

math

# MAMMOTH

## Grade 2-A Worktext

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

**R**eading 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 math curriculum for the second grade mathematics studies. This curriculum is aligned to the Common Core standards. The four main areas of study for second grade are:

1. Understanding of the base-ten system within 1000. This includes place value with three-digit numbers, skip-counting in fives, tens, and multiples of hundreds, tens, and ones (within 1000). (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 standard units of measure (chapter 7);
4. Describing and analyzing 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. For the chapter on measuring, the child should be familiar with three-digit numbers.

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.

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 spiraling 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 review problems from past topics.

This does not mean that your child would not need occasional review. 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 review 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 review, 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 already studied pages. Also, chapter 3, which practices addition and subtraction facts within 18, contains a lot of pages with problems, so you can choose to “save” some of them for later review.

*I wish you success in your math 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 review, and some new topics.

In the first two lessons we review adding and subtracting two-digit numbers from first grade. Then students get to review skip-counting using the 100-chart.

Next, the lesson Fact Families reviews the connection between addition and subtraction, and 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 is presented in the context of equal sharing: if you can share that many objects evenly (equally), then the number is even. Children may need to use manipulatives to grasp this idea.

Then we study doubling and halving. Don't skip the simple word problems included in these lessons—they are very important. Students 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	(hours)
Some Review .....	9	2 pages	
The 100-Chart and More Review .....	11	3 pages	
Fact Families .....	14	2 pages	
Ordinal Numbers .....	16	2 pages	
Even and Odd Numbers .....	18	2 pages	
Doubling .....	20	3 pages	
One-Half .....	23	2 pages	
Adding with Whole Tens .....	25	3 pages	
Subtracting Whole Tens .....	28	2 pages	
Review .....	30	2 pages	

## Helpful Resources on the Internet

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

### 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 neighboring 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

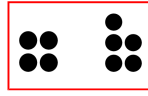
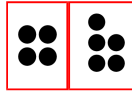
A simple story about two ladybugs named Odd and Even. It teaches even and odd within 1-10.

[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>		
<p>Sometimes in a subtraction problem, the <i>total</i> is asked:</p> $\square - 8 = 20$ <p>You know 20 and 8 are the “parts,” and the total is missing. To find the total, just add the “parts”:</p> $20 + 8 = \underline{28}$	<p> <math>4 + 5 = 9</math>  <math>5 + 4 = 9</math>  <math>9 - 5 = 4</math>  <math>9 - 4 = 5</math> </p> <p>Notice the <b>TOTAL</b>. The subtraction sentences <u>start</u> with the total.</p>	<p> <math>4 + 5 = 9</math>  <math>5 + 4 = 9</math>  <math>9 - 5 = 4</math>  <math>9 - 4 = 5</math> </p> <p>Notice the <b>PARTS</b>. The two parts make up the total.</p>

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

<p>a.  </p> <p> <math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math>  <math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math>  <math>\underline{\quad} - \underline{\quad} = \underline{\quad}</math>  <math>\underline{\quad} - \underline{\quad} = \underline{\quad}</math> </p>	<p>b. <span style="border: 1px solid black; padding: 2px;">T</span>  </p> <p> <math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math>  <math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math>  <math>\underline{\quad} - \underline{\quad} = \underline{\quad}</math>  <math>\underline{\quad} - \underline{\quad} = \underline{\quad}</math> </p>	<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> <p> <math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math>  <math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math>  <math>\underline{\quad} - \underline{\quad} = \underline{\quad}</math>  <math>\underline{\quad} - \underline{\quad} = \underline{\quad}</math> </p>
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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> <p><math>\square + 2 = 8</math></p> <p><math>8 - 2 = \square</math></p> <p><math>8 - \square = 2</math></p>	<p>b. <math>\underline{\quad} + \underline{\quad} = 10</math></p> <p><math>\underline{\quad} + \underline{\quad} = 10</math></p> <p><math>10 - 7 = \square</math></p> <p><math>10 - \square = 7</math></p>	<p>c. <math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math></p> <p><math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math></p> <p><math>9 - \square = 6</math></p> <p><math>\underline{\quad} - \underline{\quad} = \underline{\quad}</math></p>
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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!

It is like “adding backwards”:

$$\begin{array}{c} \text{Add.} \\ \leftarrow + \\ \boxed{8} - 6 = 2 \end{array}$$

$$\begin{array}{c} \text{Add.} \\ \leftarrow + \\ \boxed{23} - 3 = 20 \end{array}$$

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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### Puzzle Corner

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 child can turn the clock hands.

First we practice telling time in the *hours:minutes* form (such as 10:20), and then using the colloquial phrases “ten after,” “quarter till,” and so on.

Also studied are simple time intervals, or how much time passes. When practicing these, tell the child to imagine moving the minute (or 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
Review - Whole and Half Hours .....	35	<i>1 page</i>
The Minutes .....	36	<i>3 pages</i>
The Minutes, Part 2 .....	39	<i>2 pages</i>
Past and Till in Five-Minute Intervals .....	41	<i>3 pages</i>
How Many Hours Pass? .....	44	<i>2 pages</i>
The Calendar: Weekdays and Months .....	46	<i>3 pages</i>
The Calendar: Dates .....	49	<i>3 pages</i>
Review 1.....	52	<i>1 page</i>

### Helpful Resources on the Internet

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

#### Analog 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)

#### Match Clocks

Make the digital clock to show the time given with the analog 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 analog and type in the time in digital form. Very clear clock and good 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 2 clocks that have draggable 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 till it, or 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 analog 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 customization. Easy to use and set up.

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

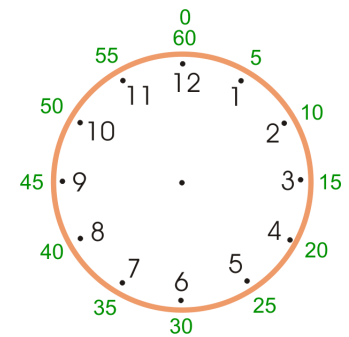
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# The Minutes

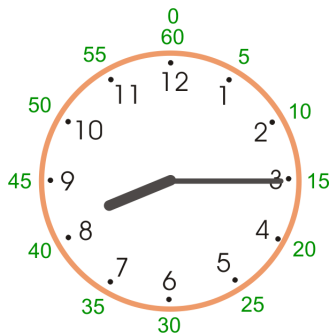
When the hour hand moves from one number to the next (from 1 to 2, or from 6 to 7, etc.), it takes one hour to do that.

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.

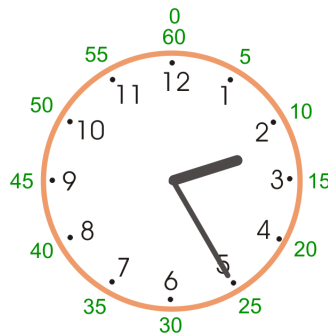
When you read the minute hand, you use the green numbers (marked outside the clock face of the clock on the right). They go by fives, and are not normally marked on clocks. You need to know them. Just skip-count by fives!



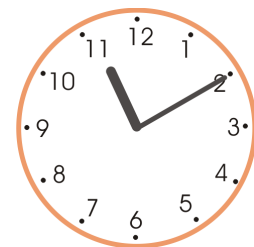
1 hour = 60 minutes.  
1/2 hour = 30 minutes.



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

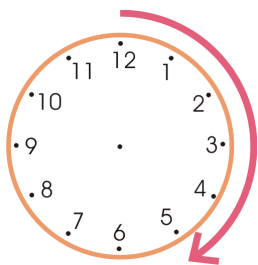


The hour hand is past 2.  
The minute hand is at 25.  
The time is 2:25.

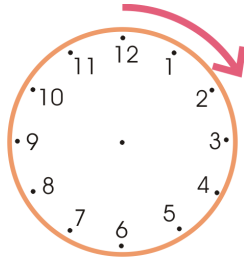


The hour hand is past 11.  
The minute hand is at 10.  
The time is 11:10.

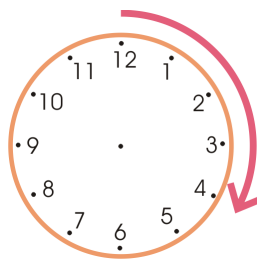
1. The arrow shows how much the minute hand travels. How many minutes pass?



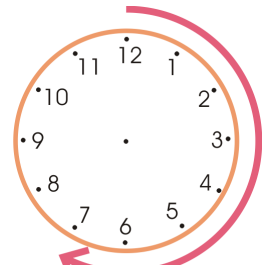
a. \_\_\_\_\_ minutes



b. \_\_\_\_\_ minutes

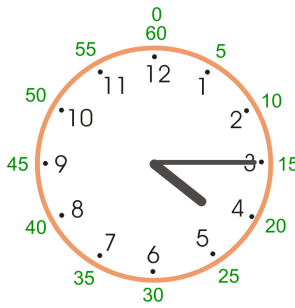
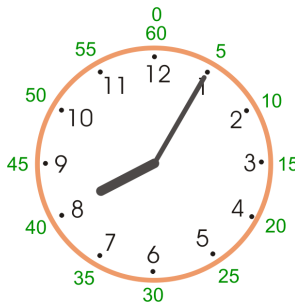



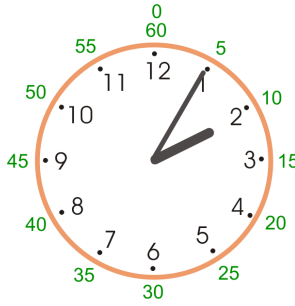
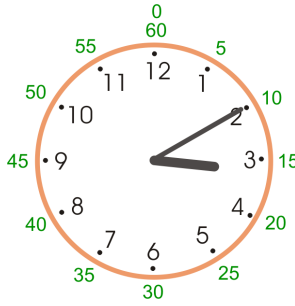
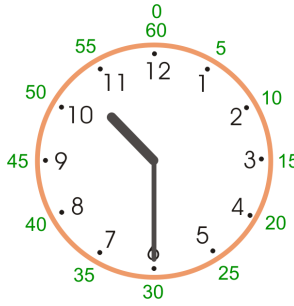


c. \_\_\_\_\_ minutes

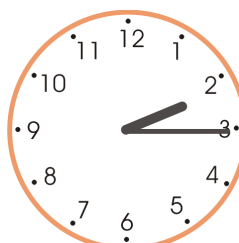


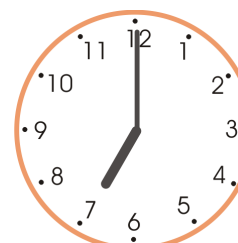






d. \_\_\_\_\_ minutes

2. Write the time using the special clock that shows the numbers for hours and for minutes.

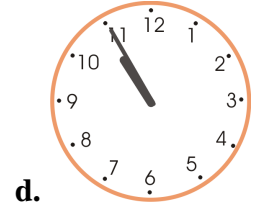
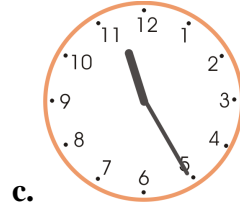
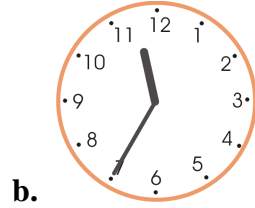
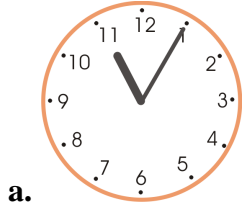
 <p><b>a.</b> _____ : _____</p>	 <p><b>b.</b> _____ : _____</p>	 <p><b>c.</b> _____ : _____</p>	 <p><b>d.</b> _____ : _____</p>
 <p><b>e.</b> _____ : _____</p>	 <p><b>f.</b> _____ : _____</p>	 <p><b>g.</b> _____ : _____</p>	 <p><b>h.</b> _____ : _____</p>

3. Write the time using the normal clock. Remember, the numbers for the minute hand are not shown, and they go by 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 memorizing the basic addition and subtraction 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 memorize 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 math strategy to get the answer.

Some children 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 below).

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 reviewing 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 into two parts. For example, in the sum  $9 + 7$ , the child first completes 10 by adding  $9 + 1$ . Then, the child adds the rest, or 6, to 10. Learning this prepares the child 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 memorizing the basic addition facts. There are 20 such facts:

$9 + 2$  till  $9 + 9$ : 8 facts  
 $8 + 3$  till  $8 + 8$ : 6 facts  
 $7 + 4$  till  $7 + 7$ : 4 facts  
 $6 + 5$  till  $6 + 6$ : 2 facts

After those lessons, we study subtraction. First, the child 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 practices 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 emphasize 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
Review: Completing the Next Whole Ten .....	57	2 pages
Review: Going Over Ten .....	59	2 pages
Adding with 9 .....	61	2 pages
Adding with 8 .....	63	2 pages
Adding with 7 .....	65	2 pages
Adding with 6 .....	67	2 pages
Review—Facts with 6, 7, and 8 .....	69	2 pages
Subtract to Ten .....	71	2 pages
Difference and How Many More .....	73	3 pages
Number Rainbows—11 and 2 .....	76	2 pages
Fact Families with 11 .....	78	1 page
Fact Families with 12 .....	79	2 pages
Number Rainbows—13 and 14 .....	81	1 page
Fact Families with 13 and 14 .....	82	3 pages
Fact Families with 15 .....	85	2 pages
Fact Families with 16 .....	87	2 pages
Fact Families with 17 and 18 .....	89	3 pages
Mixed Review .....	91	2 pages
Review .....	93	3 pages

## Helpful Resources on the Internet

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

### Video: Strategies for Subtraction Facts

I recommend the usage of FACT FAMILIES in order to learn the basic subtraction facts. That way, when children 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 math. 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 neighboring die-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. Practices 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/mathsub.html>

### **Aplus Math Games**

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

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

### **Addition Surprise**

Draw the answer square in the addition table.

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

### **Fun 4 the Brain**

Practice 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**

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

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

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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 practice. Don't write the answers there.  
Just point to different problems and say the answer aloud.

1. Add. First, circle the ten.

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

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

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

$2 + 2 = \underline{\quad}$  $3 + 3 = \underline{\quad}$  $4 + 4 = \underline{\quad}$	$5 + 5 = \underline{\quad}$  $6 + 6 = \underline{\quad}$  $7 + 7 = \underline{\quad}$	$8 + 8 = \underline{\quad}$  $9 + 9 = \underline{\quad}$  $10 + 10 = \underline{\quad}$
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Addition facts with eight. Do not write the answers down, but just practice 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.

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

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

b. Ashley is 13 years old, and Maryann is 5.  
How many years older is Ashley than Maryann?

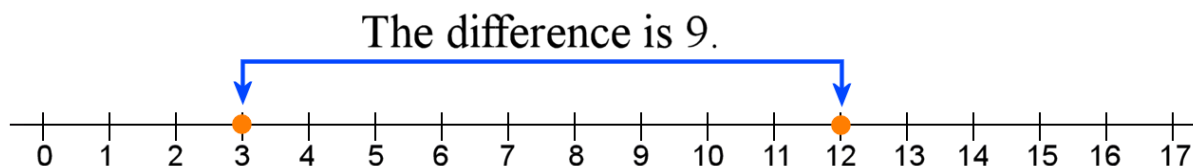
5. Find the patterns and continue them.

<p>a. <math>8 + 2 = \underline{\quad}</math></p> <p><math>8 + 4 = \underline{\quad}</math></p> <p><math>8 + 6 = \underline{\quad}</math></p> <p><math>8 + \underline{\quad} = \underline{\quad}</math></p> <p><math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math></p> <p><math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math></p> <p><math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math></p>	<p>b. <math>18 + 2 = \underline{\quad}</math></p> <p><math>18 + 4 = \underline{\quad}</math></p> <p><math>18 + 6 = \underline{\quad}</math></p> <p><math>18 + \underline{\quad} = \underline{\quad}</math></p> <p><math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math></p> <p><math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math></p> <p><math>\underline{\quad} + \underline{\quad} = \underline{\quad}</math></p>	<p>c.</p> <p><math>\frac{1}{2}</math> of 0 is <math>\underline{\quad}</math>.</p> <p><math>\frac{1}{2}</math> of 2 is <math>\underline{\quad}</math>.</p> <p><math>\frac{1}{2}</math> of 4 is <math>\underline{\quad}</math>.</p> <p><math>\frac{1}{2}</math> of <math>\underline{\quad}</math> is <math>\underline{\quad}</math>.</p> <p><math>\frac{1}{2}</math> of <math>\underline{\quad}</math> is <math>\underline{\quad}</math>.</p> <p><math>\frac{1}{2}</math> of <math>\underline{\quad}</math> is <math>\underline{\quad}</math>.</p> <p><math>\frac{1}{2}</math> of <math>\underline{\quad}</math> is <math>\underline{\quad}</math>.</p>
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## Difference and How Many More

**The difference** of two numbers on the number line means how far apart they are from each other. The difference of 3 and 12 is 9, because those two numbers are NINE steps apart.



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

a. The difference of 10 and 6 _____	b. The difference of 12 and 8 _____
c. The difference of 14 and 2 _____	d. The difference of 17 and 6 _____

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

The difference of 10 and 4? Subtract  $10 - 4 = 6$ . The difference is 6.

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

The difference of 10 and 4 a. _____ - _____ = _____	The difference of 2 and 9 b. _____ - _____ = _____	The difference of 8 and 3 c. _____ - _____ = _____
The difference of 20 and 50 d. _____ - _____ = _____	The difference of 10 and 90 e. _____ - _____ = _____	The difference of 19 and 8 f. _____ - _____ = _____

3. Solve the subtractions by thinking of their difference—how far apart the two numbers are from each other.

a. $20 - 16 = \underline{\quad}$	b. $40 - 38 = \underline{\quad}$	c. $65 - 61 = \underline{\quad}$	d. $36 - 31 = \underline{\quad}$
e. $100 - 99 = \underline{\quad}$	f. $87 - 84 = \underline{\quad}$	g. $55 - 50 = \underline{\quad}$	h. $79 - 78 = \underline{\quad}$

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

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

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

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

a. The difference of 10 and 6 is _____. $6 + \underline{\quad} = 10$	b. The difference of 6 and 12 is _____. $6 + \underline{\quad} = 12$
c. The difference of 15 and 8 is _____. $\underline{\quad} + \underline{\quad} = \underline{\quad}$	d. The difference of 4 and 11 is _____. $\underline{\quad} + \underline{\quad} = \underline{\quad}$

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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So, there are **two ways** to find the difference: subtraction or a “*how many more*” addition.

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

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

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

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

6. Find the differences.

a. The difference of 60 and 56 _____	b. The difference of 22 and 20 _____
c. The difference of 35 and 1 _____	d. The difference of 67 and 3 _____
e. The difference of 50 and 30 _____	f. The difference of 40 and 100 _____
g. The difference of 19 and 14 _____	h. The difference of 78 and 4 _____

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 of the two numbers.

7. Solve the word problems.

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

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

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

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

e. Betty is going batty with flies! She killed 28 flies. Her husband killed 5 flies.  
How many more did she kill than him?

f. The next day, Betty was again going batty with flies. 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. Matthew had \$12 and Bob had \$6. Then both brothers worked helping dad in the garden. Matthew earned \$5 and Bob earned \$9.  
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 math

Mental math 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 child 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 practice 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 review problems about doubling and even and odd numbers.

#### The Lessons

	page	span
Going Over to the Next Ten .....	99	3 pages
Add with Two-Digit Numbers Ending in 9 .....	102	2 pages
Add a Two-Digit Number and a Single-Digit Number Mentally.....	104	3 pages
Regrouping withTens .....	106	3 pages
Add in Columns Practice .....	109	3 pages
Mental Addition of Two-Digit Numbers .....	112	3 pages
Adding Three or Four Numbers Mentally .....	115	2 pages
Adding Three or Four Numbers in Columns.....	117	4 pages
Mixed Review .....	121	2 pages
Review .....	123	2 pages

## Helpful Resources on the Internet

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

### **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 tens, or ten hundreds 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**

Practice 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**

Practice 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 colored 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**

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

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

### **Double Digit Addition**

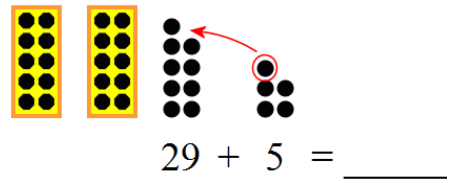
Match the addition problem with the correct sum. Enjoy!

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

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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.

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

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





a. $19 + 7 = \underline{\hspace{2cm}}$ $\underline{9} + \underline{7} = \underline{\hspace{2cm}}$	b. $49 + 3 = \underline{\hspace{2cm}}$ $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{2cm}}$	c. $39 + 4 = \underline{\hspace{2cm}}$ $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{2cm}}$
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3. Add. Compare the problems.

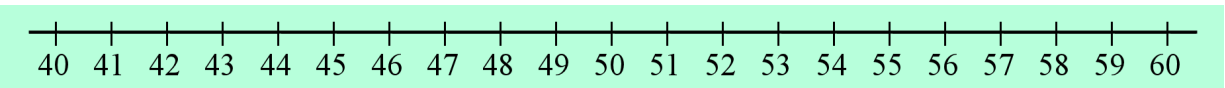
a. $9 + 3 = \underline{\hspace{2cm}}$ $19 + 3 = \underline{\hspace{2cm}}$	b. $9 + 6 = \underline{\hspace{2cm}}$ $39 + 6 = \underline{\hspace{2cm}}$	c. $9 + 4 = \underline{\hspace{2cm}}$ $49 + 4 = \underline{\hspace{2cm}}$
d. $9 + 7 = \underline{\hspace{2cm}}$ $39 + 7 = \underline{\hspace{2cm}}$ $29 +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



4. These problems review the basic facts with 9 and 8. By this time you should already remember these addition facts. Try to remember what number will fit, and not count.

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

5. Find the difference of numbers. The number line can help.



<b>a.</b> Difference of 41 and 53	<b>b.</b> Difference of 60 and 46	<b>c.</b> Difference of 59 and 48
$\underline{\quad}$	$\underline{\quad}$	$\underline{\quad}$

6. Find the patterns and continue them!

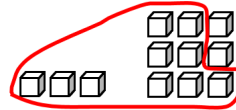
<b>a.</b>	
$\begin{array}{cccccccc} + \square & + \square & + \square & + \square & + \square & + \square & + \square & + \square \\ \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright \end{array}$	
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<b>b.</b>	
$\begin{array}{cccccccc} + \square & + \square & + \square & + \square & + \square & + \square & + \square & + \square \\ \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright \end{array}$	
$\underline{\quad}$ $\underline{\quad}$ $\underline{\quad}$ $\underline{\quad}$ $\underline{\quad}$ 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.

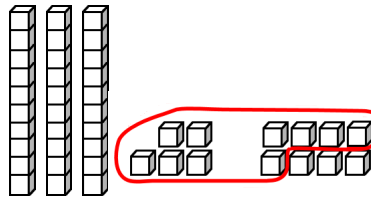
There are two little ones left over, so we write “2” in the ones column.



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.

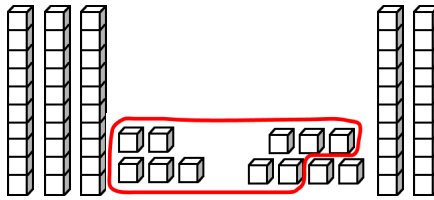


tens	ones
3	5
	8
4	3

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;">tens</th> <th style="padding: 5px;">ones</th> </tr> </thead> <tbody> <tr> <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="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 colspan="2" style="border-top: 1px solid black; border-bottom: 1px solid black;"></td> </tr> <tr> <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;">tens</th> <th style="padding: 5px;">ones</th> </tr> </thead> <tbody> <tr> <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="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 colspan="2" style="border-top: 1px solid black; border-bottom: 1px solid black;"></td> </tr> <tr> <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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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
+	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.

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tens	ones																

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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.

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

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 eleven).

$$\begin{array}{r} 3 \\ 3 \\ 1 \\ 2 \\ + 2 \\ \hline 111 \end{array}$$

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

a.  $8 + 4 + 5 = \underline{\hspace{2cm}}$

b.  $3 + 8 + 7 = \underline{\hspace{2cm}}$

c.  $8 + 5 + 6 + 4 = \underline{\hspace{2cm}}$

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

a. 
$$\begin{array}{r} 52 \\ 30 \\ + 11 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 13 \\ 25 \\ + 54 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 33 \\ 38 \\ + 27 \\ \hline \end{array}$$

d. 
$$\begin{array}{r} 36 \\ 27 \\ + 19 \\ \hline \end{array}$$

e. 
$$\begin{array}{r} 36 \\ 27 \\ 18 \\ + 16 \\ \hline \end{array}$$

f. 
$$\begin{array}{r} 40 \\ 18 \\ 16 \\ + 22 \\ \hline \end{array}$$

g. 
$$\begin{array}{r} 15 \\ 17 \\ 18 \\ + 39 \\ \hline \end{array}$$

h. 
$$\begin{array}{r} 12 \\ 29 \\ 25 \\ + 14 \\ \hline \end{array}$$

i. 
$$\begin{array}{r} 19 \\ 69 \\ + 19 \\ \hline \end{array}$$

j. 
$$\begin{array}{r} 56 \\ 32 \\ + 29 \\ \hline \end{array}$$

k. 
$$\begin{array}{r} 45 \\ 55 \\ + 19 \\ \hline \end{array}$$

l. 
$$\begin{array}{r} 59 \\ 19 \\ + 42 \\ \hline \end{array}$$

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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 recognize and draw basic shapes, and identify triangles, rectangles, squares, quadrilaterals, pentagons, hexagons, and cubes. Drawing happens 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 let children explore geometry and help them memorize 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 color parts to show a given fraction. We also study comparing fractions using visual models.

### The Lessons

	page	span
Shapes Review .....	127	3 pages
Surprises with Shapes .....	130	2 pages
Rectangles and Squares .....	132	3 pages
Making Shapes .....	137	1 page
Geometric Patterns .....	138	2 pages
Solids .....	140	2 pages
Printable Shapes .....	143	4 pages
Some Fractions.....	151	3 pages
Comparing Fractions .....	154	2 pages
Mixed Review .....	156	2 pages
Review .....	158	2 pages



# Helpful Resources on the Internet

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

## **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>

## **Polygon Playground**

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

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

## **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>

## **Interactive Tangram Puzzle**

Place the tangram pieces so they form the given shape. Uses Java.

[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)

## **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>

## **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>

## **Fractions - Part of a Whole**

Divide the pie into pieces and color 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 color 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>

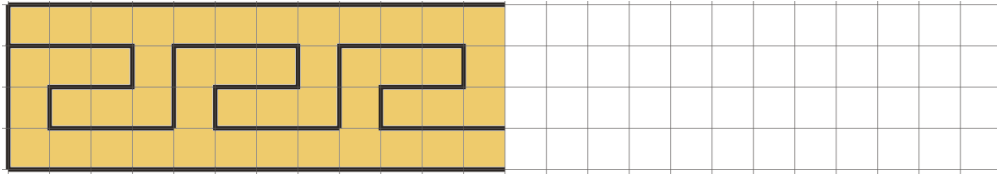
**Sample worksheet from**

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

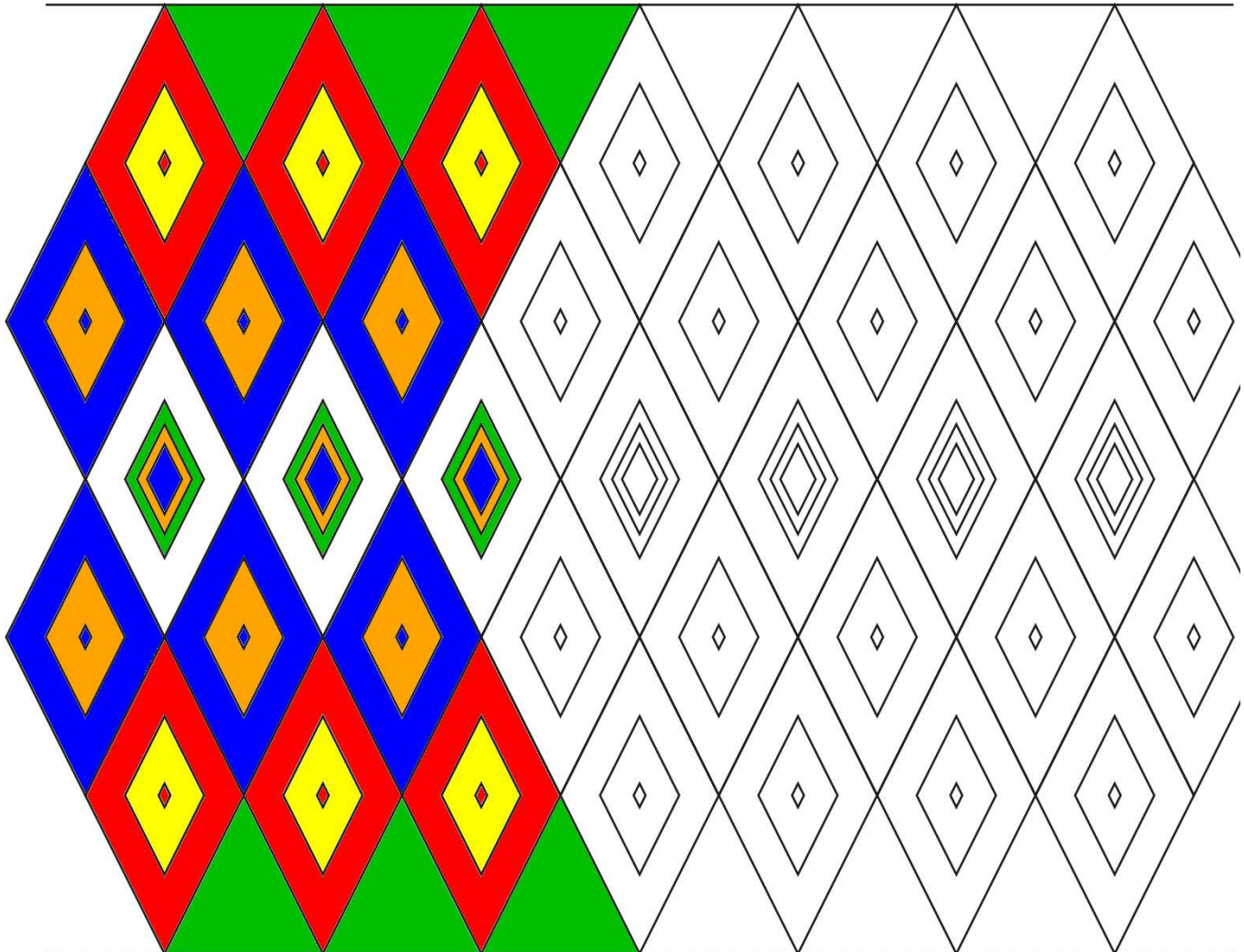
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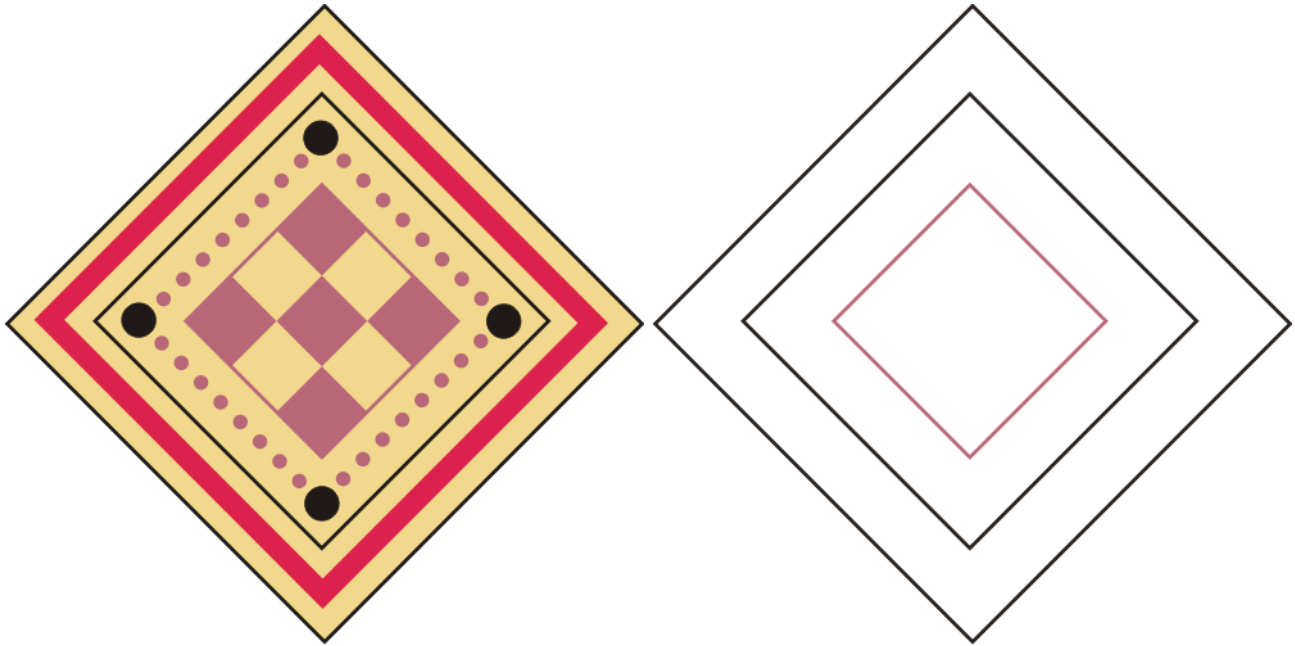
# Geometric Patterns

1. The design below is often seen in 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 coloring in the pattern.



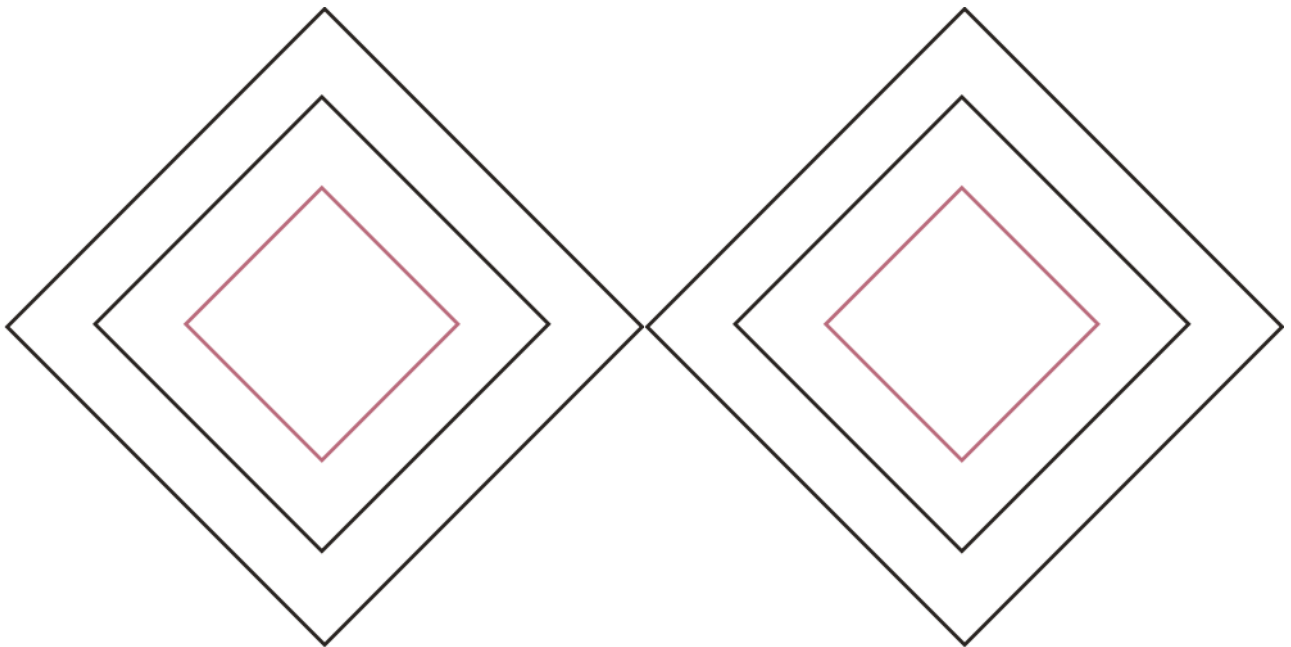


3. This is a geometric design found on a Greek vase.

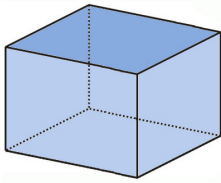
a. What two shapes are used in this design?

\_\_\_\_\_ and \_\_\_\_\_

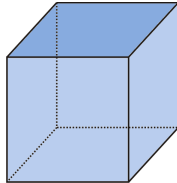
b. Copy the design at least once in the empty shapes.



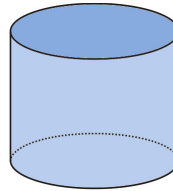
# Solids



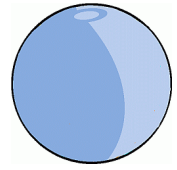
This is a **box**. It is also called a “rectangular prism.”



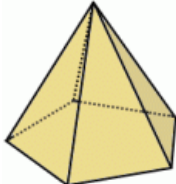
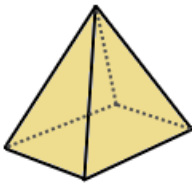
A **cube** is a box, too, but all of its sides are equal in length.



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



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 provided 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?

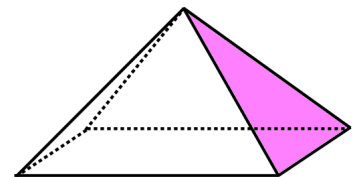
b. Count how many faces a box has. \_\_\_\_\_ faces

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.