

Component Chart

Foundation

Higher

Student Book



Feb 2010

Edexcel Linear 1
978-0-00-734018-7
Edexcel Modular 1
978-0-00-733986-0
AQA Modular 1 978-0-00-734002-6



Mar 2010

Edexcel Linear 2
978-0-00-734022-4
Edexcel Modular 2
978-0-00-733990-7
AQA Modular 2 978-0-00-734006-4



Feb 2010

Edexcel Linear 1
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978-0-00-733994-5
AQA Modular 1 978-0-00-734010-1



Mar 2010

Edexcel Linear 2
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Edexcel Modular 2
978-0-00-733997-6
AQA Modular 2 978-0-00-734013-2

Homework Book

Includes Student Book CD-ROM



Apr 2010

Edexcel Linear 1
978-0-00-734019-4
Edexcel Modular 1
978-0-00-733987-7
AQA Modular 1
978-0-00-734003-3



May 2010

Edexcel Linear 2
978-0-00-734023-1
Edexcel Modular 2
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AQA Modular 2
978-0-00-734007-1



Apr 2010

Edexcel Linear 1
978-0-00-734027-9
Edexcel Modular 1
978-0-00-733995-2
AQA Modular 1
978-0-00-734011-8



May 2010

Edexcel Linear 2
978-0-00-734030-9
Edexcel Modular 2
978-0-00-733998-3
AQA Modular 2
978-0-00-734014-9

VLE version

Homework CD-ROM Foundation 1: Edexcel and AQA
978-0-00-735375-0 Apr 2010
Homework CD-ROM Foundation 2: Edexcel and AQA
978-0-00-735376-7 May 2010

Homework CD-ROM Higher 1: Edexcel and AQA
978-0-00-735379-8 Apr 2010
Homework CD-ROM Higher 2: Edexcel and AQA
978-0-00-735380-4 May 2010

Teacher's Pack



Feb 2010

Edexcel Linear 1
978-0-00-734020-0
Edexcel Modular 1
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AQA Modular 1 978-0-00-734004-0



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Edexcel Linear 2
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AQA Modular 2 978-0-00-734008-8



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AQA Modular 1 978-0-00-734012-5



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AQA Modular 2 978-0-00-734015-6

Interactive Book

Includes VLE version



Apr 2010
Interactive Book Foundation 1: Edexcel and AQA
978-0-00-734000-2

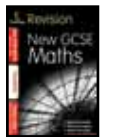
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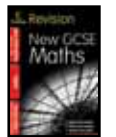
June 2010
Interactive Book Higher 2: Edexcel and AQA
978-0-00-734033-0

Revision Guide



Apr 2010

Foundation: Edexcel, AQA and OCR 978-0-00-734098-9



Apr 2010

Higher: Edexcel, AQA and OCR 978-0-00-734099-6

Working at Grades G–E

Grade C Booster Workbook

Workbook



Mar 2010

Edexcel Linear 1 978-0-00-734021-7
Edexcel Modular 1 978-0-00-733989-1
AQA Modular 1 978-0-00-734005-7



Apr 2010

Edexcel Linear 2 978-0-00-734025-5
Edexcel Modular 2 978-0-00-733993-8
AQA Modular 2 978-0-00-734009-5

May 2010

Edexcel Linear Grade C Booster Workbook
978-0-00-735382-8
Edexcel Modular Grade C Booster Workbook
978-0-00-735381-1
AQA Modular Grade C Booster Workbook
978-0-00-735383-5

Foundation and Higher

Assessment



Sept 2010

Assessment 1 978-0-00-734491-8



Sept 2010

Assessment 2 978-0-00-734492-5



At Collins, we speak to teachers every step of the way to make sure our resources are the best possible match to your needs. Here are the requirements that many teachers tell us are the most important, and how we can help:

✓ More practice

There are more questions than ever before in our Student Books and Homework Books. **Functional skills, problem solving** and new **assessing understanding** questions are flagged throughout, so your students will be confident answering any type of new question in the exam.

There is also further support to give students working at grades G–E a solid foundation in maths with write-in Workbooks, and extra questions in Grade C Booster Workbooks to help students get those vital grade Cs.

✓ Smooth progression

Differentiation is provided at every stage of the course. **Colour-coded grades** on the page in Student Books and Homework Books highlight the difficulty level of each question, so students know what level they are working at.

Differentiation is built in to each lesson plan, highlighting what **More able** and **Less able** students could be working on so you can teach a range of abilities in one classroom.

✓ Functional maths

Colourful functional skills and problem-solving pages can be found at the end of each chapter, with accompanying lesson plans in the Teacher's Pack so you can provide practice for students' process skills in stimulating real-life contexts.

Functional maths practice questions are also flagged throughout the Student Books, Workbooks and Homework Books with the **FM** logo, and the **Functional Skills Standards** are highlighted for every lesson in the Teacher's Packs so you can see at a glance which skills you have covered.

✓ The new Assessment Objectives

In the Student Books, Workbooks and Homework Books, questions that assess understanding (**new Assessment Objective AO2**) are marked **AU**, and questions that test problem-solving skills (**AO3**) are marked **PS**, so both you and your students know you are practising the different question types for every maths topic.

✓ Assessing Pupils' Progress

Students are given the opportunity to assess their own progress and find out what they need to do to improve with **grade boosters** in each chapter in the Student Books and Revision Guides.

The APP focuses covered in each lesson are included in the Teacher's Pack, and you can save valuable administrative time with ready-made tests and reporting tools in our Assessment package.



The Components Explained: Student Books

Collins New GCSE Maths Student Books are available for the Foundation and Higher papers. Plenty of functional skills, problem solving and graded maths practice are provided to ensure students are confident answering questions for the new Assessment Objectives (AO1, AO2 and AO3).

Chapter 3 Negative numbers

Why this chapter matters

Life is full of pairs: up and down, hot and cold, left and right, light and dark, rough and smooth, to name a few. One pairing that is particularly relevant to maths is positive and negative.

You are already familiar with positive numbers, including where they appear in real life and how to carry out calculations with them. However, sometimes we need to use a set of numbers in addition to the positive counting numbers. This set of numbers is known as the negative numbers. Here are some examples of where you might encounter negative numbers.

A negative number on a bank statement will show how much money you have spent above what you have in your bank account. The amount for withdrawal is £42 more than what they had spent on these accounts and will have to pay this money back to the bank.

On the temperature scale of degrees Celsius zero is known as freezing point. In many places—such as the UK—the temperature falls below freezing point. In these cases we need negative numbers to represent the temperature.

All pilots experience a force when their aircraft accelerates or decelerates quickly. Negative g forces can be felt when an aircraft accelerates downwards and they are represented by negative numbers. They negative forces are responsible for the feeling of weightlessness that you have on rollercoasters!

In 2016, negative numbers are used to represent items below ground level. These are often called lower ground floors.

As you can see, negative numbers are just as important as positive numbers in your everyday life.

Chapter 3 Negative numbers

Introduction to negative numbers

Everyday use of negative numbers

The number line

Arithmetic with negative numbers

This chapter will show you ...

- how negative numbers are used in real life
- what is meant by a negative number
- how to use inequalities with negative numbers
- how to do arithmetic with negative numbers

Visual overview

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    graph TD
      A[Chapter 3: Negative numbers] --> B[Introduction to negative numbers]
      A --> C[Everyday use of negative numbers]
      A --> D[The number line]
      A --> E[Arithmetic with negative numbers]
      B --> F[Real life examples]
      C --> F
      D --> F
      E --> F
      F --> G[Understand problems]
    
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What you should already know

- What a negative number means (GCSE level 3, GCSE grade 4)
- How to put numbers in order (GCSE level 3, GCSE grade 4)

Quick check

Put the numbers in the following lists into order, smallest first.

- 1, 8, 2, 5, 9, 1, 0, 4
- 14, 19, 11, 10, 17
- 51, 92, 24, 0, 33
- 87, 136, 12, 268, 56
- 3, 87, 1, 100, 0, 50

Show students exactly why each chapter matters to them with new chapter openers that develop the cross-curricular nature of maths

Be confident that students are practising the key elements of the new curriculum in every lesson with functional skills, problem solving and assessing understanding questions flagged within exercises

From AQA Student Book Foundation 1

Smooth progression in our questions and more of them gives every student the chance to practise, progress and fulfil their potential

You can find sample pages from AQA Student Book Foundation 2 on page 22

EXERCISE 2B

Copy and complete each of the following.

- If +25 means a profit of five pounds, then means a loss of five pounds.
- If +25 means a profit of nine pounds, then a loss of 25 is
- If -4 means a loss of four pounds, then +4 means a of four pounds.
- If +200 m means 200 metres above sea level, then means 200 metres below sea level.
- If +30 m means fifty metres above sea level, then fifty metres below sea level is written
- If -100 m means one hundred metres below sea level, then +100 m means one hundred metres sea level.
- If +3 h means three hours after midday, then means three hours before midday.
- If +3 h means 3 hours after midday, then means 3 hours before midday.
- If -4.5 means six hours before midday, then +6 h means six hours midday.
- If +2 °C means two degrees above freezing point, then means two degrees below freezing point.
- If +8 °C means eight degrees above freezing point, then means eight degrees below freezing point.
- If -5 °C means five degrees below freezing point, then +5 °C means five degrees freezing point.
- If +70 km means 70 kilometres north of the equator, then means 70 kilometres south of the equator.
- If +200 km means 200 kilometres north of the equator, then 200 kilometres south of the equator is written
- If -30 km means fifty kilometres south of the equator, then +30 km means fifty kilometres of the equator.
- If 11 minutes before midnight is represented by -11 minutes, then five minutes after midnight is represented by
- If a car moving forwards at 10 miles per hour is represented by +10 mph, then a car moving backwards at 3 miles per hour is represented by

10 In an office building, the first floor above ground level is represented by +3. So the second floor below ground level is represented by

MEGA BANK PLC
"Your money is safe in our pockets!"

Statement 2000

Date	Description	Debits	Credits	Balance
				£320.45
20 Sept 2000	Gas bill	£410.17		-£89.72
23 Sept 2000	Cheques		£140.00	£50.28
28 Sept 2000	Mobile phone bill	£83.46		-£13.20

- What does -£89.72 mean?
- What is a debit?
- What is a credit?

11 The temperature on these days in Moscow was -7 °C, -5 °C and -11 °C.

- Which temperature is the lowest?
- What is the difference in temperature between the coldest and the warmest day?

12 Which is the smallest number in the cloud?

Which is the largest number in the cloud?

What is the difference between the smallest and largest numbers in the cloud?

13 Sydney the snail is at the bottom of a 10-foot well. Each day he climbs 2 feet up the wall of the well. Each night he slides 1 foot back down the wall of the well. How many days does it take Sydney to reach the top of the well?

14 A thermometer is set at 16 °C. The temperature in a room at 1:00 am is -2 °C. The temperature rises two degrees every 6 minutes.

Help students to monitor their own progress through the GCSE Maths course with Collins' colour-coded grades on every page and a grade booster at the end of every chapter

How the Books are Structured:

AQA Modular Foundation and Higher:	Edexcel Modular Foundation:
Book 1: Core, Unit 1, Unit 2	Book 1: Core, Unit 1
Book 2: Recall, Unit 3	Book 2: Unit 3
Edexcel Linear Foundation and Higher:	Edexcel Modular Higher:
Book 1: for first year of teaching	Book 1: Core, Unit 1, Unit 2
Book 2: for second year of teaching	Book 2: Unit 3

ALSO AVAILABLE IN THE STUDENT BOOKS:

- Comprehensive exam practice and worked exam questions with examiner notes at the end of every chapter

10 Functional Maths Walking using Naismith's rule

Many people go walking each weekend. It is good exercise and can be a very enjoyable pastime.

When walkers set out they often try to estimate the length of time the walk will take. There are many factors that could influence this, but one rule that can help in estimating how long a walk will take is Naismith's Rule.

Naismith's rule
Naismith's rule is a rule of thumb that you can use when planning a walk by calculating how long it will take. The rule was devised by William Naismith, a Scottish mountaineer, in 1892.

The basic rule is:
Allow 1 hour for every 3 miles (5 km) forward, plus 1 hour for every 1000 feet (300 m) of ascent.

Getting started
Before you begin your main task, you may find it useful to fill in the following table to practise using Naismith's Rule.

Can you use algebra to display the rule?

Day	Distance (km)	Height (m)	Time (hr)
1	16	250	
2	18	0	
3	11	340	
4	13	100	
5	14	120	

Now, in small groups think about:

- What kind of things influence the speed at which you walk?
- Do different types of routes make people walk at different rates?
- If there is a large group of people will they all walk at the same rate?
- Use all the ideas you have just discussed as you move on to your main task.

Your task
You are going to compare data to see if Naismith's Rule is still a useful way to work out how much time to allow for different walks.

The table on the right shows the actual times taken by a school group as they did five different walks in five days. Use this information to work out the following:

- If the group had started at the same times and had the same breaks how long would the group have taken each day, according to Naismith's rule?
- Do you think Naismith's rule is still valid today? Explain your reasons.
- If your friend was going to climb Ben Nevis, setting out at 11.30 am, would you advise them to do the walk? You will need to research the distance and climb details of the pathway up Ben Nevis, in order to advise them fully.

Day	Distance (km)	Height (m)	Time (minutes)	Time (hours/minutes)	Start	Breaks	Finish
1	16	250	255	4 h 15 m	10.00 am	2 h	4.15 pm
2	18	0	270	4 h 30 m	10.00 am	1 h 30 m	4.00 pm
3	11	340	199	3 h 19 m	09.30 am	2 h 30 m	3.19 pm
4	13	100	195	3 h 15 m	10.30 am	2 h 30 m	4.15 pm
5	14	120	222	3 h 42 m	10.30 am	2 h 30 m	4.42 pm

From AQA Student Book Foundation 1

Help students develop their process skills as they apply maths in stimulating real-life contexts using the colourful functional skills and problem-solving pages at the end of chapters

The Components Explained: Workbooks

Collins New GCSE Maths Workbooks provide support for students to make a smooth transition from KS3 to KS4. Hundreds of practice questions provided in a write-in format make them an ideal resource to give students working at Grades G–E a solid foundation in GCSE Maths. The Grade C Booster Workbook will ensure D/C borderline students get the practice they need to get the C grade on the day.

ALSO AVAILABLE IN THE WORKBOOKS:

- Answers at the back in a handy, detachable section to aid self-assessment
- Application sections which cover Functional Skills Level 1 help students understand the application of maths in real-life scenarios
- Exam questions included throughout to prepare students for GCSE exams
- Colourful functional skills and problem-solving pages at the end of each chapter that will help students develop their process skills and allow them to apply maths in stimulating real-life contexts

Check progress with student-friendly learning objectives

Remind students of important vocabulary with key words listed for each chapter

Help students learn how to work through problems step-by-step using the worked examples

5 Area and perimeter

5.1 Perimeter

In this section you will learn how to:

- Find and use the perimeter of a shape

Key words
perimeter, rectangle, square

Worked Example

Here is a sketch of a field.

The perimeter of the field is 205 metres.

The shortest side is 40 metres. The longest is 75 metres.

The other two sides are the same length.

How long are the other two sides?

Solution:

$40 + 75 + \text{third} + \text{fourth} = 205$ → The perimeter is the distance all around the field.

$\text{Third} + \text{fourth} = 205 - 115 = 90$ → $40 + 75 = 115$

The other two sides are both 45 metres → Half of 90 is 45.

EXERCISE 5A

Work out the perimeters of the following shapes.

Each square on the grid represents 1 cm by 1 cm.

Perimeter = ____ cm Perimeter = ____ cm

EXERCISE 5B

Find the perimeters of these fields.

a Perimeter = ____ m

b Perimeter = ____ m

c Perimeter = ____ m

Here is a sketch of the floor of a room.

What is the perimeter of the room? ____

Ab-draw these shapes with a ruler.

He measured the sides. They were 10 cm, 3 cm, 3 cm and 6 cm.

What is the perimeter of Ali's shape? ____

The perimeter of this triangle is 24 cm.

How long is the third side? ____

A four-sided shape has a perimeter of 20 cm.

Give possible lengths of the four sides.

This rectangle is 4 cm wide and 7 cm long.

What is the perimeter? ____

Hint: write the length on each side of the rectangle.

From AQA Workbook 1

The Components Explained: Teacher's Packs

Collins New GCSE Maths Foundation and Higher Teacher's Packs contain everything you need to deliver effective lessons with confidence. Differentiated lesson plans, quick access to the Student Book and Homework Book answers, and lesson plans in Word format on the accompanying CD-ROM give you the support and flexibility to adapt lessons to suit all your classes.

Chapter 9 Number properties

Overview

- 9.1 Multiples of whole numbers
- 9.2 Factors of whole numbers
- 9.3 Prime numbers
- 9.4 Square numbers
- 9.5 Square roots
- 9.6 Powers
- 9.7 Multiplying and dividing by powers of 10
- 9.8 Prime factors
- 9.9 Rules for multiplying and dividing powers

This chapter begins by looking at multiples and factors of whole numbers. It then looks at special numbers, such as primes, squares and square roots. It moves on to the different powers and then the effects of multiplying and dividing by powers of 10. Next it covers how to work out prime factors and finally the rules for multiplying and dividing powers.

Context

This chapter contains material that is interesting and valuable for its own sake. Factors and multiples relate to the multiplication tables and instant recall of these is a useful tool in life. Knowledge of factors also helps when cancelling or multiplying and dividing fractions. Squares and roots are used in patterns, for example when tiling a floor or wall.

Curriculum references

KS4 Programme of Study references

1.3a Knowing that mathematics is a rigorous, coherent discipline.
2.2a Make connections within mathematics.
2.2d Identify and classify patterns.
2.2f Calculate accurately, using mental methods or calculating devices as appropriate.
3.1a Real numbers, their properties and their different representations.
3.1b Rules of arithmetic applied to calculations and manipulations with real numbers, including standard index form and surds.
4e Work on tasks that bring together different aspects of concepts, processes and mathematical context.

AQA specification

N1.1 Understand integers and place value to deal with arbitrarily large positive numbers.
N1.2 Add, subtract, multiply and divide any number.
N1.6 The concepts and vocabulary of factor (divisor), multiple, common factor, highest common factor, least common multiple, prime number and prime factor decomposition.
N1.7 The terms square, positive and negative square root, cube and cube root.
N1.8 Index notation for squares, cubes and powers of 10.
N1.9 Index laws for multiplication and division of integer powers.

Functional Skills standards

L1 R2 Identify and obtain necessary information to tackle the problem.
L1 A1 Apply mathematics in an organised way to find solutions to straightforward practical problems for different purposes.

PLTS
Independent enquirers explore issues, events or problems from different perspectives. **Reflective learners** set goals with success criteria for their development and work. **Team workers** collaborate with others to work towards common goals. **Self-managers** seek out challenges or new responsibilities and show flexibility when priorities change.

APP
Numbers and the number system L8 Recognise and describe number relationships including multiple, factor and square. **Calculating L4** Multiply a simple decimal by a single digit.

Route mapping

Exercise	Grades				
	G	F	E	D	C
A	1-8	9			
B	1-7b	7c-8			
C			all		
D	1-3	4-5	6-10		
E	1-3	4	5-10	11-16	
F		1-6	7-8		
G			1-11	12	
H				all	
I					all
J					all
K					all

Overview test

All questions are GCSE grade G.

Write down the answers to the following questions.

$1\ 36 \div 6 = \square$	$6\ 5 \times 5 = \square$	$11\ 300 \times 4 = \square$	$16\ 10 \times 15 = \square$
$2\ 5 \times 9 = \square$	$7\ 3 \times 27 = \square$	$12\ 6 \times 6 = \square$	$17\ 49 \div 7 = \square$
$3\ 3 \times 8 = 72$	$8\ 64 \div 8 = \square$	$13\ 60 \div 5 = \square$	$18\ 4 \times 4 = \square$
$4\ 63 \div 9 = \square$	$9\ 6 \times 5 = \square$	$14\ 11 \times 11 = \square$	$19\ 3 \times 8 = \square$
$5\ 2 \times 9 = \square$	$10\ 9 \times 8 = \square$	$15\ 30 \times 9 = 36$	$20\ 12 \times \square = 48$

Answers to overview test

1 6	6 25	11 1200	16 150
2 45	7 9	12 36	17 7
3 9	8 8	13 12	18 16
4 7	9 30	14 121	19 24
5 18	10 72	15 4	20 4

Why this chapter matters

Cross-curricular: This topic links in to Art and Design and ICT.
Introduction: This lesson explores pattern and discusses where it can be found in numbers and in the environment.
Discussion points: Discuss the questions in the Student Book. (Around 30 km in 21 m; $5000^2 = 5000 \times 5000 = 25\ 000\ 000$; $100 \times 100 \times 100 = 100\ 000\ 000$; $33347 = 1111\ 5556$; $109\ 998\ 9 \times 9 = 989\ 990\ 1$; $5 \times 5 = 1 + 3 + 5 = 7 = 9$; $4 \times 4 \times 4 \times 4 = 4 \times 4 = 4096$; $9 \times 9 = 81$; multiples, squares, prime, powers; and 14 is the missing number.)
Plenary: Explain that there are visual ways of remembering number patterns, and they will be exploring them in forthcoming lessons.

Capture the essence of chapters at a glance with chapter overviews

Easily access learning objectives and references to the exam board specifications, KS4 Programme of Study, Functional Skills Standards, Personal Learning and Thinking Skills (PLTS) and Assessing Pupils' Progress (APP) opportunities for each chapter

9.4 Square numbers

Curriculum references

Functional Skills standards

L1 R2 Identify and obtain necessary information to tackle the problem.
L1 A1 Apply mathematics in an organised way to find solutions to straightforward practical problems for different purposes.

PLTS
Independent enquirers Reflective learners
Team workers Self-managers

APP
Numbers and the number system L8 Calculating L4

Collins references

- Student Book pages 00 to 000
- Interactive Book 00

Prior knowledge

Students will need to know the multiplication tables to 10×10 .

Common mistakes and remediation

Students may multiply the number by two instead of squaring it. Encourage students to write out the calculation in full to avoid this error, e.g. $3^2 = 3 \times 3 = 3 \times 2 = 3 \times 2 = 6$. When using a calculator **less able** students often type -3^2 and then do not realise that -9 is an incorrect answer. Show students that they need to type $1-3^2$.

Useful tips

It may be helpful to display a chart of the squares, up to 15^2 .

$1^2 = 1, 2^2 = 4, 3^2 = 9, 4^2 = 16, 5^2 = 25, 6^2 = 36, 7^2 = 49, 8^2 = 64, 9^2 = 81, 10^2 = 100, 11^2 = 121, 12^2 = 144, 13^2 = 169, 14^2 = 196, 15^2 = 225$

Functional maths and problem-solving help

Square numbers are often used in functional maths (FM) questions. They frequently involve tiling and are often used for working out areas of square-based shapes. Incorporating functionality into other questions the same number is repeated in a context that requires multiplications, e.g. in questions 5 and 10 of Exercise 40. Stress to students the importance of knowing square numbers up to 15×15 as learned facts. Many of the questions in these two exercises will have alternative methods of solution. Discuss these with the students so that they can select their preferred method.

Learning objectives

- Identify square numbers. [Grade G]
- Use a calculator to find the square of a number. [Grade G]

Learning outcomes

- Students **must** be able to understand the concept of a square number and to recognise square numbers in terms of a pattern of dots. [Grade G]
- Students **should** be able to write down the first twenty square numbers with the use of a calculator. [Grade G]
- Students **could** be able to work out the value of square numbers bigger than 15 times 15 without the use of a calculator. [Grade F]

Key words

- square
- square number

Starter

- Put the sequence 1, 4, 9, 16, 25 on the board. Ask the students if they can give the next two terms (36, 49).
- Ask them how the pattern is building up. They may say that it goes up by 3, 5, 7, 9, ... but make sure they eventually spot that it is $1 \times 1, 2 \times 2, 3 \times 3$, etc. Carry on the sequence as far as possible without using a calculator.
- Now try the 'Brainwash' game. This involves asking the students a simple multiplication but when they give the answer they also have to say the answer to an agreed square number. For example, if the agreed brainwash is '14 squared is equal to 196' ask, 'What is 8×8 ?' The student has to reply, ' $8 \times 8 = 64$ and 14 squared is equal to 196.' Ask the next student, 'What is 6×6 ?' and this student has to reply, ' $6 \times 6 = 36$ and 14 squared is equal to 196.' Students will soon remember the answer to 14 squared.
- Students are expected to know all square numbers up to 15×15 for the GCSE examination.

Main lesson activity

- When any integer is multiplied by itself, the result is a square number.
- Square numbers can form square patterns when they are drawn as arrays of dots.
- The short way of writing 'squared' is to put a small 2 after and above a number. For example, 12 squared is written as 12^2 .
- Write on the board: $5^2 = 5 \times 5 = 25$ $50^2 = 50 \times 50 = 2500$ $500^2 = 500 \times 500 = 250\ 000$
- Ask students to give the answer to 5000^2 ($5000 \times 5000 = 25\ 000\ 000$)
- Ask students to describe the pattern. Then ask for other square numbers and continue the same pattern. For example, ask for $8^2, 80^2, 800^2$. Cover all square numbers up to 15×15 .
- Less able** students could start by just looking at the first 10 square numbers, while **more able** could go beyond 15×15 .
- Now show students the calculator key for working out square numbers: \square
- Students can now do Exercise 9D. In this exercise, the FM questions are 8, 9 and 10, the problem-solving (PS) questions are 2 and 3 and the question that assesses understanding (AU) is 5. If students are struggling to complete the exercise, advise them to complete questions 1, 4, 6 and 7 and then move on to questions 2, 3, 5 and 9-10.
- Exercise 9E is a summary of the exercises covered so far: multiples, factors, prime numbers and square numbers. It differentiates by asking questions covering more than one topic. Students can do this exercise when they have completed Exercise 9D or until the chapter is completed. **Less able** students may need to be reminded of the basic facts before attempting the exercise. **More able** students should not need such help.
- In Exercise 9E, the FM question is 12, the PS questions are 5, 6, 7, 11, 14 and 16 and the AUs are 9 and 10. If students are struggling to complete the exercise, advise them to complete questions 1-4, 8, 13 and 15, and then move on to questions 5, 6, 7, 9-12, 14 and 16.

Plenary

- Put the following on the board: $1 = 1$ $1 + 3 = 4$ $1 + 3 + 5 = 9$
- Ask students if they can continue the pattern, e.g.: $1 + 3 + 5 + 7 = 16$
- Ask students to describe what is on each side of the equals sign. (Sum of consecutive odd numbers, square numbers.)
- Ask if they can fill in the missing square number for: $1 + 3 + \dots + 17 + 19 = 100$, as the value is $(19 + 1) \times 10$
- Now ask students to give the answers to, for example, 8×8 followed by 7×9 , $(64 \text{ and } 63)$
- Repeat for similar calculations, e.g. 6×6 followed by 5×7 ($36 \text{ and } 35$) or 15×15 followed by 14×16 ($225 \text{ and } 224$).
- Ask students if they can see the pattern.

Answers

Answers to Exercises 9D and 9E can be found on page 00.

Link maths concepts and help students to access functional and problem-solving questions

Engage the whole class and help them consolidate new concepts with tripartite lesson structures

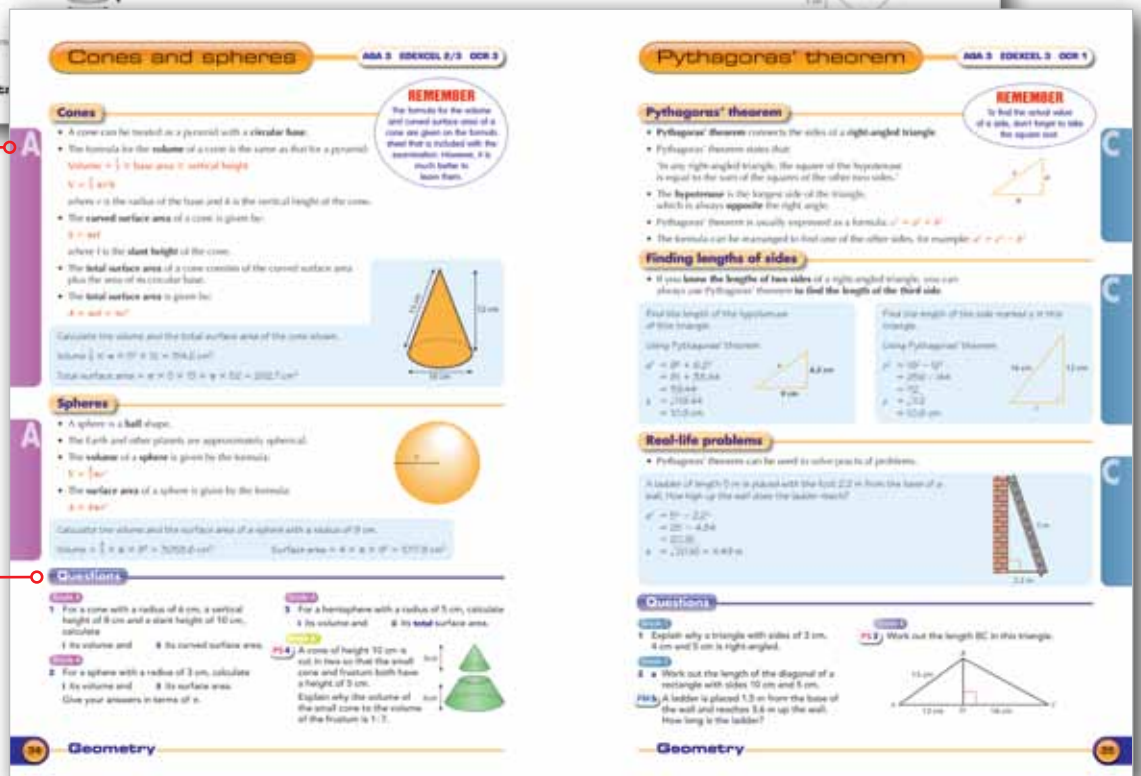
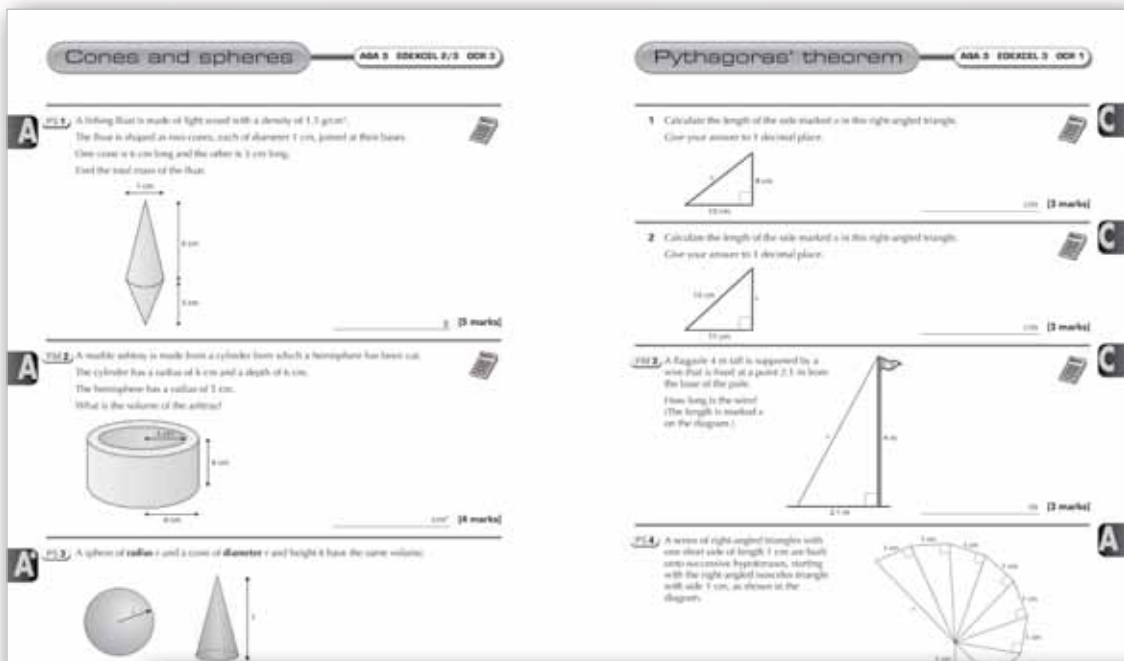
ALSO AVAILABLE IN THE TEACHER'S PACKS:

- Quick access to answers to questions in the corresponding Student Book and Homework Book. (Please note: answers to Homework Book Foundation 1 will be available at www.collinseducation.com/newgcsemathsanswers)
- Ready-made Schemes of Work for 2 and 3 years
- Lesson plans in Word format on the CD-ROM

This guide contains full size samples of 'Negative numbers', including four lessons for you to use with Student Book Foundation 1. Turn to page 12...

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You can find full size examples from the Foundation and Higher Revision Guides on pages 30-37 in this guide.

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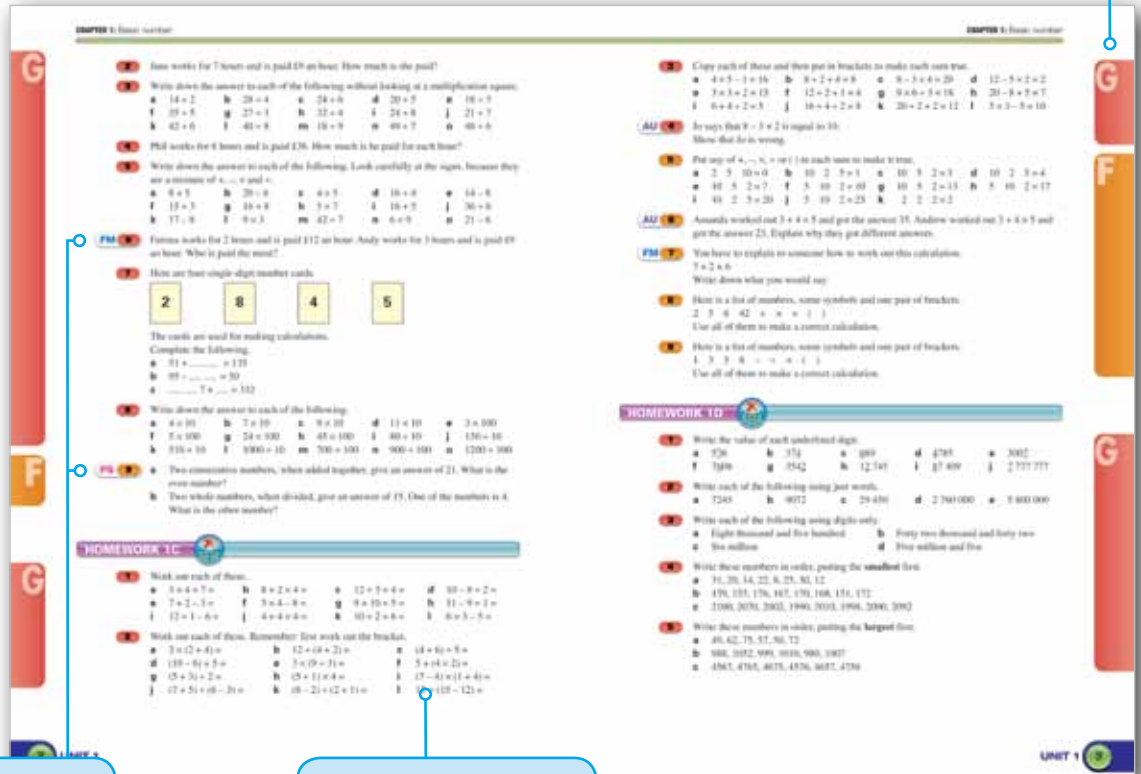
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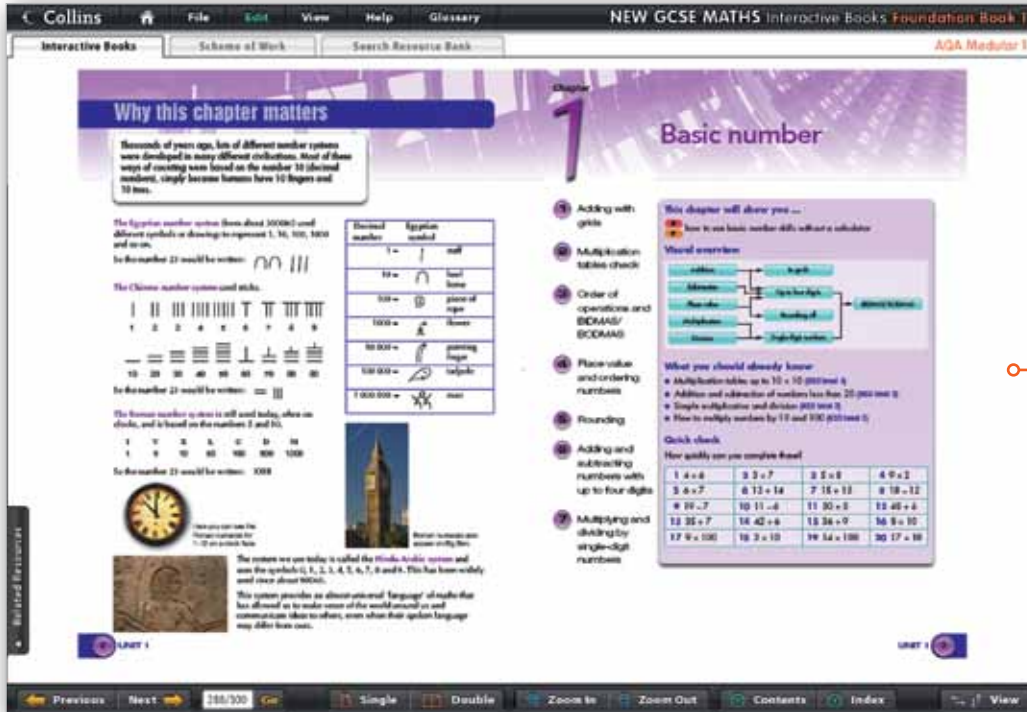
TESTS AVAILABLE:

- Paper tests (per book): initial test, end of chapter tests, half term tests, end of year test, end of unit tests
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The Components Explained: Interactive Books

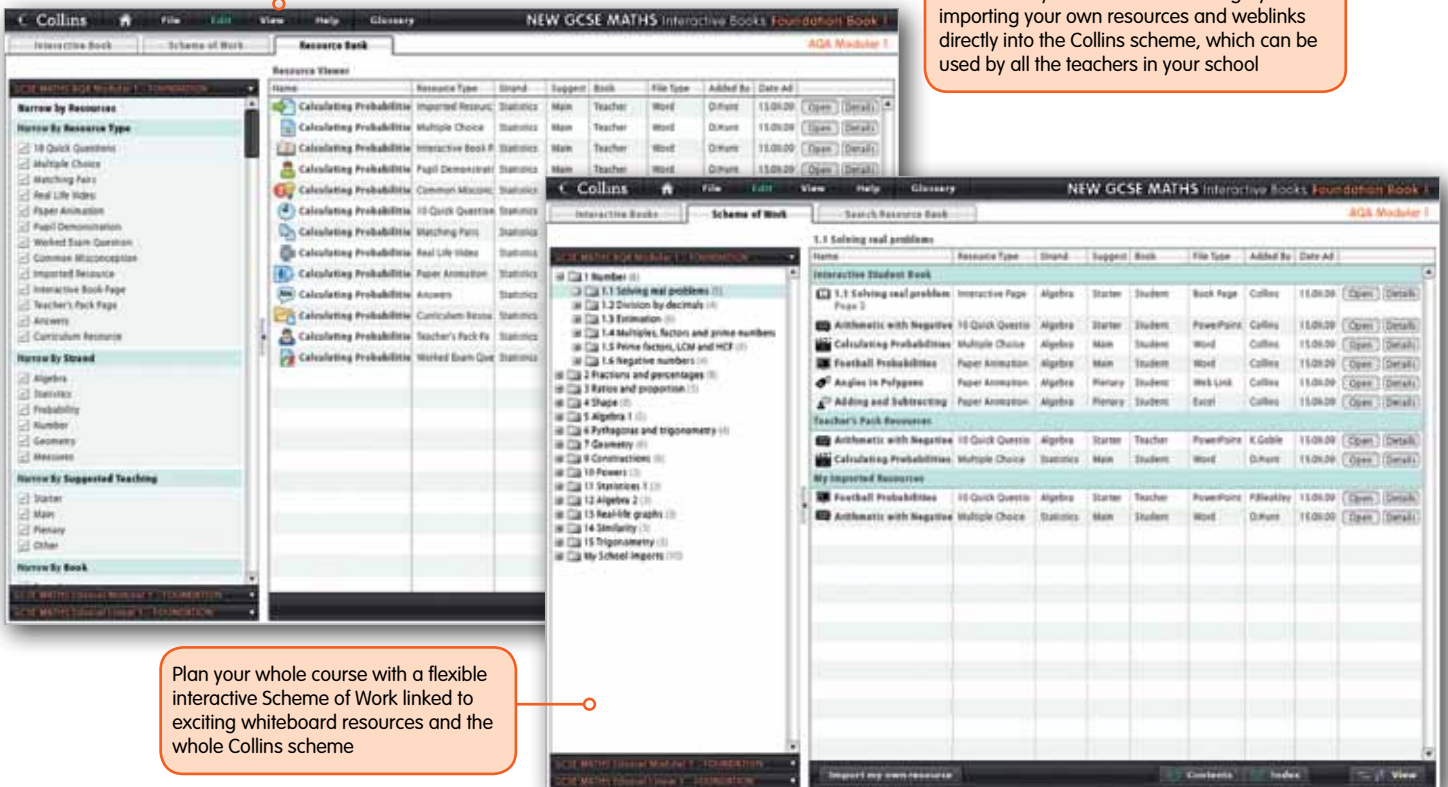
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