Collins



Available Spring 2015





Your whole class will need frequent practice in problemsolving and reasoning skills to succeed in the new GCSE Maths exam.

Our resources provide exactly that, for students at every level.

And we've done it in the most easily accessible way.

For Edexcel

Edexcel Gi Maths

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Edexcel GCSE Maths edexcel

Out now

Authors: Kevin Evans Keith Gordon Brian Speed Michael Kent

GCSE Maths 4th Edition

Your whole class will need frequent practice in problemsolving and reasoning skills to succeed in the new GCSE Maths exam.

Our resources provide exactly that, for students at every level.

And we've done it in the most easily accessible way.

GCSE Maths is changing, and the Fourth Edition of GCSE Maths from Collins has been completely revised and updated to develop and embed the skills your students need, while providing a clear and supportive route through the new, more challenging GCSE content.









More opportunities for practice - targeted

support for your students with tailored, differentiated resources designed to provide extra practice where it is most needed. Choose from Skills Books which focus on reasoning and problem solving, Practice Books which focus on fluency and a Booster Workbook to provide additional practice for Foundation tier students, plus hundreds of differentiated questions in the Student Books. **Flexible routes through the curriculum** – however you want to teach it. The structured teacher resources provide options for covering the GCSE in two, three, or five years, plus support on how to tackle the new content that has moved from AS and A-level to GCSE and from Higher tier to Foundation.



Easy for your students to get

to grips with – content is designed to be as clear and easy to understand as possible whilst covering all of the new, harder topics, featuring clear sign-posting of skills plus plenty of practice for fluency and consolidation.

7.2 Speed, distance and time

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Collins Connect

On-going assessment opportunities – track progress with auto-marked end of chapter, half term and end of year tests – which give you and your students regular knowledge checks before moving on, and prepare students for final assessment with examstyle question papers.

Changes to GCSE Maths

GCSE Maths is changing from September 2015 – you can read an overview of the main changes below. Find out more at **collins.co.uk/GCSEMaths**.

- New assessment objectives
- New, more challenging content for both tiers
- Linear course with exams at the end of Year 11
- Change to assessment time (4.5 hours)
- New grading (9–1 not A* to G)

A brief overview of the new Assessment Objectives

AO1: Use and apply standard techniques

AO2: Reason, interpret and communicate mathematically

AO3: Solve problems within mathematics in other contexts

Examples of new content

New to both Foundation and Higher tiers

systematic listing strategies Fibonacci type sequences quadratic sequences simple geometrical progressions pressure functions frequency trees Venn diagrams

standard form surds expanding and factorising quadratic expressions solving quadratic equations by factorising simultaneous equations trigonometry

New to Foundation tier

New to Higher tier

inverse functions composite functions graph of y = tan x velocity-time graphs quadratic inequalities nth term of a quadratic sequence rates of change iterative processes invariance

Move to linear assessment

No modules - all assessed at end of year 11

3 papers, 4.5 hours in total and any topic can feature in any paper

How will GCSE Maths support you and your students?

- More opportunities to practice!
- Flexible routes through the curriculum
- Highly accessible and easy for your students to get to grips with
- On-going assessment opportunities

Find out more about how GCSE Maths will support you and your students in the course overview on the opposite page.



How is GCSE Maths structured?

Collins Connect

Content is available online at home and at school, meaning it's ideal for use as a front-ofclass teaching tool and as a way to set homework and tests.

Teach

Teacher Packs Available for Foundation and Higher tiers.

Deliver the new GCSE Maths curriculum with confidence using a detailed introduction to the course.



Assess

Track progress with automarked end of chapter, half term and end of year tests, and prepare students for final assessment with exam-style question papers.



GCSE Maths for Edexcel 4th Edition

Practise

Practice Books Available for Foundation and Higher tiers.

Support students in mastering Assessment Objective AO1.

Booster Workbook

Available for Foundation tier. More practice for those students who require additional support.

Learn Student Books Available for



Foundation and Higher tiers. Cover the content for the new GCSE

Maths specifications with practice opportunities throughout and a focus on problem solving and reasoning – supporting the new AOs.

Build Skills

Maths Skills Builder Extra support for a smooth transition from KS3 to GCSE.

Skills Books

Available for Foundation and Higher tiers. Support students in mastering Assessment Objectives AO2 and AO3.





Using **Maths Frameworking**, **3rd edition** and **GCSE Maths**, **4th edition** together will give you a complete 5 year maths programme. A free 5 year Scheme of Work for Higher tier is available to download from collins.co.uk/GCSEMaths.

(Maths Frameworking and the 5 year Scheme of Work have not been entered into approval processes with AQA or endorsement processes with Edexcel.)



Student Books

- Fully revised and updated for the new GCSE specifications for AQA and Edexcel
- Written by experienced teachers and expert authors
- Focused on mathematical reasoning and problem solving to build the skills students need for success at GCSE

Student Books are structured to cover all the content required for the complete GCSE. Separate Student **Books for Foundation** and Higher tier are available.

> Solve problems within mathematics and in other contexts with clearly flagged questions





GCSE Maths for AQA Higher Student Book is approved by AQA. The Foundation Student Book has entered an approval process with AQA.

GCSE Maths for Edexcel Higher Student Book is endorsed by Edexcel. We are working with Edexcel to gain endorsement for the Foundation Student Book.

Exercise 7C

- Derek, aged 15, and Ricki, aged 10, shared all the conkers they found in the woods in the same ratio as their ages. Derek had 48 conkers. a Write down and simplify the ratio of their ages. b How many conkers did Ricki have? c How many conkers did they find altogether? A blend of tea is made by mixing Lapsang with Assam in the ratio 3 : 5. I have a lot of Assam tea but only 600 g of Lapsang. How much Assam do I need to make the blend, if I use all the Lapsang? The ratio of male to female spectators at ice hockey games is 4 : 5. At the Giants' last match, 4500 men watched the match. What was the total attendance at the game? A teacher always arranged the content of every lesson for Year 10 as 'teaching' and 'practising learnt skills' in the ratio 2 : 3. a If a lesson lasted 35 minutes, how much teaching would he do? b If he decided to teach for 30 minutes, how long would the lesson be? Three business partners, Kevin, John and Margaret, put money into a business in the ratio 3 : 4 : 5. They shared any profits in the same ratio. Last year, Margaret made £3400 out of the profits. How much did Kevin and John make last year? lqra is making a drink from lemonade, orange and ginger ale in the ratio 40:9:1. If lqra has only 4.5 litres of orange, how much of the other two ingredients does she need to make the drink? b Another drink made from lemonade, orange and ginger ale uses the ratio 10:2:1. Which drink has a larger proportion of ginger ale, Iqra's or this one? Show how you work out your answer. • On a plane the ratio of business to premium to economy class seats is 1:6:30. A family of 8 book all of the business seats. How many seats are there on the plane altogether? ര A group of boys and girls is waiting for school buses. 25 girls get on the first bus. The ratio of boys to girls at the stop is now 3 : 2. 15 boys get on the second bus There are now the same number of boys as girls at the bus stop. How many students alterether were originally at the bus stop? altogether were originally at the bu A jar contains 100 cc of a to make the ratio of oil t ratio of oil to water 1:3 0 This timetable shows a train journey from Sheffield mainline. The distance travelled is 150 miles. (ev) A teacher asked her cla the ratio 1:3:5. Zeke chose 10. Yoko cho 11:29 Sheffield 13:30 London St Train a Who made the most : Pancras Intl b Zeke correctly worke This timetable shows a train journey from Sheffield mainline. The distance from Sheffield to Doncaster London is 160 miles. Yoko correctly worke What mistake have th avel by 11:10 Sheffield 11:35 Doncaster Train 10 7 Ratio, speed and proportion 11:35 London Kings 11:46 Doncaster Train Cross a Work out the average speed of each journey. Reason, interpret b Work out the average speed of the train journey and communicate (10) 10 A train travels at 50 km/h for 2 hours. Then it slows o mathematically with of its journey at 40 km/h plenty of practice a What is the total distance of this journey? questions b What is the average speed of the train over the w ints and tips Remember that there are 3600 s 1000 metres in a kilometre. So t multiply by 1000 and divide by 3 Change each speed to metres per second. a 36 km/h b 12 km/h Provide rigorous Out Hints and tips To change from m/s to km/h mu now maths practice with hundreds Change each speed to kilometres per hour. of high- quality a 25 m/s b 12 m/s questions To convert a decimal fraction of multiply by 60. A train travels at an average speed of 18 m/s. The train sets off at 07:30 on a 40 km journey. Differentiate at the At approximately what time will it reach its destinati top end with more (5) (14) At 9:00 am cyclist A sets off on a trail at an average s challenging questions At 10:00 am cyclist B sets off from the same place, in speed of 24 km/h.
 - Approximately what time will cyclist 8 catch up with
 - 15 minutes after 10:00 am

- Set up a table to show how far t



Teacher Packs

Available for Foundation and Higher tiers

- Deliver the new GCSE Maths curriculum with confidence using a detailed introduction to the course
- Help students achieve a smooth transition from KS3 to GCSE with carefully structured lessons and thorough explanations of the assessment objectives
- Plan ahead with detailed, practical schemes of work for 2, 3 and 5 year teaching
- Pick up and teach with detailed lesson plans - perfect for cover lessons, NQTs and full of ideas for more experienced teachers
- Extra teacher support on more challenging topics
- Answers to all questions from the Student Books included

Go to collins.co.uk/GCSEmaths to download sample chapters from the Foundation and Higher Teacher Packs.

Chapter 24 Algebraic fractions and functions

Overview 24.1 Algebraic fractions 24.4 Composite functions 24.2 Changing the subject of a formula 24.5 Iteration 24.3 Functions Prior learning Manipulate algebraic expressions and solve equations Use rules to generate sequences. Use trial and improvement to solve equations. Chapter 24 Ensure students can solve equations involving algebraic fractions by manipulation, find inverse and composite functions, and use iteration to find solutions. In the examination, students will be expected to A manipulate, simplify and rearrange algebraic expressions involving fractions B substitute into functions, find inverse and composite functions C rearrange polynomials to the terative form; solve iterations to a given number of iterations or number of occumal places. Extension

Explore more complex algebraic fractions, for example partial fractions. Use a wider range of mathematics in functions including trigonometric functions. Explore iteration in coding, in particular the generation of fractals.

Curriculum references

GCSE Maths 4th edition Higher Teacher Pack

Out

now

	KS4 NC Programmes of Study	GCSE specification	
24.1	A (ER) 10	A4, A6	
24.2	A (ER) 3	A5, A6	
24.3	A (ER) 6	A6, A7	
24.4	A (EF) 7	A6, A7	
24.5	A (EF) 2	A6, A20	

4

Γ	1-6, 8-10, 13-14, 18	7, 12, 15, 17	11, 16, 19	6, 8, 10, 12, 16
	1-6,9		7-8, 10- 11	4, 7, 9
	1-3, 5-7	4,7		2,7
	1-2	3		1e, 1f, 2
	1-2	3	4	2a, 2f, 3i, 3v
	1-5	5-6,8	7,9-11	6, 9

ery of the concept or which require a step-u used to identify the questions that students tify the questions that should be teacher-

her alg	ebraic manipulation, solving
eration	builds on understanding of
Jences	is a clear way of demonstrating
ter, the	next step is A level content.
logic a	and thinking in steps. There are
acturin	g, project management and man

lex, having a linear algebraic numerator or tween fg(x) and gf(x)? When will they be qual to the function? Find a chain of steps the iterative form. How efficient can you

th linear denominators and simple numerators. Ask them to select two to create an equation of the form y = A + B, where A and B are their chosen fractions. They should then represent this in as many forms as they can: rearrange, simplify, graph, iteration etc. See the CD for supported to the form y = A + B.

See the CD for suggested assessment tracking foci, and the section plans for further suggested Assessment tasks.

- Worked exemplars from Student Book suggestions for use

 A
 Present students with the same question but different numbers. They use the exemplar to mirror the working, in full or just the notes.

 B
 Copy and cut up the exemplar into cards. Students match the working with the notes. (You may need to remove the works first, second etc.)

 C
 Copy and cut up the exempting into cards but split the table/description from the working. Students put the working in order then match with the descriptions.

5

Answers to Student Book questions at the end of this book (NB: not included in this sample)

GCSE Maths 4th edition Higher Teacher Pack

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Extra support for a smooth transition from KS3 to GCSE

Maths Skills Builder

Author: Chris Pearce

- Get a head start on GCSE in Year 9
- Focus on two of the main aims of the new curriculum - mathematical reasoning and problem-solving - with additional practice and explanation
- Develop GCSE skills with longer, more descriptive questions that support the development of students' literacy, thinking skills and investigative strategies
- Use flexibly in the classroom or as a homework resource
- Assess learning with answers and comments included in a tear-out section

Maths Skills Builder Transition from KS3 to GCSE

Collins Connect resources, Teacher Packs and the Maths Skills Builder are not being entered into the AQA approval process, or the Edexcel endorsement process.

Go to collins.co.uk/GCSEmaths to download a sample chapter from the Maths Skills Builder.

Collins Connect

Teach GCSE Maths flexibly and in a way that suits your students with a full suite of digital resources.



Powered by an innovative online learning platform, **Collins Connect** makes GCSE Maths content available at home and at school, meaning it's ideal for use as a front-of-class teaching tool and as a way to set homework and tests.

Digital resources for **Collins GCSE Maths** have been selected to improve and build on key skills in maths such as fluency, problem-solving, correcting common misconceptions, using the correct vocabulary, applying maths to real-life scenarios and encouraging independent learning.

Collins Connect also contains automarked test questions to help students check their progress and understanding of topics as they move through the course and provide you with an overview of areas of strengths and weaknesses. You can assign homework and tests to individuals or your whole class via your VLE or by email in just a few clicks.

You can trial **Collins Connect** completely free for 14 days. Email **education.support@harpercollins.co.uk** to find out more.

Sample material is also available for you to look at online for free – visit **connect.collins.co.uk/secondary-teaching-resources**.





Discover GCSE Maths resources on Collins Connect

- You can access the Student Book on Connect, formatted for easy use section-by-section in classroom.
- Individual student log-ins are also available
- Progress and review feature that helps students know what they should have learnt and how they are progressing, followed by useful review questions
- End of chapter homework auto-marked tests for every chapter
- A problem-solving feature in every chapter
- Interactive glossary

Collins Connect for GCSE Maths also contains Tests

- 25 auto-marked half term tests, labelled for 2 year and 3 year GCSE respectively
- 3 auto-marked end of year tests

And, downloadable exam-style practice papers with mark schemes.

Practice Books

Available for Foundation and Higher tiers, Practice Books are designed to support students in mastering Assessment Objective AO1 – using and applying standard techniques. They follow the same structure as the Student Books, making them ideal for use both in the classroom for additional practice or as a homework resource.

- Build students' confidence with hundreds of differentiated practice questions
- Easily identify topics for further practice, intervention, prior knowledge recall and revision
- Challenge the most able students with plenty of challenging questions

Go to collins.co.uk/GCSEmaths to download a sample chapter from the Higher Practice Book.





Skills Books

Available for Foundation and Higher tiers, Skills Books support students in mastering Assessment Objectives AO2 and AO3: reason, interpret and communicate mathematically; and solve problems. Structured by strand, the resources are easily used alongside both the Practice Book and the Student Books.

- Build confidence in tackling longer questions in class and allow further practice at home
- Improve literacy, thinking skills and investigative strategies by providing opportunities for students to tackle problems within and outside mathematics
- Encourage students to think and analyse their work with questions designed to encourage independence

Go to collins.co.uk/GCSEmaths to download a sample chapter from the Higher Skills Book.

Practice Books, Skills Books and the Booster Workbook are not being entered into the AQA approval process, or the Edexcel endorsement process.





Booster Workbook

Available for Foundation tier, this write-in Booster Workbook provides more practice for those students who require additional support.

- Ideal for revision, intervention groups and booster classes
- Improve students' confidence with plenty of practice questions targeted at the right level

About the authors

Keith Gordor

Keith is an experienced author and education consultant who has written for a wide range of KS3 and GCSE materials. He was previously a Head of Department for many years.

Kevin Evans

After 25 years as a Head of Mathematics in Leeds High Schools, Kevin is a part-time Mathematics Intervention teacher and an established author writing material for KS3 and GCSE maths resources.

Brian Speed

Brian has written a number of education textbooks. He was also a maths teacher, rising to Head of Department.

Rob Ellis

Rob has taught maths for 25 years in comprehensive schools, with focus on GCSE and A Level. His current role is assistant headteacher.

Sandra Wharton

Sandra has taught maths at a number of schools for many years. Amongst other roles, she is an Independent Advisor for the Advisory Committee on Mathematics Education, she has previously been Regional Advisor for Mathematics for National Strategy and a Curriculum Development Advisor for North Somerset.

Michael Kent

Michael is a Director of Mathematics and STEM at a girls' grammar school and also a Cluster Leader overseeing Mathematics, Design Technology and Computing. He is an experienced author of GCSE Maths resources.

Chris Pearce

Chris has over 30 years' experience teaching maths in secondary schools. He worked as an adviser with the National Maths Strategy for over five years. He has written a number of textbooks and other maths resources. He has also worked as a consultant in the Middle and Far East.

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For AQA

For Edexcel

Student Books	Foundation 978-0-00-759743-7 Mar 2015 • £19.99	Higher 978-0-00-759734-5 Out now • £19.99	Student Books	Foundation 978-0-00-811382-7 Mar 2015 • £19.99	Higher 978-0-00-811381-0 Out now • £19.99
Student Book + individual student log-in to Collins Connect resources. (f2 per student log-in to access a digital only copy of the book).*	Foundation 978-0-00-759743-7 1 year subscription 978-0-00-811617-0 f21.99 3 year subscription 978-0-00-811396-4 f24.99	Higher 978-0-00-759734-5 1 year subscription 978-0-00-811616-3 £21.99 3 year subscription 978-0-00-811395-7 £24.99	Student Book + individual student log-in to Collins Connect resources. (f2 per student log-in to access a digital only copy of the book).*	Foundation 978-0-00-811382-7 1 year subscription 978-0-00-811619-4 £21.99 3 year subscription 978-0-00-811398-8 £24.99	Higher 978-0-00-811381-0 1 year subscription 978-0-00-811618-7 £21.99 3 year subscription 978-0-00-811397-1 £24.99
Teacher Packs	Foundation 978-0-00-811392-6 Apr 2015 • £100	Higher 978-0-00-811391-9 Feb 2015 • £100	Teacher Packs	Foundation 978-0-00-811394-0 Apr 2015 • £100	Higher 978-0-00-811393-3 Feb 2015 • £100
Interactive Book, Homework and Tests	Foundation 1 year subscription 978-0-00-811411-4 • £250 Foundation 3 year subscription 978-0-00-811415-2 • £700 Higher 1 year subscription 978-0-00-8114109-1 • £250 Higher 3 year subscription 978 0 0 0114112 0 = £700		Interactive Book, Homework and Tests	Foundation 1 year subscription 978-0-00-811412-1 • £250 Foundation 3 year subscription 978-0-00-811417-6 • £700 Higher 1 year subscription 978-0-00-811410-7 • £250 Higher 3 year subscription 978-0-00-811414-5 • £700	
Skills Builder	978-0-00-753780-8 Out now • £5.99		Skills Builder	978-0-00-753780-8 Out now • £5.99	
Skills Books	Foundation 978-0-00-811386-5 Apr 2015 • £7.99	Higher 978-0-00-811385-8 Mar 2015 • £7.99	Skills Books	Foundation 978-0-00-811390-2 Apr 2015 • f7.99	Higher 978-0-00-811389-6 Mar 2015 • £7.99
Practice Books	Foundation 978-0-00-811384-1 May 2015 • £7.99	Higher 978-0-00-811383-4 Feb 2015 • £7.99	Practice Books	Foundation 978-0-00-811388-9 May 2015 • £7.99	Higher 978-0-00-811387-2 Feb 2015 • £7.99
Booster Workbook	Foundation 978-0-00-811419-0 Jun 2015 • f5.99		Booster Workbook	Foundation 978-0-00-811420-6 Jun 2015 • f5.99	

The prices quoted here are for individual components. Our sales consultants are always happy to discuss your requirements and find a package that suits your needs, including exclusively digital solutions.

Subscriptions to the online Student Books are not available without a subscription to the Collins Connect package. For the full terms and conditions please visit www.connect.collins.co.uk.

The Collins Connect package allows unlimited access for teachers and students in school, including whiteboard use. It does not allow access to the full reporting functionality or allow students to have individual log-ins. Individual student access must be purchased to access this.

*Schools must purchase 60 or more Student Books to qualify for the £2 per student log-in.