. Do not write the answers there.  
Just point to the different problems and say the answer aloud.

1. Add. First, circle the ten.

 <b>a. <math>8 + 5</math></b> $10 + 3 = \underline{\quad}$	 <b>b. <math>8 + 4</math></b> $10 + \underline{\quad} = \underline{\quad}$	 <b>c. <math>8 + \underline{\quad}</math></b> $10 + \underline{\quad} = \underline{\quad}$
 <b>d. <math>8 + \underline{\quad} =</math></b> $10 + \underline{\quad} = \underline{\quad}$	 <b>e. <math>8 + \underline{\quad} =</math></b> $10 + \underline{\quad} = \underline{\quad}$	 <b>f. <math>8 + \underline{\quad} =</math></b> $10 + \underline{\quad} = \underline{\quad}$

$8 + 1 = \square$

$8 + 2 = \square$

$8 + 3 = \square$

$8 + 4 = \square$

$8 + 5 = \square$

$8 + 6 = \square$

$8 + 7 = \square$

$8 + 8 = \square$

$8 + 9 = \square$

2. It is good to memorise the doubles, also. Fill in.

<b>a. <math>2 + 2 = \underline{\quad}</math></b>  $3 + 3 = \underline{\quad}$  $4 + 4 = \underline{\quad}$	<b>b. <math>5 + 5 = \underline{\quad}</math></b>  $6 + 6 = \underline{\quad}$  $7 + 7 = \underline{\quad}$	<b>c. <math>8 + 8 = \underline{\quad}</math></b>  $9 + 9 = \underline{\quad}$  $10 + 10 = \underline{\quad}$
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Addition facts with eight. Do not write the answers down, but just practise the sums.

$8 + 0 = \square$	$8 + 5 = \square$	$8 + 8 = \square$	$8 + 9 = \square$
$8 + 3 = \square$	$8 + 7 = \square$	$8 + 1 = \square$	$8 + 4 = \square$
$8 + 10 = \square$	$8 + 1 = \square$	$8 + 6 = \square$	$8 + 2 = \square$

3. Add and fill in what is missing.

a. $8 + 4 = \underline{\quad}$ $8 + 6 = \underline{\quad}$	b. $7 + 8 = \underline{\quad}$ $8 + 5 = \underline{\quad}$	c. $3 + 8 = \underline{\quad}$ $8 + 9 = \underline{\quad}$
d. $8 + \underline{\quad} = 13$ $8 + \underline{\quad} = 15$	e. $8 + \underline{\quad} = 12$ $8 + \underline{\quad} = 16$	f. $\underline{\quad} + 8 = 11$ $\underline{\quad} + 8 = 14$

4. a. Jane ate 8 strawberries, and John ate 5 more than what Jane did.  
How many strawberries did John eat?

b. Ansie is 13 years old, and Mampho is 5.  
How many years older is Ansie than Mampho?

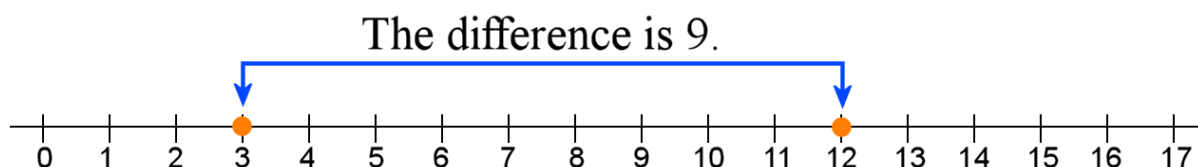
5. Find the patterns and continue them.

<p style="text-align: center;"><b>a.</b></p> $8 + 2 = \underline{\quad}$ $8 + 4 = \underline{\quad}$ $8 + 6 = \underline{\quad}$ $8 + \underline{\quad} = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$	<p style="text-align: center;"><b>b.</b></p> $18 + 2 = \underline{\quad}$ $18 + 4 = \underline{\quad}$ $18 + 6 = \underline{\quad}$ $18 + \underline{\quad} = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$	<p style="text-align: center;"><b>c.</b></p> $\frac{1}{2}$ of 0 is $\underline{\quad}$ . $\frac{1}{2}$ of 2 is $\underline{\quad}$ . $\frac{1}{2}$ of 4 is $\underline{\quad}$ . $\frac{1}{2}$ of $\underline{\quad}$ is $\underline{\quad}$ . $\frac{1}{2}$ of $\underline{\quad}$ is $\underline{\quad}$ . $\frac{1}{2}$ of $\underline{\quad}$ is $\underline{\quad}$ . $\frac{1}{2}$ of $\underline{\quad}$ is $\underline{\quad}$ .
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## Difference and How Many More

The **difference** between two numbers on the number line means how far apart they are from each other. Three and twelve are NINE steps apart, so their difference is **9**.



1. Find the differences between these numbers using the number line above.

a. between 10 and 6 _____	b. between 12 and 8 _____
c. between 14 and 2 _____	d. between 17 and 6 _____

We can solve the difference between two numbers by **subtracting**.

What is the difference between 10 and 4? Subtract  $10 - 4 = 6$ . The difference is 6.

2. Write a subtraction to find the difference between the numbers.

<b>a.</b> difference between 10 and 4 _____ - _____ = _____	<b>b.</b> difference between 2 and 9 _____ - _____ = _____	<b>c.</b> difference between 8 and 3 _____ - _____ = _____
<b>d.</b> difference between 20 and 50 _____ - _____ = _____	<b>e.</b> difference between 10 and 90 _____ - _____ = _____	<b>f.</b> difference between 19 and 8 _____ - _____ = _____

3. Solve the subtractions by thinking of *the difference between the numbers*—how far apart they are from each other.

<b>a.</b> $20 - 16 =$ _____	<b>b.</b> $40 - 38 =$ _____	<b>c.</b> $65 - 61 =$ _____	<b>d.</b> $36 - 31 =$ _____
<b>e.</b> $100 - 99 =$ _____	<b>f.</b> $87 - 84 =$ _____	<b>g.</b> $55 - 50 =$ _____	<b>h.</b> $79 - 78 =$ _____

We can ALSO solve the difference between two numbers by writing a “*how many more*” addition (addition where one addend is missing).

What is the difference between 12 and 7? Think:  $7 + \underline{\quad} = 12$ .  
This means, “7 and how many more makes 12?”

The answer is 5. So, the difference between 12 and 7 is 5.

4. Write a “*how many more*” addition to find the difference between the numbers.

a. the difference between 10 and 6 $6 + \underline{\quad} = 10$	b. the difference between 6 and 12 $6 + \underline{\quad} = 12$
c. the difference between 15 and 8 $\underline{\quad} + \underline{\quad} = \underline{\quad}$	d. the difference between 4 and 11 $\underline{\quad} + \underline{\quad} = \underline{\quad}$

5. Subtract. Think of the *difference* as “*how many more.*”

a. $15 - 12 = \underline{\quad}$ 12 and <i>how many more</i> makes 15?	b. $11 - 9 = \underline{\quad}$ 9 and <i>how many more</i> makes 11?	c. $16 - 11 = \underline{\quad}$ 11 and <i>how many more</i> makes 16?
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There are *two ways* to find the difference: subtraction or a “*how many more*” addition.

**Example.** Find the difference between 100 and 95.

It is easier to think  $95 + \underline{\quad} = 100$ .  
The difference is 5.

**Example.** Find the difference between 100 and 2.

It is easier to subtract  $100 - 2 = 98$ .  
The difference is 98.

6. Find the difference...

a. ...between 60 and 56 $\underline{\quad}$	b. ...between 22 and 20 $\underline{\quad}$
c. ...between 35 and 1 $\underline{\quad}$	d. ...between 67 and 3 $\underline{\quad}$
e. ...between 50 and 30 $\underline{\quad}$	f. ...between 40 and 100 $\underline{\quad}$
g. ...between 19 and 14 $\underline{\quad}$	h. ...between 78 and 4 $\underline{\quad}$

Whenever a word problem asks “*how many more*,” you can solve it in two ways. You can either subtract, or you can write a “*how many more*” addition. Either way, you are finding the difference between the two numbers.

7. Solve the word problems.

a. Jane is on page 20 and Thipe is on page 17 of the same book.  
How many more pages has Jane read?

b. Mum has one dozen eggs plus five in another carton. A dozen means 12.  
How many eggs does Mum have?

c. Buhle is reading a 50-page book. She is on page 42.  
How many more pages does she have left to read?

d. Hunadi worked in the garden for 2 hours in the morning and 3 hours in the afternoon. Andrew worked for 8 hours in the shop.  
Who worked more hours?  
  
How many more?

e. Thandi has a house full of flies! She killed 28 flies. Her husband killed 5 flies.  
How many more did she kill than him?

f. The next day, Thandi had a house full of flies again. She killed 5 flies in the living room, 12 in the kitchen, and 2 in her room.  
How many flies did she kill in total?

g. Musa had R12 and Bonga had R6. Then both brothers worked helping Dad in the garden. Musa earned R5 and Bonga earned R9.  
Now, who has more money?  
  
How much more?

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# Chapter 4: Regrouping in Addition

## Introduction

The fourth chapter of *Math Mammoth Grade 2* deals with addition within 0-100, both mentally and in columns, especially concentrating on regrouping in addition (carrying).

### Mental maths

Mental maths is important because it builds number sense. We study adding mentally a two-digit number and a single-digit number where the answer goes to the next ten (problems such as  $36 + 8$  or  $45 + 9$ ). These additions use the helping problem composed of the single-digit numbers ( $6 + 8$  or  $5 + 9$ ). The student knows that  $6 + 8$  fills the first ten and is four more than the ten. He/she will learn to use that fact when adding  $36 + 8$ . The sum  $36 + 8$  fills the *next* whole ten (40), and is four more than that, or 44.

### Regrouping in tens

We also study adding two-digit numbers in columns, and regrouping with tens, or “carrying,” which is illustrated and explained in detail with the help of visual models. These visual models take the place of base-ten blocks or other manipulatives. You are welcome to use actual manipulatives if you prefer. The main concept to understand is that 10 ones make a new ten, and this new ten is regrouped with the other tens, written using a little “1” in the tens column.

In order to prepare for adding three or four two-digit numbers in columns, we practise explicitly how to add 3 or 4 single-digit numbers, such as  $7 + 8 + 6 + 4$ , and the principle of adding in parts (such as  $13 + 16$  is the same as  $10 + 10$  and  $3 + 6$ ).

The lessons also include lots of word problems, and occasional revision problems about doubling and even and odd numbers.

### The Lessons

	page	span
Going Over to the Next Ten .....	100	3 pages
Add with Two-Digit Numbers Ending in 9 .....	103	2 pages
Add a Two-Digit Number and a Single-Digit Number Mentally.....	105	2 pages
Regrouping with Tens .....	107	3 pages
Add in Columns Practice .....	110	3 pages
Mental Addition of Two-Digit Numbers .....	113	3 pages
Adding Three or Four Numbers Mentally .....	116	2 pages
Adding Three or Four Numbers in Columns.....	118	4 pages
Mixed Revision, Chapters 1 - 4 .....	122	2 pages
Revision, Chapter 4 .....	124	2 pages

# Helpful Resources on the Internet

Use these free online resources to supplement the “bookwork” as you see fit.

**Disclaimer:** These links were valid at the time of writing this book, and to the best of our knowledge we believe these websites to have what is described. However, we cannot guarantee that the links have not changed. Parental supervision is recommended.

## Base Blocks Addition

A virtual manipulative that shows regrouping in addition. You can either solve addition problems that are provided, or create your own. “Lasso” with a mouse ten units, ten 10s, or ten 100s to regroup them. Choose “Columns = 2” to restrict the work to two-digit numbers.

[http://nlvm.usu.edu/en/nav/frames\\_asid\\_154\\_g\\_1\\_t\\_1.html?from=category\\_g\\_1\\_t\\_1.html](http://nlvm.usu.edu/en/nav/frames_asid_154_g_1_t_1.html?from=category_g_1_t_1.html)

## Callum's Addition Pyramid

Add the pairs of numbers to get a number on the next level and finally the top number. Three difficulty levels.

<http://www.amblesideprimary.com/ambleweb/mentalmaths/pyramid.html>

## Techno Tortoise

Practise adding 2 two-digit numbers into parts on a number line.

<http://www.ictgames.com/technowithflock.html>

## Mr. Martini's Classroom: Addition and Subtraction Inequalities

Compare expressions that involve addition and subtraction of one and two-digit numbers.

<http://www.thegreatmartinicompany.com/inequalities/number-comparison.html>

and

<http://www.thegreatmartinicompany.com/inequalities/add-subtract-comparison.html>

## Mr. Martini's Classroom: Long Addition

Practise adding two-digit numbers in columns online.

<http://www.thegreatmartinicompany.com/longarithmetic/longaddition.html>

## Mathionare Addition Quiz

Answer increasingly more difficult addition questions (one and two-digit numbers), and win a million!

<http://www.mathsisfun.com/games/mathionaire-addition-quiz.html>

## Button Beach Challenge

Figure out what number the various coloured buttons represent.

<http://www.amblesideprimary.com/ambleweb/mentalmaths/buttons.html>

## Teaching Treasures - Year 2 Math Worksheets

Simple online addition and subtraction worksheets where the student types in the answer and can check it. [http://www.teachingtreasures.com.au/maths/maths\\_level2.html](http://www.teachingtreasures.com.au/maths/maths_level2.html)

## Count on Convict

Practise “adding up” strategy for mental subtraction. First type the amount to move on to the next whole ten, then count in tens, then the rest.

<http://www.ictgames.com/countonconvict.html>

## Double Digit Addition

Match the addition problem with the correct sum. Enjoy!

<http://www.quia.com/mc/818288.html>

**Sample worksheet from**

[www.mathmammoth.com](http://www.mathmammoth.com)

**Addition Level 2**

A matching game where you add a one-digit number and a two-digit number.

<http://www.quia.com/mc/65798.html>

**Speed Grid Addition**

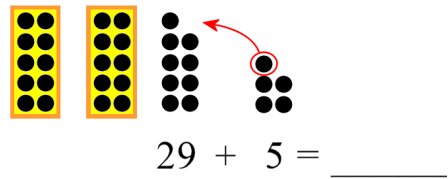
Find numbers on the grid that add up to the given number. This uses both single-digit and two-digit numbers.

<http://www.oswego.org/ocsd-web/games/SpeedGrid/Addition/urikares.html>

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## Add with Two-Digit Numbers Ending in 9

Imagine that 29 wants to be 30...  
so it “grabs” one from 5.  
Then, 29 becomes 30, and 5 becomes 4.  
The addition problem is changed to  $30 + 4 = 34$ .



1. Circle the nine dots and one more dot to form a complete ten. Add.

<p>a. <math>19 + 5 = \underline{\hspace{2cm}}</math></p>	<p>b. <math>29 + 7 = \underline{\hspace{2cm}}</math></p>	<p>c. <math>49 + 5 = \underline{\hspace{2cm}}</math></p>
<p>d. <math>29 + 8 = \underline{\hspace{2cm}}</math></p>	<p>e. <math>39 + 6 = \underline{\hspace{2cm}}</math></p>	<p>f. <math>49 + 9 = \underline{\hspace{2cm}}</math></p>


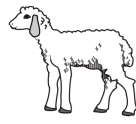


2. Add. For each problem, write a helping problem using the “ones” from the first problem.

<p>a. <math>19 + 7 = \underline{\hspace{2cm}}</math></p> <p><u>9</u> + <u>7</u> = _____</p>	<p>b. <math>49 + 3 = \underline{\hspace{2cm}}</math></p> <p>_____ + _____ = _____</p>	<p>c. <math>39 + 4 = \underline{\hspace{2cm}}</math></p> <p>_____ + _____ = _____</p>
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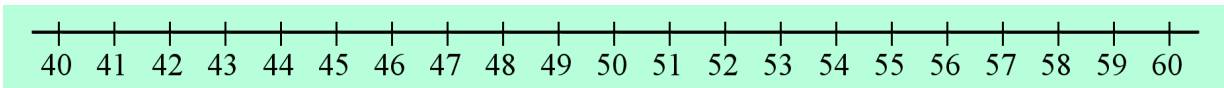
3. Add. Compare the problems.

<p>a. <math>9 + 3 = \underline{\hspace{2cm}}</math></p> <p><math>19 + 3 = \underline{\hspace{2cm}}</math></p>	<p>b. <math>9 + 6 = \underline{\hspace{2cm}}</math></p> <p><math>39 + 6 = \underline{\hspace{2cm}}</math></p>	<p>c. <math>9 + 4 = \underline{\hspace{2cm}}</math></p> <p><math>49 + 4 = \underline{\hspace{2cm}}</math></p>
<p>d. <math>9 + 7 = \underline{\hspace{2cm}}</math></p> <p><math>39 + 7 = \underline{\hspace{2cm}}</math></p> <p><math>29 + 7 = \underline{\hspace{2cm}}</math></p>	<p>e. <math>9 + 9 = \underline{\hspace{2cm}}</math></p> <p><math>69 + 9 = \underline{\hspace{2cm}}</math></p> <p><math>79 + 9 = \underline{\hspace{2cm}}</math></p>	<p>f. <math>9 + 5 = \underline{\hspace{2cm}}</math></p> <p><math>19 + 5 = \underline{\hspace{2cm}}</math></p> <p><math>59 + 5 = \underline{\hspace{2cm}}</math></p>

4. These problems revise the basic facts with 9 and 8. By this time you should already remember these addition facts. Try to remember what number will fit without counting.








 <b>a.</b>	 <b>b.</b>	 <b>c.</b>	 <b>d.</b>
$9 + \underline{\quad} = 14$	$4 + 9 = \underline{\quad}$	$8 + \underline{\quad} = 15$	$7 + 8 = \underline{\quad}$
$9 + \underline{\quad} = 15$	$8 + 9 = \underline{\quad}$	$8 + \underline{\quad} = 17$	$8 + 8 = \underline{\quad}$
$9 + \underline{\quad} = 13$	$2 + 9 = \underline{\quad}$	$8 + \underline{\quad} = 12$	$5 + 8 = \underline{\quad}$
$9 + \underline{\quad} = 18$	$5 + 9 = \underline{\quad}$	$8 + \underline{\quad} = 14$	$6 + 8 = \underline{\quad}$
$9 + \underline{\quad} = 12$	$6 + 9 = \underline{\quad}$	$8 + \underline{\quad} = 13$	$3 + 8 = \underline{\quad}$
$9 + \underline{\quad} = 17$	$9 + 9 = \underline{\quad}$	$8 + \underline{\quad} = 18$	$9 + 8 = \underline{\quad}$
$9 + \underline{\quad} = 16$	$7 + 9 = \underline{\quad}$	$8 + \underline{\quad} = 16$	$4 + 8 = \underline{\quad}$

5. Find the difference between numbers.










<b>a.</b> between 41 and 53  _____	<b>b.</b> between 60 and 46  _____	<b>c.</b> between 59 and 48  _____
--	--	--

6. Find the patterns and continue them!

<b>a.</b>	+ <input type="text"/>	+ <input type="text"/>	+ <input type="text"/>	+ <input type="text"/>	+ <input type="text"/>	+ <input type="text"/>	+ <input type="text"/>
							
	0	1	3	6	10	_____	_____

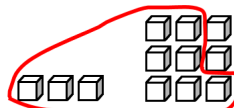
<b>b.</b>	+ <input type="text"/>	+ <input type="text"/>	+ <input type="text"/>	+ <input type="text"/>	+ <input type="text"/>	+ <input type="text"/>	+ <input type="text"/>
							
	_____	_____	_____	_____	_____	44	48
						52	56

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## Regrouping with Tens

When adding  $3 + 9$ , we can circle ten little ones to form a ten. We write “1” in the tens column.

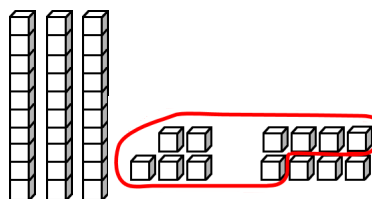
There are two little ones left over, so we write “2” in the ones column.



	tens	ones
		3
+		9
	1	2

With  $35 + 8$ , we circle ten little ones to make a ten. There already are three tens, so in total we now have four tens. So, we write “4” in the tens column.

There are three little cubes left over, so we write “3” in the ones column.



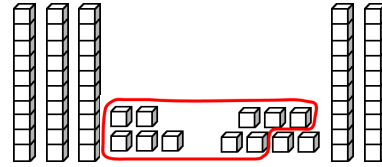
	tens	ones
	3	5
+		8
	4	3

1. **Circle** ten cubes to make **a new ten**. Count the tens, including the new one. Count the ones. Write the tens and ones in their own columns. You can also use manipulatives.

<p><b>a.</b></p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="padding: 5px;"></th> <th style="padding: 5px; text-align: center;">tens</th> <th style="padding: 5px; text-align: center;">ones</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;"></td> <td style="border: 1px solid black; width: 40px; height: 30px; text-align: center;">3</td> <td style="border: 1px solid black; width: 40px; height: 30px; text-align: center;">3</td> </tr> <tr> <td style="padding: 5px; text-align: right;">+</td> <td style="border: 1px solid black; width: 40px; height: 30px;"></td> <td style="border: 1px solid black; width: 40px; height: 30px; text-align: center;">9</td> </tr> <tr> <td style="padding: 5px;"></td> <td style="border: 1px solid black; width: 40px; height: 30px;"></td> <td style="border: 1px solid black; width: 40px; height: 30px;"></td> </tr> </tbody> </table>		tens	ones		3	3	+		9				<p><b>b.</b></p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="padding: 5px;"></th> <th style="padding: 5px; text-align: center;">tens</th> <th style="padding: 5px; text-align: center;">ones</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;"></td> <td style="border: 1px solid black; width: 40px; height: 30px; text-align: center;">2</td> <td style="border: 1px solid black; width: 40px; height: 30px; text-align: center;">5</td> </tr> <tr> <td style="padding: 5px; text-align: right;">+</td> <td style="border: 1px solid black; width: 40px; height: 30px;"></td> <td style="border: 1px solid black; width: 40px; height: 30px; text-align: center;">8</td> </tr> <tr> <td style="padding: 5px;"></td> <td style="border: 1px solid black; width: 40px; height: 30px;"></td> <td style="border: 1px solid black; width: 40px; height: 30px;"></td> </tr> </tbody> </table>		tens	ones		2	5	+		8			
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	tens	ones																							
	3	6																							
+	1	8																							
	tens	ones																							
	2	5																							
+	2	7																							



When we make a new ten from the ones, we are **regrouping**. The ten ones get grouped as a ten, and are counted with the other tens.



	tens	ones
	1	
	3	5
+	2	7
	6	2

This is also called **carrying to tens**.

Imagine someone “gathering” ten little cubes in his lap and “carrying” them over into the tens column as 1 ten.

To show this new ten, write a little “1” in the tens column above the other numbers. Then add in the tens-column as usual, adding the little “1” also.

2. Circle ten ones to make a new ten. Add the tens and ones in columns.

<p>a.  <math>\begin{array}{r} \text{tens} \quad \text{ones} \\ 1 \quad 3 \\ + 2 \quad 9 \\ \hline \end{array}</math></p>	<p>b.  <math>\begin{array}{r} \text{tens} \quad \text{ones} \\ 2 \quad 4 \\ + 3 \quad 8 \\ \hline \end{array}</math></p>
<p>c.  <math>\begin{array}{r} \text{tens} \quad \text{ones} \\ 3 \quad 5 \\ + 1 \quad 9 \\ \hline \end{array}</math></p>	<p>d.  <math>\begin{array}{r} \text{tens} \quad \text{ones} \\ 2 \quad 4 \\ + 4 \quad 7 \\ \hline \end{array}</math></p>
<p>e.  <math>\begin{array}{r} \text{tens} \quad \text{ones} \\ \phantom{0} \quad \phantom{0} \\ + \phantom{0} \quad \phantom{0} \\ \hline \end{array}</math></p>	<p>f.  <math>\begin{array}{r} \text{tens} \quad \text{ones} \\ \phantom{0} \quad \phantom{0} \\ + \phantom{0} \quad \phantom{0} \\ \hline \end{array}</math></p>
<p>g.  <math>\begin{array}{r} \text{tens} \quad \text{ones} \\ \phantom{0} \quad \phantom{0} \\ + \phantom{0} \quad \phantom{0} \\ \hline \end{array}</math></p>	<p>h.  <math>\begin{array}{r} \text{tens} \quad \text{ones} \\ \phantom{0} \quad \phantom{0} \\ + \phantom{0} \quad \phantom{0} \\ \hline \end{array}</math></p>

3. Add. If you can make a new ten from the ones, regroup.

a. 
$$\begin{array}{r} 42 \\ + 15 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 27 \\ + 45 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 65 \\ + 26 \\ \hline \end{array}$$

d. 
$$\begin{array}{r} 83 \\ + 15 \\ \hline \end{array}$$

e. 
$$\begin{array}{r} 34 \\ + 19 \\ \hline \end{array}$$

f. 
$$\begin{array}{r} 52 \\ + 41 \\ \hline \end{array}$$

g. 
$$\begin{array}{r} 13 \\ + 44 \\ \hline \end{array}$$

h. 
$$\begin{array}{r} 63 \\ + 27 \\ \hline \end{array}$$

i. 
$$\begin{array}{r} 36 \\ + 51 \\ \hline \end{array}$$

j. 
$$\begin{array}{r} 66 \\ + 29 \\ \hline \end{array}$$

We can add three numbers by writing them under each other. This is not any more difficult than adding two numbers.

On the right, first add the ones.  $2 + 7 + 5 = 14$ . You get a new ten. So, regroup and write that new ten with the other tens.

In the tens, add  $1 + 3 + 2 + 1 = 7$ .

	1	
	3	2
	2	7
+	1	5
	7	4

4. Add. Regroup the ones to make a new ten.

a. 
$$\begin{array}{r} 34 \\ 19 \\ + 26 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 15 \\ 27 \\ + 45 \\ \hline \end{array}$$

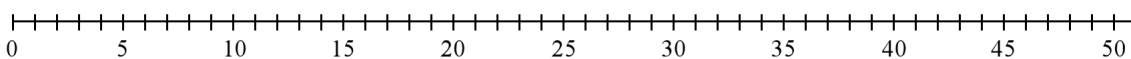
c. 
$$\begin{array}{r} 13 \\ 27 \\ + 26 \\ \hline \end{array}$$

d. 
$$\begin{array}{r} 26 \\ 42 \\ + 19 \\ \hline \end{array}$$

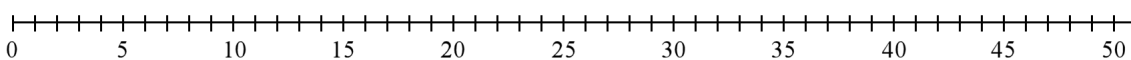
e. 
$$\begin{array}{r} 34 \\ 21 \\ + 19 \\ \hline \end{array}$$

5. Show the additions on the number line by drawing lines that are that long.

a.  $13 + 9 + 11 = \underline{\hspace{2cm}}$



b.  $27 + 16 = \underline{\hspace{2cm}}$



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## Adding Three or Four Numbers in Columns

Sometimes we get *two or three new* tens from the ones. We need to regroup.

In the ones, we add  
 $8 + 7 + 8 = 23$ .

We write the two new  
 tens in the tens column.  
 Complete the problem.

$$\begin{array}{r} 2 \\ 4 \text{ } 8 \\ 2 \text{ } 7 \\ + 1 \text{ } 8 \\ \hline 3 \end{array}$$

In the ones we add  $9 + 9 + 7 + 6$   
 $= 18 + 13 = 31$ . We write *three*  
 new tens in the tens column.

In the tens, we add  
 $3 + 3 + 1 + 2 + 2 = 11$ . The  
 answer is *more* than one hundred.  
 It is 111 (one hundred and eleven).

$$\begin{array}{r} 3 \\ 3 \text{ } 9 \\ 1 \text{ } 9 \\ 2 \text{ } 7 \\ + 2 \text{ } 6 \\ \hline 1 \text{ } 1 \text{ } 1 \end{array}$$

1. Add mentally. *Remember* to first try to find if any of the numbers **make 10**.

a.  $8 + 4 + 5 = \underline{\quad}$

b.  $3 + 8 + 7 = \underline{\quad}$

c.  $8 + 5 + 6 + 4 = \underline{\quad}$

2. Add. The answers are “hidden” in the list of numbers below the problems.

a. 
$$\begin{array}{r} 5 \ 2 \\ 3 \ 0 \\ + 1 \ 1 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 1 \ 3 \\ 2 \ 5 \\ + 5 \ 4 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 3 \ 3 \\ 3 \ 8 \\ + 2 \ 7 \\ \hline \end{array}$$

d. 
$$\begin{array}{r} 3 \ 6 \\ 2 \ 7 \\ + 1 \ 9 \\ \hline \end{array}$$

e. 
$$\begin{array}{r} 3 \ 6 \\ 2 \ 7 \\ 1 \ 8 \\ + 1 \ 6 \\ \hline \end{array}$$

f. 
$$\begin{array}{r} 4 \ 0 \\ 1 \ 8 \\ 1 \ 6 \\ + 2 \ 2 \\ \hline \end{array}$$

g. 
$$\begin{array}{r} 1 \ 5 \\ 1 \ 7 \\ 1 \ 8 \\ + 3 \ 9 \\ \hline \end{array}$$

h. 
$$\begin{array}{r} 1 \ 2 \\ 2 \ 9 \\ 2 \ 5 \\ + 1 \ 4 \\ \hline \end{array}$$

i. 
$$\begin{array}{r} 1 \ 9 \\ 6 \ 9 \\ + 1 \ 9 \\ \hline \end{array}$$

j. 
$$\begin{array}{r} 5 \ 6 \\ 3 \ 2 \\ + 2 \ 9 \\ \hline \end{array}$$

k. 
$$\begin{array}{r} 4 \ 5 \\ 5 \ 5 \\ + 1 \ 9 \\ \hline \end{array}$$

l. 
$$\begin{array}{r} 5 \ 9 \\ 1 \ 9 \\ + 4 \ 2 \\ \hline \end{array}$$

74 80 82 89 91 92 93 96 97 98 117 107 120 119 122

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# Chapter 5: Geometry and Fractions

## Introduction

The fifth chapter of *Math Mammoth Grade 2* covers geometry topics and an introduction to fractions.

In geometry, the emphasis is on exploring shapes. Students are supposed to recognise and draw basic shapes, and identify triangles, rectangles, squares, quadrilaterals, pentagons, hexagons, and cubes. Drawing is done by first drawing dots on paper, then connecting those with a ruler.

We also study some geometric patterns, have surprises with pentagons and hexagons, and make shapes in a tangram-like game. These topics are to provide some fun while also letting students explore geometry and helping them to memorise the terminology for basic shapes.

In the section on fractions, the student divides some basic shapes into halves, thirds, and fourths (quarters). They also learn the common notation for fractions (such as  $\frac{1}{3}$ ) and colour in parts to show a given fraction. We also study comparing fractions using visual models.

### The Lessons

	page	span
Shapes Revision .....	129	<i>3 pages</i>
Surprises with Shapes .....	132	<i>2 pages</i>
Rectangles and Squares .....	134	<i>3 pages</i>
Making Shapes .....	137	<i>1 page</i>
Geometric Patterns .....	140	<i>2 pages</i>
Solids .....	142	<i>2 pages</i>
Printable Shapes .....	144	<i>4 pages</i>
Some Fractions.....	152	<i>3 pages</i>
Comparing Fractions .....	155	<i>2 pages</i>
Mixed Revision, Chapters 1 - 5 .....	157	<i>2 pages</i>
Revision, Chapter 5 .....	159	<i>2 pages</i>

# Helpful Resources on the Internet

Use these free online resources to supplement the “bookwork” as you see fit.

**Disclaimer:** These links were valid at the time of writing this book, and to the best of our knowledge we believe these websites to have what is described. However, we cannot guarantee that the links have not changed. Parental supervision is recommended.

## Buzzing with Shapes

Tic tac toe with shapes; drag the counter to the shape that has that amount of sides.

<http://www.harcourtschool.com/activity/buzz/buzz.html>

## Patch Tool

An online activity where the student designs a pattern using geometric shapes.

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=27>

## Shape Cutter

Draw any shape (polygon), cut it, and manipulate the cut pieces. You can have the computer mix them up, and then try to recreate the original shape.

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=72>

## Shifting Shapes

Figure out what shape it is when viewing through a small opening! Click on the “eye” button to see it in its entirety.

<http://www.ictgames.com/YRshape.html>

## Polygon Matching Game

[http://www.mathplayground.com/matching\\_shapes.html](http://www.mathplayground.com/matching_shapes.html)

## Polygon Playground

Drag various colourful polygons to the work area to make your own creations!

<http://mathcats.com/explore/polygons.html>

## Shapes Identification Quiz from ThatQuiz.org

An online quiz in a multiple-choice format, asking to identify common two-dimensional shapes. You can modify the quiz parameters to your liking.

[www.thatquiz.org/tq-f/math/shapes/](http://www.thatquiz.org/tq-f/math/shapes/)

## Tangram puzzles for kids

Use the seven pieces of the Tangram to form the given puzzle.

Complete the puzzle by moving and rotating the seven shapes.

<http://www.abcya.com/tangrams.htm>

## Logic Tangram game

Note: this uses four pieces only. Use logic and spatial reasoning skills to assemble the four pieces into the given shape.

<http://www.mathplayground.com/tangrams.html>

## Interactive Tangram Puzzle

Place the tangram pieces so they form the given shape.

[http://nlvm.usu.edu/en/nav/frames\\_asid\\_112\\_g\\_2\\_t\\_1.html](http://nlvm.usu.edu/en/nav/frames_asid_112_g_2_t_1.html)

**Sample worksheet from**

[www.mathmammoth.com](http://www.mathmammoth.com)

**Tangram set**

Cutting instructions for making a Tangram set. Also includes a large gallery of puzzle shapes to make.

<http://tangrams.ca/make-a-set>

<http://tangrams.ca/puzzle-shapes>

**Online Kaleidoscope**

Create your own kaleidoscope creation with this interactive tool.

[http://www.zefrank.com/dtoy\\_vs\\_byokal/](http://www.zefrank.com/dtoy_vs_byokal/)

**Fractions - Part of a Whole**

Divide the pie into pieces and colour in some. The computer shows the fraction.

[http://nlvm.usu.edu/en/nav/frames\\_asid\\_102\\_g\\_2\\_t\\_1.html](http://nlvm.usu.edu/en/nav/frames_asid_102_g_2_t_1.html)

**Visualizing Fractions**

The other way around as in the previous activity: the computer shows a fraction, and you divide the pie and colour in the pieces.

[http://nlvm.usu.edu/en/nav/frames\\_asid\\_103\\_g\\_2\\_t\\_1.html](http://nlvm.usu.edu/en/nav/frames_asid_103_g_2_t_1.html)

**Naming Fractions**

An interactive activity that asks the student to name the fraction shown.

[http://nlvm.usu.edu/en/nav/frames\\_asid\\_104\\_g\\_2\\_t\\_1.html](http://nlvm.usu.edu/en/nav/frames_asid_104_g_2_t_1.html)

**Who Wants Pizza?**

Lessons and interactive exercises about fractions, based on the pizza model.

<http://math.rice.edu/~lanius/fractions/frac.html>

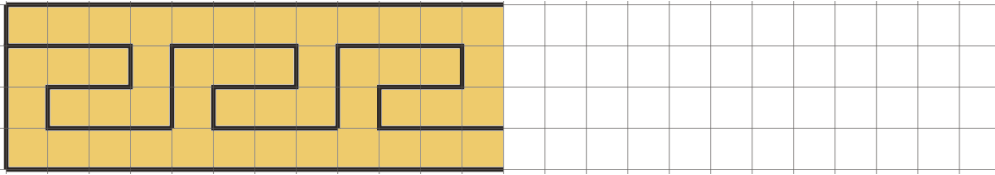


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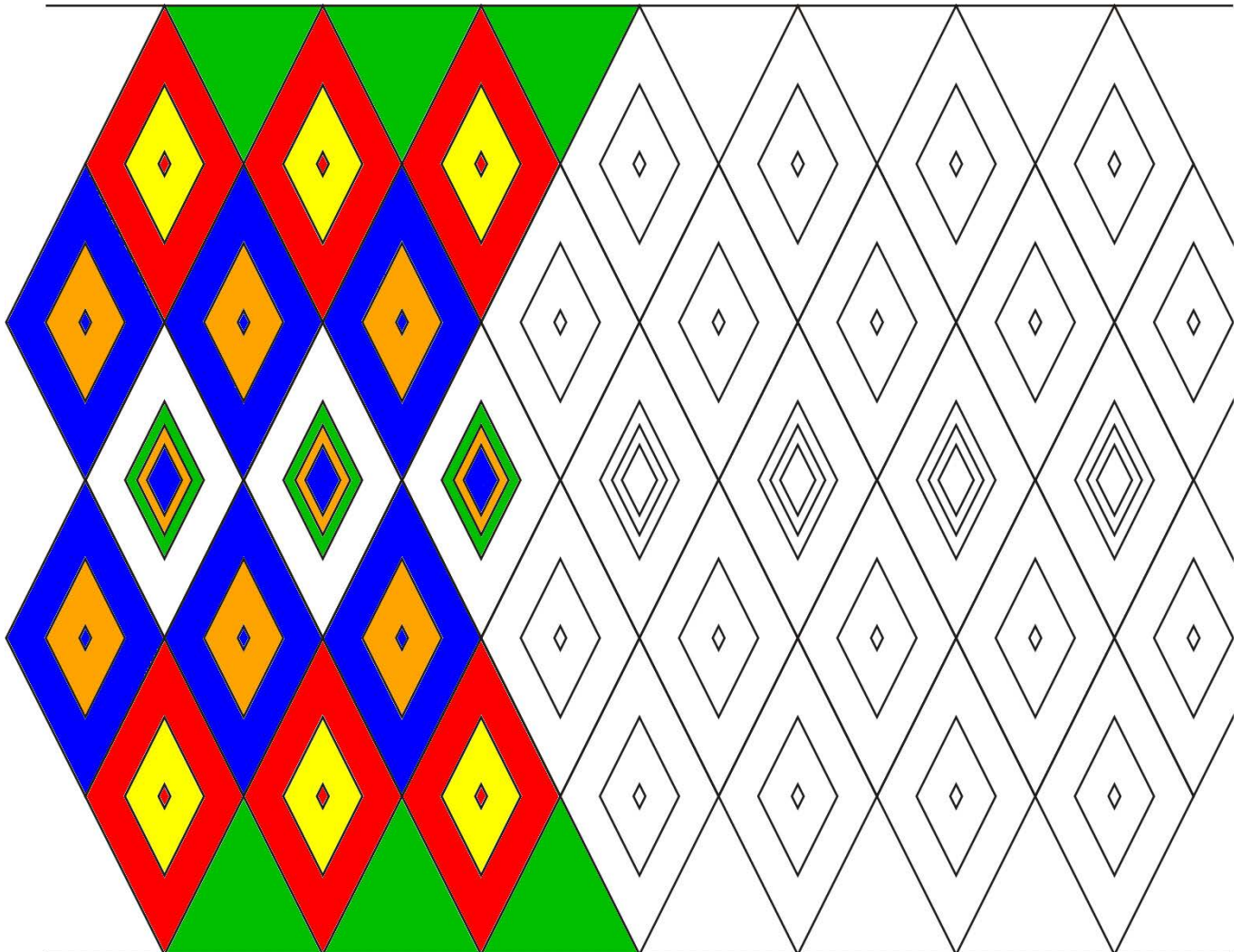
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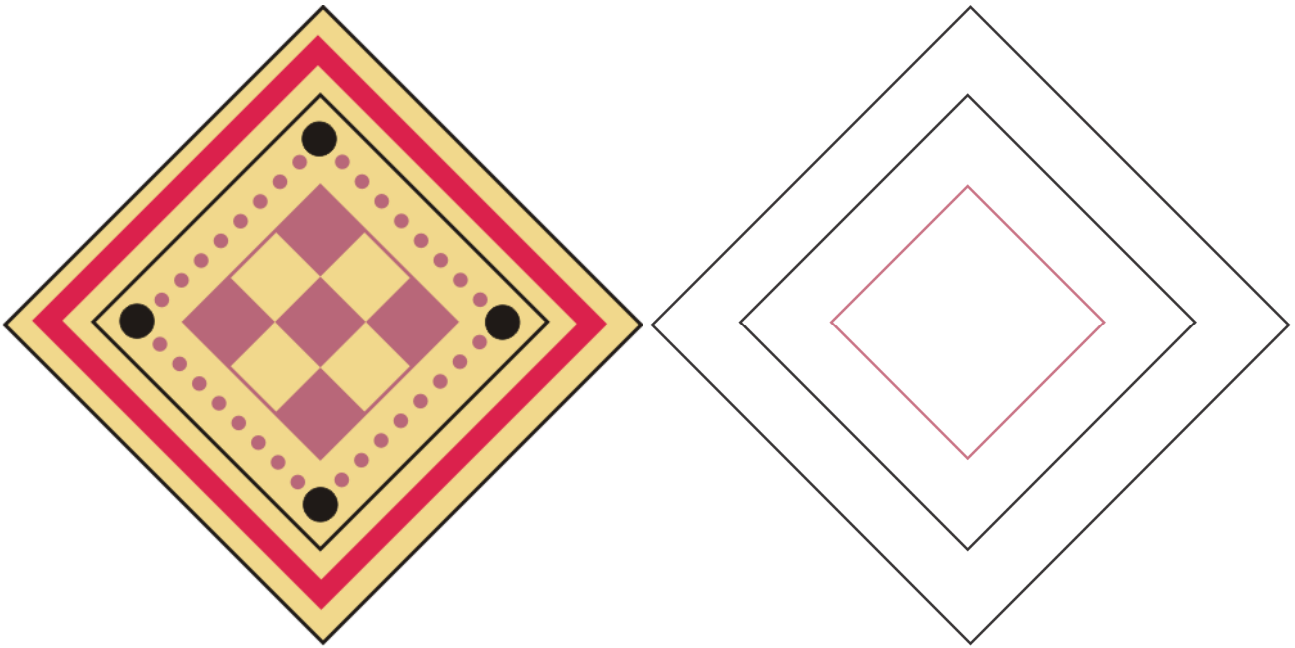
## Geometric Patterns

1. The design below is often seen on Greek vases. Continue it.



2. This is a pattern from an apron used by Kirdi people in Cameroon, Africa. Notice it uses PARALLELOGRAMS that are inside each other. Continue the colouring in the pattern.

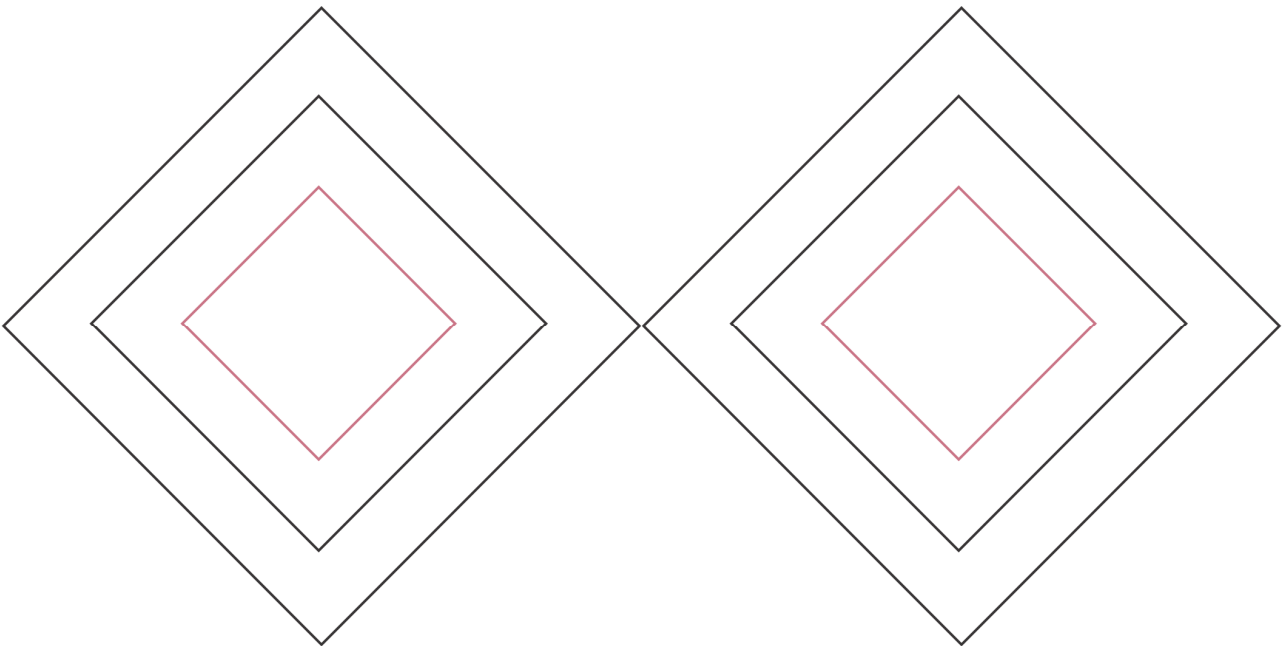




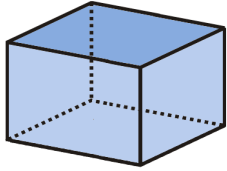
3. This is a geometric design found on a Greek vase.

a. What two shapes are used in this design? \_\_\_\_\_ and \_\_\_\_\_

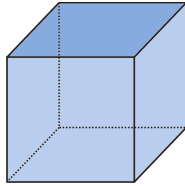
b. Copy the design at least once in the empty shapes.



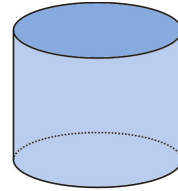
## Solids



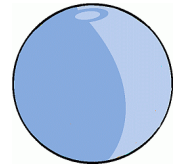
This is a **box**. It is also called a “rectangular prism.”



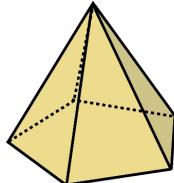
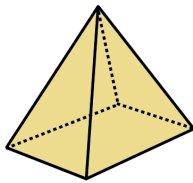
A **cube** is a box, too, but all of its sides are equal in length.



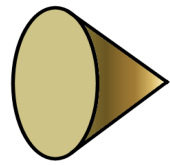
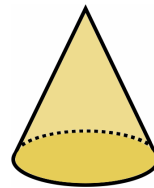
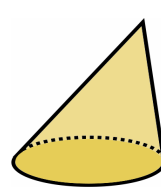
A **cylinder** has a circle at the top and the bottom.



This is a **sphere**, or just a ball.



A **pyramid** has a pointed top. Its bottom shape can be any many-sided figure, such as a triangle, a rectangle, a square, or a pentagon.



A **cone** has a pointed top, as well, but it has a rounded shape on the bottom.

1. Make a cube, a cylinder, a cone, and a pyramid using the cut-outs on the following pages. Your teacher will help you.

2. A *face* is any of the flat sides of a solid.

a. Count how many faces a cube has. \_\_\_\_\_ faces

What shapes are they?

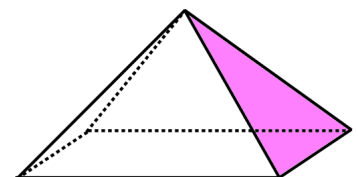
b. Count how many faces a box has. \_\_\_\_\_ faces

What shapes are they?

c. Count how many faces this pyramid has. \_\_\_\_\_ faces

What shapes are they?

d. Count how many faces a ball has. \_\_\_\_\_ faces



How about the cylinder? It has three faces: the top and bottom circles are two faces, and the third face is “wrapped around” it. And the cone? It has two faces.