Contents

Chapter 4: Multiplication Tables

Chapter 5: Time

Chapter 6: Money

Foreword

Math Mammoth Grade 3, South African Version, comprises a complete maths curriculum for the third grade mathematics studies. This curriculum is essentially the same as the U.S. version of Math Mammoth Grade 3, only customised for South African audiences in a few aspects (listed below). The curriculum meets the Common Core Standards in the United States, but it may not perfectly align to the third grade/year standards in your country.

This version of Math Mammoth has been customised for South Africa in these aspects:

- The currency used in the money chapter (chapter 6) is the South African Rand. (The download version of the curriculum also includes this chapter for the U.S., British, Canadian, European, Australian, and New Zealand currencies.)
- The curriculum uses only metric measurement units.
- The spelling conforms British international standards.
- Large numbers are formatted with a space as the thousands separator (such as 12 394). (Decimals are formatted with a decimal comma.)
- The pages are formatted for A4 size paper.

The main areas of study in Math Mammoth Grade 3 are:

1. Students develop an understanding of multiplication and division of whole numbers through problems involving equal-sized groups, arrays, and area models. They learn the relationship between multiplication and division, and solve many word problems involving multiplication and division (chapters 3, 4, and 8).
2. Students develop an understanding of fractions, beginning with unit fractions. They compare fractions by using visual models and strategies based on noticing equal numerators or denominators (chapter 11).
3. Students learn the concepts of area and perimeter. They relate area to multiplication and to addition, recognise perimeter as a linear measure (in contrast with area) and solve problems involving area and perimeter (chapter 10).
4. Students fluently add and subtract within 1000, both mentally and in columns. They also learn to add and subtract four-digit numbers, and use addition and subtraction in problem solving in many contexts, such as with money, time, and geometry (chapters 1, 2, and 7).

Additional topics we study are time, money, measuring, and graphs.

This book, 3-A, covers addition and subtraction (chapters 1-2), the concept of multiplication (chapter 3), the multiplication tables (chapter 4), time (chapter 5) and money (chapter 6). The rest of the topics are in the 3-B worktext.

I heartily recommend that you read the full user guide in the following pages.

I wish you success in teaching maths!

Maria Miller, the author

User Guide

Note: You can also find the information that follows online, at **https://www.mathmammoth.com/userguides/** .

Basic principles in using Math Mammoth Complete Curriculum

Math Mammoth is mastery-based, which means it concentrates on a few major topics at a time, in order to study them in depth. The two books (parts A and B) are like a "framework", but you still have a lot of liberty in planning your child's studies. You can even use it in a *spiral* manner, if you prefer. Simply have your student study in 2-3 chapters simultaneously. In third grade, I suggest studying chapters 1-4 in order, but you can be flexible with the other chapters and schedule them earlier or later.

Math Mammoth is not a scripted curriculum. In other words, it is not spelling out in exact detail what the teacher is to do or say. Instead, Math Mammoth gives you, the teacher, various tools for teaching:

- **The two student worktexts** (parts A and B) contain all the lesson material and exercises. They include the explanations of the concepts (the teaching part) in blue boxes. The worktexts also contain some advice for the teacher in the "Introduction" of each chapter.

  The teacher can read the teaching part of each lesson before the lesson, or read and study it together with the student in the lesson, or let the student read and study on his own. If you are a classroom teacher, you can copy the examples from the "blue teaching boxes" to the board and go through them on the board.

- There are hundreds of **videos** matched to the curriculum available at https://www.mathmammoth.com/videos/ . There isn't a video for every lesson, but there are dozens of videos for each grade level. You can simply have the author teach your child or student!

- Don't automatically assign all the exercises. Use your judgement, trying to assign just enough for your student's needs. You can use the skipped exercises later for revision. For most students, I recommend to start out by assigning about half of the available exercises. Adjust as necessary.

- Each chapter introduction contains a **list of links to various free online games** and activities. These games can be used to supplement the maths lessons, for learning maths facts, or just for some fun.

- The student books contain some **mixed revision lessons**, and the curriculum also provides you with additional **cumulative revision lessons**.

- There is a **chapter test** for each chapter of the curriculum, and a comprehensive end-of-year test.

- The **worksheet maker** allows you to make additional worksheets for most calculation-type topics in the curriculum. This is a single html file. You will need Internet access to be able to use it.

- You can use the free online exercises at https://www.mathmammoth.com/practice/
  This is an expanding section of the site, so check often to see what new topics we are adding to it!

- Some grade levels have **cut-outs** to make fraction manipulatives or geometric solids.

- And of course there are answer keys to everything.

How to get started

Have ready the first lesson from the student worktext. Go over the first teaching part (within the blue boxes) with your child. Go through a few of the first exercises together, and then assign some problems for your child to do on their own.

Repeat this if the lesson has other blue teaching boxes. Naturally, you can also use the videos at https://www.mathmammoth.com/videos/.

Many students can eventually study the lessons completely on their own — the curriculum becomes self-teaching. However, students definitely vary in how much they need someone to be there to actually teach them.

Pacing the curriculum

Each chapter introduction contains a suggested pacing guide for that chapter. You will see a summary on the right. (This summary does not include time for optional tests.)

Worktext 3-A	
Chapter 1	10 days
Chapter 2	14 days
Chapter 3	13 days
Chapter 4	19 days
Chapter 5	14 days
Chapter 6	10 days
TOTAL	**80 days**

Worktext 3-B	
Chapter 7	11 days
Chapter 8	15 days
Chapter 9	8 days
Chapter 10	22 days
Chapter 11	15 days
TOTAL	**71 days**

Most lessons are 2 or 3 pages long, intended for one day. Some 3-page lessons can take two days. Some lessons are 4-5 pages and can be covered in two days. There are also a few optional lessons (not included in the tables on the right).

It can also be helpful to calculate a general guideline as to how many pages per week the student should cover in order to go through the curriculum in one school year.

The table below lists how many pages there are for the student to finish in this particular grade level, and gives you a guideline for how many pages per day to finish, assuming a 180-day (36-week) school year. The page count in the table below *includes* the optional lessons.

Example:

Grade level	School days	Days for tests and revisions	Lesson pages	Days for the student book	Pages to study per day	Pages to study per week
3-A	93	12	209	86	2,43	12,2
3-B	87	10	175	72	2,43	12,2
Grade 3 total	180	22	384	158	2,43	12,2

The table below is for you to fill in. Allow several days for tests and additional revision before tests — I suggest at least twice the number of chapters in the curriculum. Then, to get a count of "pages to study per day", **divide the number of lesson pages by the number of days for the student book**. Lastly, multiply this number by 5 to get the approximate page count to cover in a week.

Grade level	Number of school days	Days for tests and revisions	Lesson pages	Days for the student book	Pages to study per day	Pages to study per week
3-A						
3-B						
Grade 3 total						

Now, something important. Whenever the curriculum has lots of similar practice problems (a large set of problems), feel free to **only assign 1/2 or 2/3 of those problems**. If your student gets it with less amount of exercises, then that is perfect! If not, you can always assign the rest of the problems for some other day. In fact, you could even use these unassigned problems the next week or next month for some additional revision.

In general, 1st-2nd graders might spend 25-40 minutes a day on maths. Third-fourth graders might spend 30-60 minutes a day. Fifth-sixth graders might spend 45-75 minutes a day. If your student finds maths enjoyable, they can of course spend more time with it! However, it is not good to drag out the lessons on a regular basis, because that can then affect the student's attitude towards maths.

Working space, the usage of additional paper, and mental maths

The curriculum generally includes working space directly on the page for students to work out the problems. However, feel free to let your students use extra paper when necessary. They can use it, not only for the "long" algorithms (where you line up numbers to add, subtract, multiply, and divide), but also to draw diagrams and pictures to help organise their thoughts. Some students won't need the additional space (and may resist the thought of extra paper), while some will benefit from it. Use your discretion.

Some exercises don't have any working space, but just an empty line for the answer (e.g. 200 + _____ = 1000). Typically, I have intended that such exercises to be done using MENTAL MATHS.

However, there are some students who struggle with mental maths (often this is because of not having studied and used it in the past). As always, the teacher has the final say (not me!) as to how to approach the exercises and how to use the curriculum. We do want to prevent extreme frustration (to the point of tears). The goal is always to provide SOME challenge, but not too much, and to let students experience success enough so that they can continue to enjoy learning maths.

Students struggling with mental maths will probably benefit from studying the basic principles of mental calculations from the earlier levels of Math Mammoth curriculum. To do so, look for lessons that list mental maths strategies. They are taught in the chapters about addition, subtraction, place value, multiplication, and division. My article at https://www.mathmammoth.com/lessons/practical_tips_mental_math also gives you a summary of some of those principles.

Using tests

For each chapter, there is a **chapter test**, which can be administered right after studying the chapter. **The tests are optional.** Some families might prefer not to give tests at all. The main reason for the tests is for diagnostic purposes, and for record keeping. These tests are not aligned or matched to any standards.

In the digital version of the curriculum, the tests are provided as PDF files. You can edit them (such as to change the numbers in them) to provide a different test using PDF apps that have editing capabilities. You can even use the annotation tools (such as text boxes) available in most PDF apps. Remember to save the edited file under a different file name, or you will lose the original.

The end-of-year test is best administered as a diagnostic or assessment test, which will tell you how well the student remembers and has mastered the mathematics content of the entire grade level.

Using cumulative revisions and the worksheet maker

The student books contain mixed revision lessons which revise concepts from earlier chapters. The curriculum also comes with additional cumulative revision lessons, which are just like the mixed revision lessons in the student books, with a mix of problems covering various topics. These are found in their own folder in the digital version, and in the Tests & Cumulative Revisions book in the print version.

The cumulative revisions are optional; use them as needed. They are named indicating which chapters of the main curriculum the problems in the revision come from. For example, "Cumulative Revision, Chapter 4" includes problems that cover topics from chapters 1-4.

Both the mixed and cumulative revisions allow you to spot areas that the student has not grasped well or has forgotten. When you find such a topic or concept, you have several options:

1. Check if the worksheet maker lets you make worksheets for that topic.
2. Check for any online games and resources in the Introduction part of the particular chapter in which this topic or concept was taught.
3. If you have the digital version, you could reprint the lesson from the student worktext, and have the student restudy that.

4. Perhaps you only assigned 1/2 or 2/3 of the exercise sets in the student book at first, and can now use the remaining exercises.
5. Check if our online practice area at https://www.mathmammoth.com/practice/ has something for that topic.
6. Khan Academy has free online exercises, articles, and videos for most any maths topic imaginable.

Concerning challenging word problems and puzzles

While this is not absolutely necessary, I heartily recommend supplementing Math Mammoth with challenging word problems and puzzles. You could do that once a month, for example, or more often if the student enjoys it.

The goal of challenging story problems and puzzles is to **develop the student's logical and abstract thinking and mental discipline**. I recommend starting these in fourth grade, at the latest. Then, students are able to read the problems on their own and have developed mathematical knowledge in many different areas. Of course I am not discouraging students from doing such in earlier grades, either.

Math Mammoth curriculum contains lots of word problems, and they are usually multi-step problems. Several of the lessons utilise a bar model for solving problems. Even so, the problems I have created are usually tied to a specific concept or concepts. I feel students can benefit from solving problems and puzzles that require them to think "out of the box" or are just different from the ones I have written.

I recommend you use the free Math Stars problem-solving newsletters as one of the main resources for puzzles and challenging problems:

Math Stars Problem Solving Newsletter (grades 1-8)
https://www.homeschoolmath.net/teaching/math-stars.php

I have also compiled a list of other resources for problem solving practice, which you can access at this link:

https://l.mathmammoth.com/challengingproblems

Another idea: you can find puzzles online by searching for "brain puzzles for kids," "logic puzzles for kids" or "brain teasers for kids."

Frequently asked questions and contacting us

If you have more questions, please first check the FAQ at https://www.mathmammoth.com/faq-lightblue

If the FAQ does not cover your question, you can then contact us using the contact form at the Math Mammoth.com website.

Chapter 1: Addition and Subtraction

Introduction

This first chapter of *Math Mammoth Grade 3* focuses on mental maths, word problems, and patterns.

The beginning lessons give a revision of basic addition and subtraction facts, plus a revision of some mental maths strategies from second grade, so that even students who perhaps did not study mental maths in earlier grades can now catch up. The rest of the lessons have to do with third grade topics (word problems, patterns).

Students practise writing an equation with an unknown for two-step word problems. This is a challenging topic that will be practised throughout several chapters. In this chapter, the problems include only additions and subtractions. Later in third grade, the problems will also include multiplication and division. Students continue with this topic in fourth grade when they work on multi-step word problems in the same manner, and their work here is foundational to writing equations to solve problems and to model situations with mathematics in all grade levels, including in algebra.

The lessons on the concept of difference and on the connection between addition and subtraction have to do with algebraic thinking, and are also intended to help students with writing equations for the word problems.

Please see the user guide in the beginning of the worktext or at **https://www.mathmammoth.com/userguides/** for more guidance on using and pacing the curriculum.

Keep in mind the free videos that match the curriculum at **https://www.mathmammoth.com/videos/**.

Good Mathematical Practices

- Sometimes an elementary maths problem is better solved with mental maths, and sometimes with paper and pencil calculations. This chapter focuses on mental maths, enabling students to use it as an efficient tool in many future maths problems.
- One focus of this chapter is word problems and writing an equation with an unknown for them. This can be challenging to students, but it is also a wonderful opportunity for them to learn to persevere in solving problems — an essential skill in everyday life. Mention to them that mistakes are not bad because that is when you truly learn. Explain to them that your brain literally grows when you think about and analyse a mistake you made. In the same vein, make sure you as the teacher or parent do not put mistakes down in any manner, but treat them as something valuable.
- The lesson *Patterns* gives students opportunities to look for structure and patterns, which are foundational activities in mathematics.

Pacing Suggestion for Chapter 1

This table does not include the chapter test as it is found in a different book (or file).
Please add one day to the pacing for the test if you use it.

A Letter for the Unknown 2	36	*2 pages*	1 day
Patterns	38	*2 pages*	1 day
Revision Chapter 1	40	*2 pages*	1 day
Chapter 1 Test (optional)			
TOTALS		*21 pages*	10 days
with optional content		*(26 pages)*	(12 days)

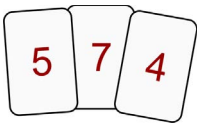
Games and Activities

The Lowest Sum

You need: Number cards with numbers from 2 to 9, preferably at least four copies of each card. A standard deck of cards from which all the aces, face cards, and jokers have been removed is one possibility.

Game play: Shuffle the cards. In each round, deal three cards to each player. Each player will then form one TWO-digit number and one SINGLE-digit number using the three cards, and will calculate the sum of those mentally. The goal is to make this sum to be as small as possible.

For example, let's say you get the cards 5, 7, and 4. You could make these sums: 57 + 4, 45 + 7, 47 + 5 and a few others. But choose the smallest sum!



Each player says their sum aloud. The person with the smallest sum wins all the cards (from all players) used in that round, and puts them into their personal pile.

Continue with the next round by dealing another three cards to each player.

Once you cannot deal three cards to each player, the game is over. The person with MOST cards in their personal pile is the winner.

Variations

1. On each round, each player is allowed to discard ONE of their cards and to draw a new one to replace it, from the deck.
2. Players try to make the largest sum possible, instead of the smallest.
3. Use four cards, and make two 2-digit numbers.
4. Use four cards, and make one 3-digit and one single-digit number.
5. Use five cards, and make one 3-digit and one 2-digit number.
6. Write down each sum of each round, and add those together, to get a final score for each player. The player with the smallest final sum wins.

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7 Up Card Game
You will see seven cards dealt face up. Choose any two cards that make 10 (or your chosen sum) to discard. When there are no cards that make that sum, click the deck to deal more cards. For this chapter, I suggest using sums of 11, 12, 13, and 14.
https://www.mathmammoth.com/practice/seven-up

Mathy's Berry Picking Adventure
Join Mathy, our mammoth mascot, on his adventure, and practise three-digit mental addition and subtraction!
https://www.mathmammoth.com/practice/mathy-berries#mode=td-plus-mult-100,td-minus-mult-100,mult-100-minus-td-mult-10,mult-100-minus-td&duration=2m

Choose other options: https://www.mathmammoth.com/practice/mathy-berries

Bingo
Click on the right answer in the grid, and it will be coloured green. Once you get five in a row, a column, or diagonally, BINGO, you win! For this chapter, choose from any of the addition and subtraction options.
https://www.mathmammoth.com/practice/bingo

Make Number Sentences
You're given numbers (in flowers), and an answer to a maths sentence. Drag two flowers to the empty slots so that the maths sentence is true. For this chapter, use a variety of number ranges to practise single-digit, double-digit, and triple-digit additions and subtractions.
https://www.mathmammoth.com/practice/number-sentences

Fruity Math
Click the fruit with the correct answer and try to get as many points as you can within two minutes. This game covers addition and subtraction, advancing from single-digit to three-digit. You can also use the manual mode to set it up for specific kinds of additions or subtractions.
https://www.mathmammoth.com/practice/fruity-math

Helpful Resources on the Internet

We have compiled a list of Internet resources that match the topics in this chapter, including pages that offer:

- **online practice** for concepts;
- online **games**, or occasionally, printable games;
- **animations** and interactive **illustrations** of maths concepts;
- **articles** that teach a maths concept.

We heartily recommend you take a look! Many of our customers love using these resources to supplement the bookwork. You can use these resources as you see fit for extra practice, to illustrate a concept better and even just for some fun. Enjoy!

https://l.mathmammoth.com/2024/gr3ch1

Scan me

Addition Facts Revision

9-trick

Nine wants to be 10, so it takes "one" from the other number!

The other number becomes one less.

7 + 9
↓ ↓
6 + 10

= 16

8-trick

Eight wants to be 10, so it takes "two" from the other number!

The other number becomes two less.

5 + 8
↓ ↓
3 + 10

= 13

1. Point to the problems and think of the answer. Practise several times! If you don't have these memorised, use the tricks above.

a.	b.	c.	d.
6 + 9	9 + 4	5 + 8	8 + 4
8 + 9	9 + 6	3 + 8	8 + 7
5 + 9	9 + 2	6 + 8	8 + 9
3 + 9	9 + 9	8 + 8	8 + 5

The doubles

Cover the answers, and practise memorising the answers.

2 + 2 = **4**	6 + 6 = **12**
3 + 3 = **6**	7 + 7 = **14**
4 + 4 = **8**	8 + 8 = **16**
5 + 5 = **10**	9 + 9 = **18**

Doubles plus 1

These facts are just one more than a doubles fact! Can you quickly tell each answer?

Point to the problems, and practise.

2 + 3	6 + 7
3 + 4	7 + 8
4 + 5	8 + 9
5 + 6	9 + 10

You can use addition facts to solve other addition problems. **Compare:**

5 + 6 = 11 35 + 6 = 41	8 + 5 = 13 78 + 5 = 83
5 + 6 is one more than 10, so 35 + 6 is one more than the *next* ten (40).	8 + 5 is three more than 10, so 78 + 5 is three more than the *next* ten (80).

2. Add.

a.	**b.**	**c.**
8 + 7 = _____	9 + 9 = _____	4 + 8 = _____
18 + 7 = _____	29 + 9 = _____	34 + 8 = _____
58 + 7 = _____	69 + 9 = _____	64 + 8 = _____

3. Add. Think of the easier problem (with single digits) in your mind.

a. 26 + 7 = _____	**b.** 74 + 9 = _____	**c.** 68 + 8 = _____
d. 58 + 5 = _____	**e.** 24 + 8 = _____	**f.** 49 + 7 = _____

4. Draw a line to connect each problem to its answer.

29 + _____ = 36		86 + _____ = 96
66 + _____ = 76	**7**	46 + _____ = 56
48 + _____ = 56	**10**	57 + _____ = 66
50 + _____ = 56	**9**	38 + _____ = 46
87 + _____ = 96	**6**	89 + _____ = 96
70 + _____ = 76	**8**	39 + _____ = 46
68 + _____ = 76		77 + _____ = 86

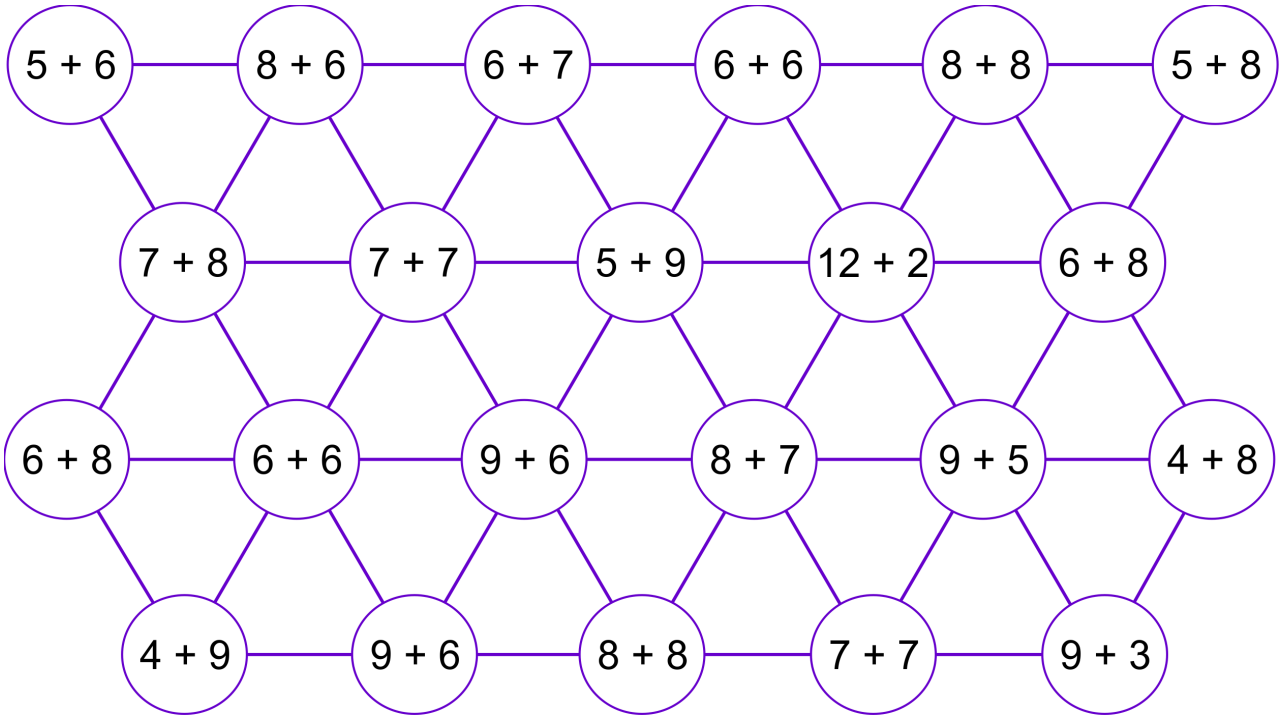
5. Add the same number each time (repeatedly).

a. Add 20.	**b.** Add 40.	**c.** Add 15.	**d.** Add 25.
20	*40*	*15*	*25*
40	*80*	*30*	*50*

6. Play the **Lowest Sum** game. (See the chapter introduction.)

7. Play the **11-Out Go Fish** game. (See the chapter introduction.) Play it also as 12-Out Go Fish and 13-Out Go Fish.

8. Island hopping puzzle! Find a path from the top to the bottom that connects islands with the same answer. *This puzzle is adapted from* ***https://www.earlyfamilymath.org*** *and published here with permission.*



Mental Addition

Break numbers into parts to make adding easier:

30 + 28
/ \
30 + 20 + 8 = _____

12 + 60
/ \
2 + 10 + 60 = _____

1. Break one of the numbers into its tens and ones. Then add using mental maths.

a. 50 + 14 = *50 + 10 + 4* = *64*	**b.** 80 + 11	**c.** 50 + 39
d. 35 + 60	**e.** 10 + 5 + 21	**f.** 29 + 40 + 30

2. Add the tens and the ones separately. Look at the example.

a. 36 + 22 = **30 + 20** + **6 + 2** =	**b.** 72 + 18 = **70 + 10** + **2 + 8** =	**c.** 54 + 37
d. 24 + 55	**e.** 36 + 36	**f.** 42 + 68

3. Play the **5-Card Draw to the Target** game. (See the chapter introduction.)

4. Find the easiest order to add! You can break numbers into parts and add part-by-part.

a. 20 + 40 + 2 + 7 = _____	**b.** 30 + 50 + 8 + 2 = _____	**c.** 40 + 60 + 4 + 3 = _____
d. 10 + 12 + 7 + 3 = _____	**e.** 52 + 4 + 30 + 3 = _____	**f.** 78 + 10 + 2 + 20 = _____

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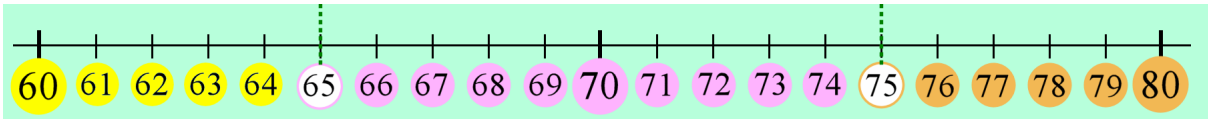
Rounding to the Nearest Ten, Part 1



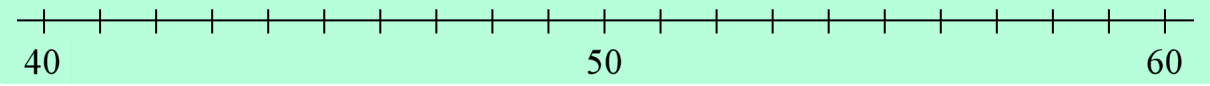
Find these multiples of ten (whole tens) on the number line: 60, 70, and 80.

Which one of those is 62 closest to? _____ And 66? _____ How about 77? _____

Rounding a number means finding another, easy number that the number is close to. *Rounding a number to the nearest ten* means finding which multiple of ten (whole ten) the number is closest to.

We use **the symbol** ≈ to indicate rounding. Read it as "is approximately" or "is about". So, 61 ≈ 60 can be read as "61 is approximately 60" or "61 is about 60".

1. Write on the empty line which multiple of ten (whole ten) each number is closest to.



a. 52 ≈ _____ **b.** 57 ≈ _____ **c.** 43 ≈ _____ **d.** 46 ≈ _____

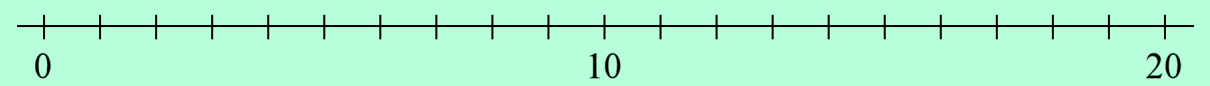
2. Round the numbers to the nearest ten.

a. 32 ≈ _____	**b.** 47 ≈ _____	**c.** 59 ≈ _____	**d.** 88 ≈ _____
e. 11 ≈ _____	**f.** 26 ≈ _____	**g.** 74 ≈ _____	**h.** 93 ≈ _____

Not only 10, 20, 30, and 40, but even *zero* is a multiple of ten.

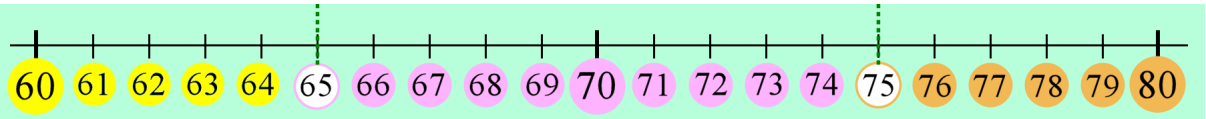
Some numbers do get rounded to zero. Think about it: two is closer to zero than it is to 10! So, rounded to the nearest ten, 2 ≈ 0.

3. Round the numbers to the nearest ten.



a. 7 ≈ _____ **b.** 3 ≈ _____ **c.** 14 ≈ _____ **d.** 19 ≈ _____ **e.** 1 ≈ _____

The middle "5"



The "middle 5" is actually as far from the previous ten as it is from the next ten, but mathematicians have decided to *round it up*. This means we round any two-digit number ending in 5 towards the "upper" or next greater multiple of ten. So, 65 ≈ 70 and 5 ≈ 10.

And, *rounding down* means that you round a number towards the "lower" or previous, lesser multiple of ten. For example, 71 is rounded down to 70.

4. Round these numbers to the nearest ten.

a. 35 ≈ _____	**b.** 65 ≈ _____	**c.** 95 ≈ _____	**d.** 82 ≈ _____
e. 5 ≈ _____	**f.** 66 ≈ _____	**g.** 75 ≈ _____	**h.** 38 ≈ _____

5. Play the **Rounding Three-in-a-Row** game. (Optional; see the chapter introduction.)

So what good does it do to round? Any time that you don't need to know the exact answer, you can use rounded numbers to do calculations. We call this *estimation*.

Example 1. A cell phone costs R78 and another costs R51. So, the one costs *about* R80 and the other costs *about* R50. The one is *about* R30 more expensive than the other.

6. Find *about* how much the two things cost together. Use rounded numbers!

a. a skirt, R28, and pants, R33	**b.** a bag, R56, and light, R12	**c.** a puzzle, R17, and book, R9
together about R _____	together about R _____	together about R _____

7. A farmer has 49 sacks of apples and his neighbour has 18 sacks of apples. *About* how many sacks do they have together?

8. About how much would a R23 DVD and two R28 DVDs cost together?

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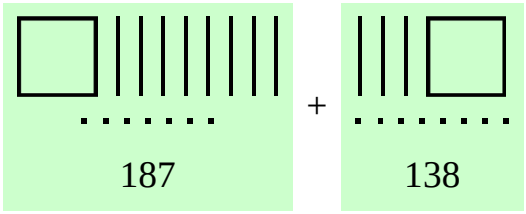
Regrouping in Addition

Remember regrouping?

Ten ones (the dots) make a new ten. Ten tens (the sticks) make a new hundred. *Circle them!*

What is the total now?



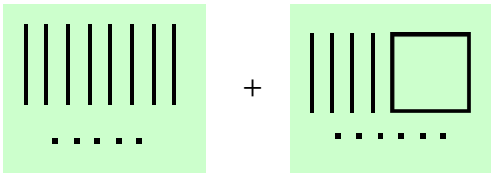
hundreds	tens	ones
	1	1
	1	8	7
+	1	3	8
	3	2	5

In the ones column, we add: 7 + 8 = 15. We *regroup* these 15 ones as 1 ten 5 ones. We move the one ten to the tens column by writing "1" there, above the other numbers.

The tens: 1 + 8 + 3 = 12. Ten of these 12 tens make a hundred. In other words, we regroup the 12 tens as 1 hundred 2 tens. We move the hundred to the hundreds' column by writing "1" there.

1. Write the numbers in the grid, and add. Regroup. You can circle 10 ten-sticks AND 10 ones in the picture to help you. Or, you can do these exercises using base-ten blocks.

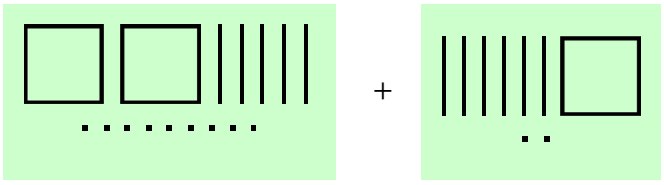
a.



85 + 146

+

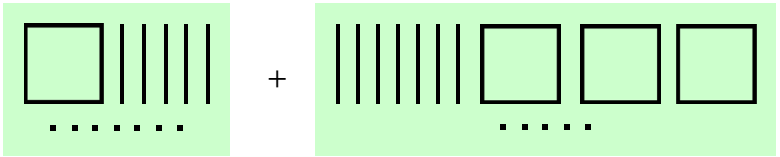
b.



259 + 162

+

c.



157 + 375

+

2. Add.

a.
$$\begin{array}{r} 677 \\ +\ 56 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 599 \\ +\ 43 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 446 \\ +\ 276 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 387 \\ +\ 458 \\ \hline \end{array}$$

$$\begin{array}{r} {\scriptstyle 2\ 2\ \ } \\ 131 \\ 255 \\ 86 \\ +\ 29 \\ \hline 501 \end{array}$$

When there are lots of numbers to add, think which of them add up to easy totals.

In the ones column, we have **1** + **5** + **6** + **9**. Notice, 1 + 9 makes 10 and 5 + 6 makes 11. So, the total is 10 + 11 = 21. That is quicker than adding the numbers one after another.

In the tens column, we have 2 + 3 + 5 + 8 + 2. Which of those add to an easy total?

3. Add. Think in which order you add the numbers in the columns.

a.
$$\begin{array}{r} 34 \\ 212 \\ 258 \\ +\ 56 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 184 \\ 527 \\ 159 \\ +\ 43 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 280 \\ 149 \\ 154 \\ +\ 276 \\ \hline \end{array}$$

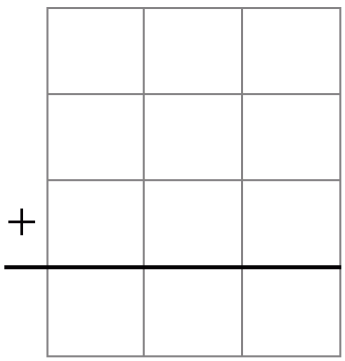
d.
$$\begin{array}{r} 56 \\ 229 \\ 9 \\ +\ 454 \\ \hline \end{array}$$

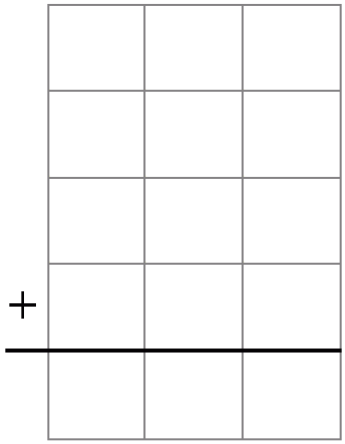
4. Write the numbers in the grids and add.

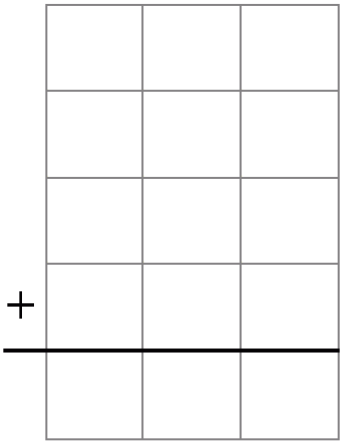
a. 524 + 68 + 180

b. 56 + 309 + 6 + 162

c. 435 + 79 + 107 + 8







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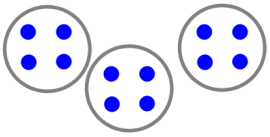
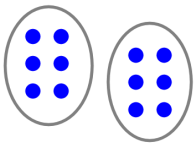
Many Times the Same Group



3 × 4

"three times four"

3 groups of 4



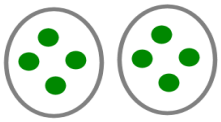
2 × 6

2 times a group of 6

We *multiply* 2 times 6.

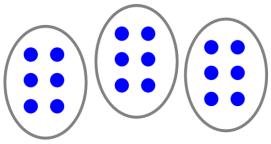
The symbol **×** is read as "times" and indicates **multiplication**. For example, 3 × 5 is read as "three times five", and it means you have three groups of five.

1. How many groups? What size groups? Write the multiplication.



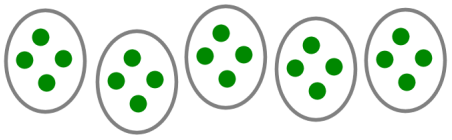
a. *2* × *4*

how many groups | how many in each group



b. ____ × ____

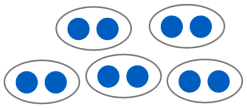
how many groups | how many in each group



c. ____ × ____

how many groups | how many in each group

d. _____ × _____



e. _____ × _____

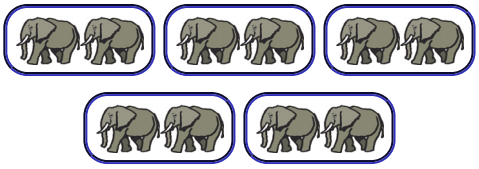
f. *1* × _____

2. Now it is your turn to draw! Remember, the first number tells you how many groups.

a. 2 × 7	**b.** 4 × 2	**c.** 4 × 3
d. 6 × 1	**e.** 1 × 8	**f.** 2 × 2

Now we have **five** groups of **two** elephants each. In total, there are **10 elephants**.

how many groups		how many in each group		how many in total
5	×	2	=	10

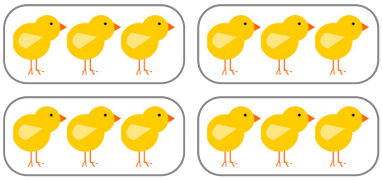


We can solve multiplications by adding repeatedly.

To solve, 5 × 2, we can add 2, five times: 5 × 2 = 2 + 2 + 2 + 2 + 2 = 10

3. Fill in the missing parts.

a.

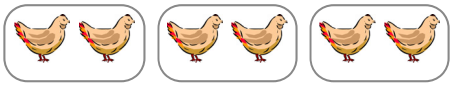


_____ + _____ + _____ + _____

____ groups of ____ chicks in each.

____ × ____ chicks = ____ chicks

b.



_____ + _____ + _____

____ groups of ____ hens in each.

____ × ____ hens = ____ hens

c.

_____ + _____ + _____

____ groups of ***1*** dog in each.

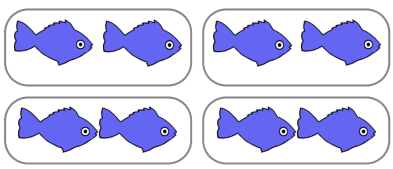
____ × ____ dog = ____ dogs

d.

1 group of ____ carrots in it.

____ × ____ carrots = ____ carrots

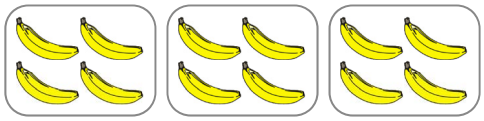
e.



_____ + _____ + _____ + _____

_____ × _____ = _____

f.



_____ + _____ + _____

_____ × _____ = _____

4. Now it is your turn to draw. Draw circles or sticks. Write the multiplication sentence.

a. Draw 3 groups of seven sticks. _____ × _____ = _____	**b.** Draw 2 groups of eight circles. _____ × _____ = _____
c. Draw 4 groups of one circle. _____ × _____ = _____	**d.** Draw 5 groups of two sticks. _____ × _____ = _____

5. Draw groups to solve the multiplications.

a. 5 × 4 = _____	**b.** 4 × 6 = _____

6. These questions have to do with equal-size groups. Write a multiplication for each. Drawing can help.

a. How many legs do five cows have? _____ × _____ = _____	**b.** How many wheels do six bicycles have? _____ × _____ = _____
c. How many legs do eight chickens have? _____ × _____ = _____	**d.** One bunch of grapes has 11 grapes. How many grapes are in three such bunches? _____ × _____ = _____

Multiplication as an Array

An **array** is an orderly arrangement of things in rows and columns.
When things are neatly aligned in an array, we can think of the *rows as groups*.

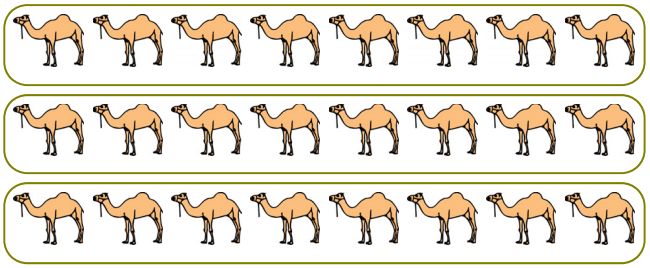
Since each group has the same amount of things, we can write a multiplication.

3 rows, 8 camels in each row.

$8 + 8 + 8$

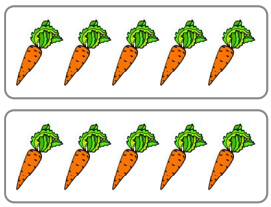
$3 \times 8 = 24$

That's a lot of camels!



1. Do the **Multiplication Arrays** activity. (Optional; see the chapter introduction.)

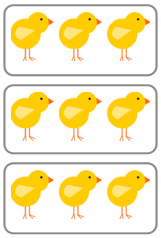
2. Fill in the missing numbers.



a. _____ rows, _____ carrots in each row.

_____ + _____

_____ × _____ = _____ carrots



b. _____ rows, _____ chicks in each row.

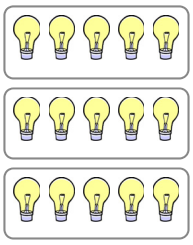
_____ + _____ + _____

_____ ×_____ = _____ chicks

c. _____ rows, _____ bear in each row.

_____ + _____ + _____

_____ × _____ = _____ bears



d. _____ rows, _____ bulbs in each row.

_____ + _____+ _____

_____ × _____ = _____ bulbs

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Multiplication Table of 4

1. **a.** Skip-count by 2 and by 4.

0, 2, 4, ____, ____, ____, ____, ____, ____, ____, ____, ____, 24

0, 4, 8, ____, ____, ____, ____, ____, ____, ____, ____, ____, 48

b. What do you notice?

What do you wonder?

2. Fill in the multiplication table of 2 and the table of 4, and compare them. What do you notice?

1 × 2 = ____	7 × 2 = ____
2 × 2 = ____	8 × 2 = ____
3 × 2 = ____	9 × 2 = ____
4 × 2 = ____	10 × 2 = ____
5 × 2 = ____	11 × 2 = ____
6 × 2 = ____	12 × 2 = ____

1 × 4 = ____	7 × 4 = ____
2 × 4 = ____	8 × 4 = ____
3 × 4 = ____	9 × 4 = ____
4 × 4 = ____	10 × 4 = ____
5 × 4 = ____	11 × 4 = ____
6 × 4 = ____	12 × 4 = ____

3. You know that 9 × 2 is the same as 2 × 9, and that the multiplication table of 2 has the doubles of each number (e.g. 8 × 2 is double 8).

Comparing the tables of 2 and 4 in exercises #1 and 2, you have probably noticed a **shortcut** for multiplying a number by 4. If not, check with your teacher. Use that shortcut to multiply these numbers by 4.

a.	**b.**	**c.**	**d.**
4 × 13 = _____	4 × 21 = _____	4 × 31 = _____	4 × 103 = _____
4 × 16 = _____	4 × 14 = _____	4 × 22 = _____	4 × 51 = _____

4. Skip-count by fours. Practise this pattern until you can say it from memory. Also practise it backwards (up-down). You may practise one-half of it at first, and the other half later.

0, 4, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, 48

5. Fill in the missing numbers. Then cover what you wrote, and choose problems in random order and practise. You may first practise only the first half of the table (from 1 × 2 till 6 × 2, and the rest at a later time, such as the next day.

a.

1 × 4 = ____	7 × 4 = ____
2 × 4 = ____	8 × 4 = ____
3 × 4 = ____	9 × 4 = ____
4 × 4 = ____	10 × 4 = ____
5 × 4 = ____	11 × 4 = ____
6 × 4 = ____	12 × 4 = ____

b.

____ × 4 = 4	____ × 4 = 28
____ × 4 = 8	____ × 4 = 32
____ × 4 = 12	____ × 4 = 36
____ × 4 = 16	____ × 4 = 40
____ × 4 = 20	____ × 4 = 44
____ × 4 = 24	____ × 4 = 48

To multiply a number by 4, you can double that number twice.

Example 1. Find 4 × 15. First we find 2 × 15 (double 15). That is 30. Then we find double 30... which is 60. So, 4 × 15 = 60.

Example 2. To find 9 × 4, first go 9 + 9 = 18. Then do 18 + 18 = 36.

6. Don't write the answers down. Use these problems for random drill practice.

6 × 4	7 × 4	4 × 3	4 × 7	3 × 4	4 × 8
9 × 4	8 × 4	4 × 11	4 × 6	4 × 5	2 × 4
4 × 4	12 × 4	4 × 9	4 × 12	10 × 4	4 × 1

7. Don't write the answers down. Use these problems for random drill practice.

☐ × 4 = 44	☐ × 4 = 12	☐ × 4 = 28	☐ × 4 = 48	☐ × 4 = 24
☐ × 4 = 32	☐ × 4 = 36	☐ × 4 = 44	☐ × 4 = 4	☐ × 4 = 16
☐ × 4 = 8	☐ × 4 = 24	☐ × 4 = 20	☐ × 4 = 40	☐ × 4 = 48

Here is an explanation of why doubling a number twice works for multiplying it by 4.

Let's look at 4 × 15. Now, **4** × 15 is equal to (**2 × 2**) × 15.

When multiplying three numbers, we can multiply the last two first, instead of the first two. This will not change the final answer. This is the **associative property** of multiplication.
(You don't have to worry about remembering the term.)

This means that (2 × 2) × 15 is equal to 2 × (2 × 15). We can multiply 2 × 15 first — which is double 15 and equals 30.

So, (2 × 2) × 15 = 2 × (**2 × 15**) = 2 × **30**. And 2 × 30 is double 30 is 60.

Notice how in this process, we ended up doubling 15 twice.

When multiplying three numbers, **it doesn't matter whether you multiply the first two first or the last two first.**

Using symbols, we can write $(a \times b) \times c = a \times (b \times c)$.

Example 2. Solve 2 × 3 × 4.

See the two ways to solve this on the right. Both ways come up with the same answer.

One way is like this:	The other way is this:
(**2 × 3**) × 4	2 × (**3 × 4**)
6 × 4	2 × **12**
24	24

8. Multiply.

a. 2 × 2 × 3	**b.** 2 × 5 × 2	**c.** 3 × 5 × 2	**d.** 2 × 4 × 2
e. 2 × 4 × 3	**f.** 2 × 2 × 2	**g.** 3 × 3 × 2	**h.** 4 × 5 × 2

9. Solve. Write down your calculations to show your work.

a. There are three baskets. Each basket has two bags. Each bag has six eggs. How many eggs are there in total?

b. How many legs do three cats and seven chickens have in total?

10. **a.** Look back to the skip-counting lists in exercise #1. You noticed a pattern.

Do you think this pattern would continue, if we continued the lists?

Why do you think so?

b. The numbers in the table of 2 are **even**. What about the numbers in the table of 4?

Explain in your own words why.

11. Solve. Write a number sentence for each problem, not just the answer!

a. Mrs. Purrfect loves cats. In her living room, she has five armchairs, and in each chair are two cats. How many legs do those cats have in total?

b. Cheap socks cost R1 per pair. Expensive socks cost R3 per pair. How many pairs of expensive socks can you buy with R15?

c. Ife bought three pairs of cheap socks and two pairs of expensive socks. How much money did she spend?

Puzzle Corner

Place brackets in each equation to make it true.

a. $2 \times 5 + 4 + 5 = 23$ **b.** $30 - 7 \times 2 - 2 = 30$ **c.** $5 \times 2 + 1 \times 2 = 30$

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Revision Chapter 4

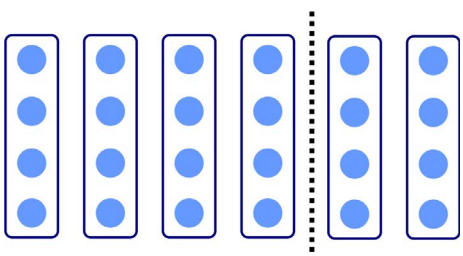
1. Fill in the multiplication chart — for the last time.

×	1	2	3	4	5	6	7	8	9	10	11	12
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

2. Multiply.

a. $4 \times 2 \times 2 =$ _____ **b.** $9 \times 2 \times 5 =$ _____ **c.** $3 \times 4 \times 7 =$ _____

3. What mathematical principle does the image illustrate?



4. What single multiplication is equal to $3 \times 7 + 2 \times 7$?

5. Fill in the missing numbers.

a. ____ × 4 = 28

36 = 4 × ____

____ × 12 = 84

b. 108 = 12 × ____

32 = ____ × 8

8 × ____ = 72

c. 36 = ____ × 3

____ × 3 = 21

____ × 12 = 60

6. Compare, writing < , > , or = in the box between the multiplications.

a. 9 × 8 ☐ 10 × 8 **b.** 9 × 5 ☐ 11 × 4 **c.** 9 × 8 ☐ 9 × 6

d. 9 × 8 ☐ 9 × 4 **e.** 4 × 4 ☐ 2 × 8 **f.** 10 × 11 ☐ 10 × 7

7. If you need to find 17 × 8, how can you use the fact that 17 × 4 = 68 to help you?

8. Solve. Write down the calculation(s) you do.

a. A teacher puts 20 students in groups so that each group has 4 students. How many groups will there be?

_____

_____

There will be _____ groups.

b. Eniola bought four books of stickers that cost R3 each and a pen for R7. What was the total cost?

_____

_____

The total cost was _____.

c. Alinafe bought some packages of seeds for R24. Each package cost R2. How many packages did he buy?

_____

_____

He bought _____ packages.

d. A zoo has five  s, three  s, and twenty  s. How many feet do those animals have in total?

_____

_____

They have _____ feet in total.

9. Figure out the missing numbers in these multiplication charts.

×		**7**	
	10		30
9			54
		77	

×	**12**			
11		33		55
	48	12		
			63	35

10. Fill in the skip-counting patterns.

a.				72			48		32
b.			180		300		420		
c.			36			63		81	

(All mystery numbers are less than 100.)

a. You can find me both in the table of eleven and in the table of four.

I am _____.

b. I am more than 15. I am in the table of two, the table of three, and the table of four!

I am _____.

c. I am between 15 and 35. The number one more than me is in the table of five. The number one less than me is in the table of four.

I am _____.

d. I am both in the table of four and in the table of three, and if you add one to me, I am in the table of five.

I am _____.

e. I am in the table of 11. The number that is one more than me, is in the table of five, but not in the table of ten.

I am _____.

f. I am less than 22 but more than 9, and I am in the table of four. If you exchange my digits, I am in the table of three!

I am _____.

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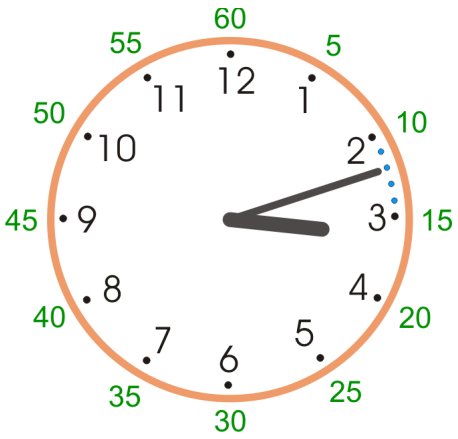
Clock to the Minute

The minute hand goes through 60 minutes, or 60 steps, each time it goes around the clock. You can see some numbers for those "steps" marked outside this clock face (the green numbers 5, 10, 15, and so on).

On this clock we have marked the steps between 10 and 15 with dots. Those dots signify 11, 12, 13, and 14 minutes.



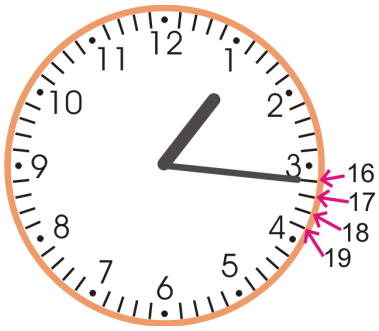
The minute hand is pointing to 12 minutes.
It is 3:12, or 12 after 3.

Some clocks have these four dots between the numbers; some don't. But even if the clock does not have the dots (or lines), you need to remember the little steps that the minute hand takes between the marked numbers.

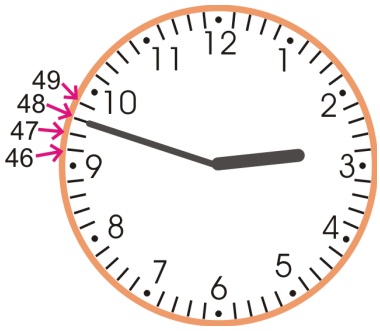
These clocks have little lines for the minute hand.

In the first clock, the minute hand is pointing to the next line past the 15-minute mark (past the number 3). The time is sixteen minutes past 1, or 1:16.

In the second clock, the minute hand points to the third line after the 45-minute mark.
It is 2:48.



1:16



2:48

1. Write the time the clock shows.

a. _____ : _____

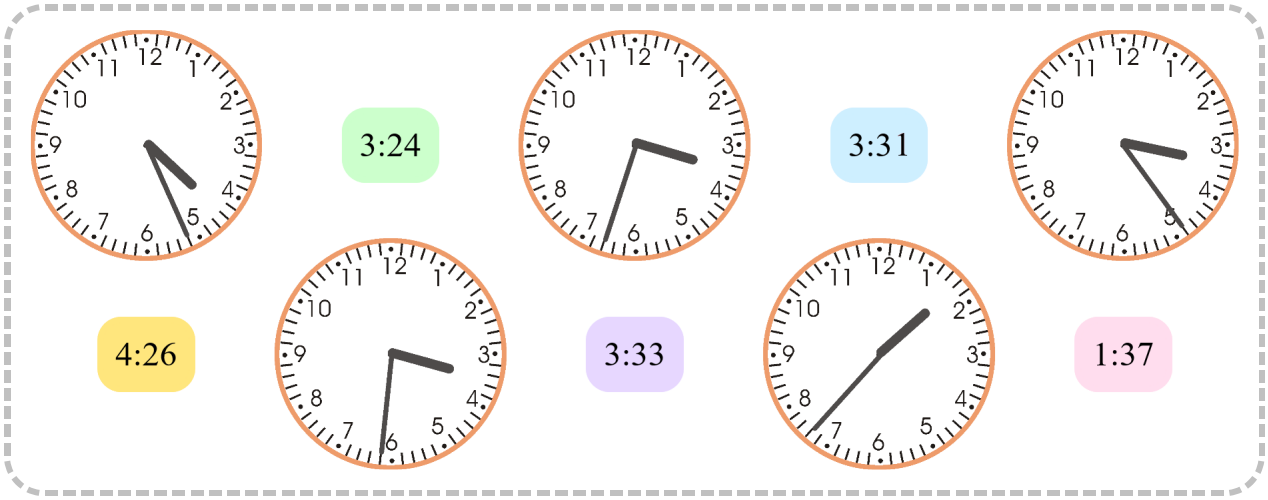
b. _____ : _____

c. _____ : _____

d. _____ : _____

2. (Optional) Do the activity **Tell the Time** from the chapter introduction.

3. Match the times.



4. Write the time the clock shows.

 **a.** _____ : _____	 **b.** _____ : _____	 **c.** _____ : _____	 **d.** _____ : _____
 **e.** _____ : _____	 **f.** _____ : _____	 **g.** _____ : _____	 **h.** _____ : _____
 **i.** _____ : _____	 **j.** _____ : _____	 **k.** _____ : _____	 **l.** _____ : _____

Example 1. Temi started jumping rope at 7:23. He jumped for 10 minutes. When did he stop?

You can simply add these 10 minutes to the 23 minutes in the given time: 23 + 10 = 33. Temi stopped jumping at 7:33.

5. Write the time the clock shows, and the time 10 minutes later.

	a.	**b.**	**c.**
			
The time now →	_____ : _____	_____ : _____	_____ : _____
10 min. later →	_____ : _____	_____ : _____	_____ : _____

6. Now only write the time 15 minutes later than the clock shows.

	a.	**b.**	**c.**
			
15 min. later →	_____ : _____	_____ : _____	_____ : _____

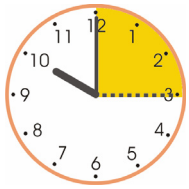
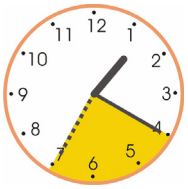
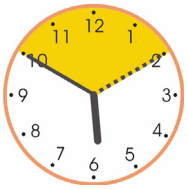
7. Now be careful. Imagine the minute-hand moving. Write the *later* time.

	a.	**b.**	**c.**
			
10 min. later →	_____ : _____	_____ : _____	_____ : _____

Elapsed Time 1

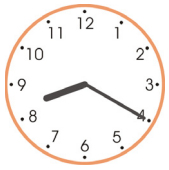
1. Do the activity **How Long?** from the chapter introduction. Use times that are to the nearest five minutes (like what you see in the lesson). The student can count by fives.

2. How many minutes does the minute hand "cover," or "pass through," on the clock? Count by fives. You can use your practice clock to help.

			
a. From 10:00 until 10:15	**b.** From 1:20 until 1:35	**c.** From 5:50 until 6:10	**d.** From 2:05 until 2:40
_____ minutes	_____ minutes	_____ minutes	_____ minutes

3. How many minutes pass? Count by fives. You can use your practise clock to help.

Start	End
	
a. _____ minutes	

Start	End
	
b. _____ minutes	

Start	End
	
c. _____ minutes	

4. Now you are given how much time passes. Tell the starting time or the ending time.

a. Start	20 minutes pass	**End**
		_____ : _____

b. Start	15 minutes pass	**End**
		_____ : _____

c. Start	10 minutes pass	**End**
_____ : _____		

d. Start	20 minutes pass	**End**
_____ : _____		

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Counting Coins

Let's revise coins!	 10 cents	 20 cents	 50 cents	 R1	 R2	 R5
Count up, starting with the coin(s) with the largest value.	 R2 R3 R3,80 R3,90					

1. (Optional) Do the **Counting Money** activity from the introduction of the book.

2. Count the coins.

 **a.** _____c	 **b.** R_____
 **c.** R_____	 **d.** R_____

3. Fill in the patterns.

a. four 20-cent coins = _____c five 20-cent coins = _____c = R_____ six 20-cent coins = _____c seven 20-cent coins = _____c eight 20-cent coins = _____c	**b.** six 50-cent coins = R_____ seven 50-cent coins = R_____ eight 50-cent coins = R_____ nine 50-cent coins = R_____ ten 50-cent coins = R_____

4. Write how many 20-cent or 50-cent coins you need to make these amounts.

a. _____ 20-cent coins = 140 cents _____ 20-cent coins = 200 cents _____ 20-cent coins = 260 cents	**b.** _____ 50-cent coins = R2 _____ 50-cent coins = R6 _____ 50-cent coins = R11

5. **a.** Dorothy says 130c = four 20-cent coins and five 10-cent coins, and Daniel says 130c = five 20-cent coins and three 10-cent coins. Who is correct?

b. Find another way to make 130c with various coins.

6. Use two different kinds of coins to make the asked amount. Find two ways to do so.

a. 90c	**b. 110c**
_____ 20-cent coins + _____ 10-cent coins _____ 20-cent coins + _____ 10-cent coins	_____ 20-cent coins + _____ 10-cent coins _____ 20-cent coins + _____ 10-cent coins

7. Draw **coins** to make the money amounts. Make them in two different ways.

a. 60c

60c

b. 120c

120c

c. 90c

90c

d. 260c

260c

Rand

Here you see the South African notes with rand amounts.

Write the "R" symbol in front of rand amounts.

First write the rand, then a decimal comma, and then the cents.

R15,20

R21,60

1. How much money? Write the amount.

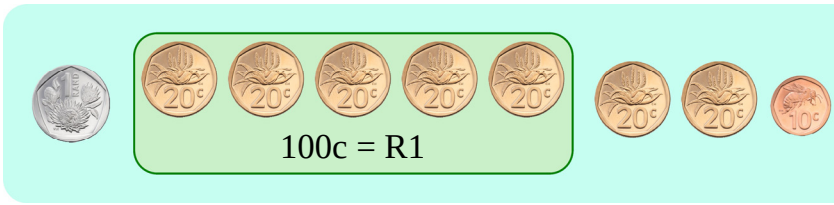
a. R_____

b. R_____

c. R_____

d. R_____

100 cents make <u>a rand</u>.



= R2,50 in total

2. How much money? Write the amount.

a. R_____

b. R_____

c. R_____

Remember to put 0 into the rand's place if your total cent-amount is less than 100.

40 cents = R0,40 80 cents = R0,80 10 cents = R0,10

3. Write as rand amounts.

a. R_____

b. R_____

three 10-cent coins
and a 50-cent coin

c. R_____

eight 10-cent coins

d. R_____

a 1-rand coin
and a 10-cent coin

e. R_____

three 20-cent coins
and two 10-cent coins

f. R_____

4. Write the cent amounts as rand amounts, and vice versa.

a. 50c = R_____	**b.** 10c = R_____	**c.** 420c = R_____
d. _____ c = R5,60	**e.** _____ c = R0,30	**f.** _____ c = R3,10

5. Mark opened his piggy bank and counted the coins. He had 240 cents.
He also had R5 in his wallet. How much money does Mark have in total?

6. The picture shows how much money you have. Write how much you will have left if you buy the items listed.

If I buy:	I will have left:
a. a puzzle for R47,20	R
b. a book for R39,90	R

If I buy:	I will have left:
c. a book for R41,50 and a toy for R49,30	R
d. three bars of soap for R15,50 each	R

If I buy:	I will have left:
e. a pen (R2,60) and an rubber (R1,50)	R
f. three pencils for R1,20 each	R

Counting Up to Make Change

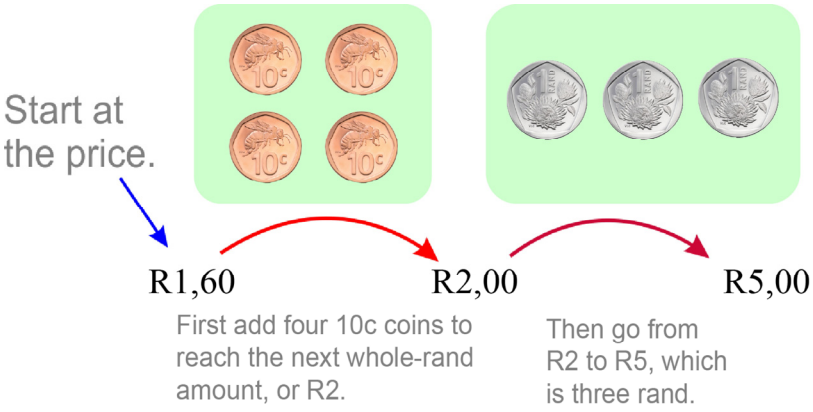
When you buy an item, you might not have the exact coins and notes for the amount it costs. You will then give *more* than the item costs, such as a bigger note. Then, the cashier will give you back some **change**. The change is the difference between what the item cost and what you paid.

Example 1. A toy costs R9,90 and you pay with a R10-note. The difference between these two is 10 cents, so you get back 10c in change.

Example 2. Let's say you are the cashier in a store. To find the amount of change, count up from *the price* of the item until you reach the amount the customer pays with.

Price: R1,60

Customer gives R5.



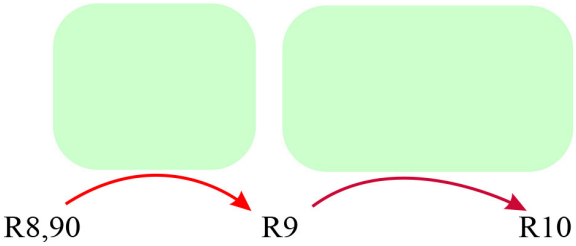
The change is the coins and notes that were used when counting up. The change is **R3,40**.

1. Find the change by counting up. Draw the coins and notes used in counting up.

a. 

Price: R8,90

Customer gives R10.



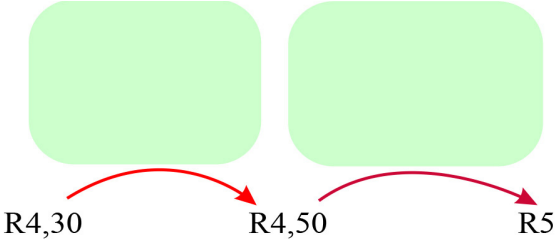
The change is

R_____

b. 

Price: R4,30

Customer gives R5.



The change is

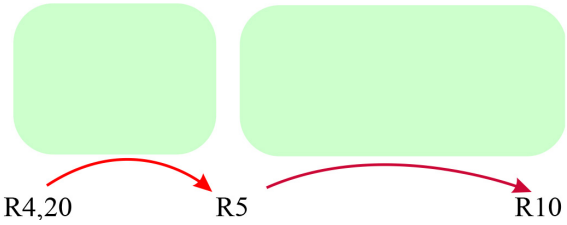
R_____

2. Find the change by counting up. Draw the coins and notes used in counting up.

a. 

Price: R4,20

Customer gives R10.

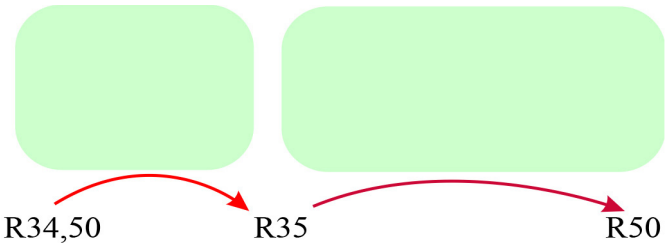


The change is R_____.

b. 

Price: R34,50

Customer gives R50.



The change is

R_____

3. Find the change by counting up. Draw the coins and notes used in counting up.

a. 

Price: R89,50

Customer gives R100.

The change is

R_____

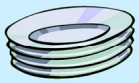
b. 

Price: R46,60

Customer gives R50.

The change is

R_____

c. 

Price: R27,50

Customer gives R30.

The change is

R_____

d. 

Price: R83,20

Customer gives R90.

The change is

R_____