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Covering a wide range of UK and international curricula, our resources draw on the best current practices in mathematics education to support teaching and learning worldwide.

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Best wishes,

The Mathematics Team

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GCSE Mathematics Online is our interactive teaching and learning subscription service available for the AQA, Edexcel and OCR 2015 GCSE Mathematics specifications. This tablet-friendly resource supports both independent learning and whole-class teaching through a suite of flexible resources that includes lesson notes, interactive walkthroughs, explanatory animations, games, worksheets, quick quizzes and levelled assessments.

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- Quick-fire quizzes with leaderboards, providing an opportunity for question practice
- Levelled questions that assess understanding of each topic
- Covers both Foundation and Higher, offering flexibility for moving students between tiers
- Resources organised into chapters corresponding to the student books, with explanatory notes for all topics
- Contains material for all types of classroom set-up, including interactive whiteboards, projectors and tablets
- Includes a digital PDF version of both the Foundation and Higher student books

Whole-school site licence AVAILABLE*

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GCSE Mathematics for OCR

OCR'S PUBLISHER PARTNER FOR MATHEMATICS

Launchpad

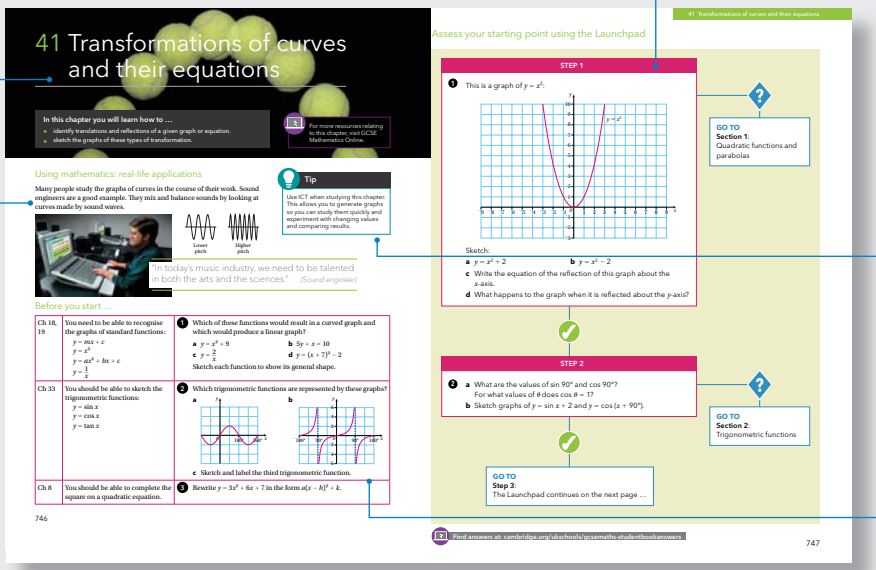
A flow chart of concepts covered in the chapter. Each step tests a different skill, progressing from least to most advanced. Students can assess their most appropriate starting point in the chapter, encouraging them to take ownership of their learning.

What you will learn

Short objectives to show the content and mathematical skills covered in the chapter.

Using mathematics

Shows how the content of the chapter relates to the world of work, making maths relevant beyond the classroom.



Sample pages from OCR Foundation student book.

Tip

General hints and reminders to aid students, sometimes including questions to prompt their knowledge.

Before you start...

Lists the prerequisite knowledge for the chapter. Includes questions on each concept to assess whether students can recall the necessary knowledge and skills.

Student books

- Written from scratch and approved for the 2015 OCR (J560) GCSE Mathematics specification
- A 'Launchpad' feature at the beginning of each chapter directs students to their best starting point to optimise progress and allows for both independent and personalised learning
- Topics and problems are introduced through a wide variety of contexts, showing how maths relates to the real world
- Thousands of questions cover all assessment objectives, offering extensive opportunity to master key skills
- A 'Work it out' feature encourages students to explore and discuss common errors, helping to draw out misconceptions

Problem-solving books

- Approved for the 2015 OCR GCSE Mathematics qualification.
- Questions with worked solutions draw out the reasoning, interpreting, estimating and communication skills required to effectively solve problems
- Each chapter focuses on a different technique to equip students with a problem-solving toolkit that they can apply to any question, encouraging students to develop problem-solving 'muscle memory'
- All questions have star ratings to show the level of difficulty, allowing students to track their progress
- Questions are colour-coded to show which strands of maths they cover, with questions covering multiple topics to prepare students for the synoptic nature of the exams

Homework books

- Approved for the 2015 OCR GCSE Mathematics specification
- Offer practice questions for students across the full GCSE Mathematics curriculum
- Contain exercises that correspond to each section of the student book, offering hundreds of additional questions for further practice
- Questions assess a variety of skills, including recall, interpretation, problem-solving and mathematical reasoning
- Ideally sized for school bags

Teacher's resource

Our FREE digital teacher's resource for both the Foundation and Higher tiers contains everything necessary to plan and deliver the 2015 OCR (J560) GCSE Mathematics qualification.

GCSE Mathematics for OCR course structure

Student books

Student books have a strong focus on the development of problem-solving skills, mathematical reasoning and fluency.

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Higher: 2 Years 9781107447967; **3 Years** 9781107569201

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Homework books

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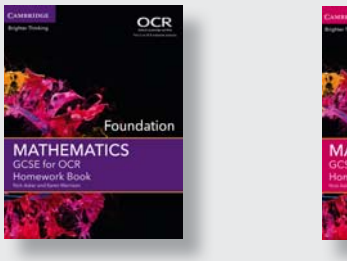

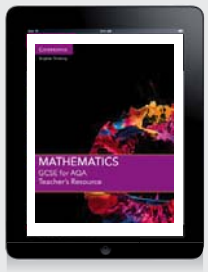

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GCSE Mathematics for Edexcel

Launchpad

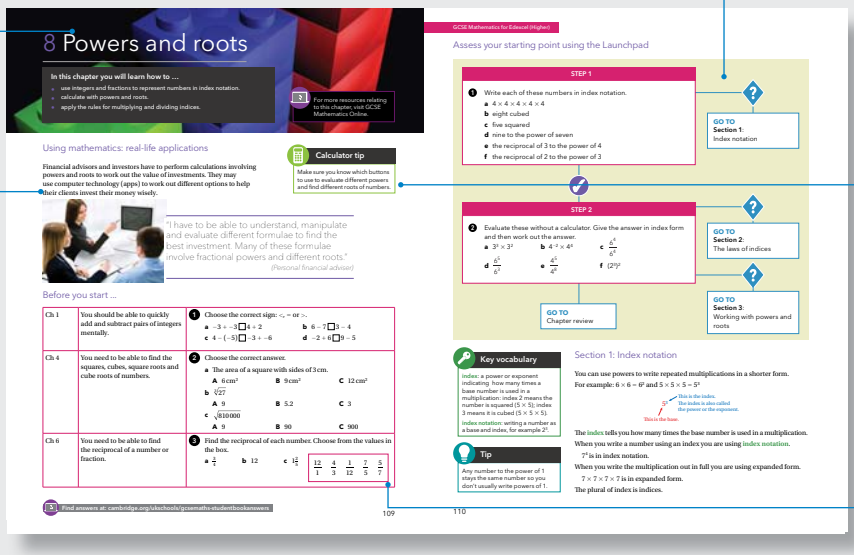
A flow chart of concepts covered in the chapter. Each step tests a different skill, progressing from least to most advanced. Students can assess their most appropriate starting point in the chapter, encouraging them to take ownership of their learning.

What you will learn

Short objectives to show the content and mathematical skills covered in the chapter.

Using mathematics

Shows how the content of the chapter relates to the world of work, making maths relevant beyond the classroom.



Tip

General hints and reminders to aid students, sometimes including questions to prompt their knowledge.

Before you start...

Lists the prerequisite knowledge for the chapter. Includes questions on each concept to assess whether students can recall the necessary knowledge and skills.

Sample pages from Edexcel Foundation student book.

Student books

- Written from scratch and approved for the 2015 Edexcel (1MA1) GCSE Mathematics specification
- A 'Launchpad' feature at the beginning of each chapter directs students to their best starting point to optimise progress and allows for both independent and personalised learning
- Topics and problems are introduced through a wide variety of contexts, showing how maths relates to the real world
- Thousands of questions cover all assessment objectives, offering extensive opportunity to master key skills
- A 'Work it out' feature encourages students to explore and discuss common errors, helping to draw out misconceptions

Problem-solving books

- Approved for the 2015 Edexcel GCSE Mathematics specification
- Questions with worked solutions draw out the reasoning, interpreting, estimating and communication skills required to effectively solve problems
- Each chapter focuses on a different technique to equip students with a problem-solving toolkit that they can apply to any question, encouraging students to develop problem-solving 'muscle memory'
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Homework books

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- Contain exercises that correspond to each section of the student book, offering hundreds of additional questions for further practice
- Questions assess a variety of skills, including recall, interpretation, problem-solving and mathematical reasoning
- Ideally sized for school bags

Teacher's resource

Our FREE digital teacher's resource for both the Foundation and Higher tiers contains everything necessary to plan and deliver the 2015 Edexcel (1MA1) GCSE Mathematics qualification.

GCSE Mathematics for Edexcel course structure

Student books

Student books have a strong focus on the development of problem-solving skills, mathematical reasoning and fluency.

Foundation: 9781107448025
Higher: 9781107448001

GCSE Mathematics Online

GCSE Mathematics Online for Edexcel is packed with flexible resources that include lesson notes, walkthroughs, animations, games, worksheets, quick quizzes and levelled assessments.

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Student book and online subscription bundle

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Foundation: 2 Years 9781107447912; **3 Years** 9781107569126
Higher: 2 Years 9781107447851; **3 Years** 9781107557642

Problem-solving books

Problem-solving books contain a variety of questions to develop students' problem-solving and reasoning skills within the context of the GCSE curriculum.

Foundation: 9781107450066
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Homework books

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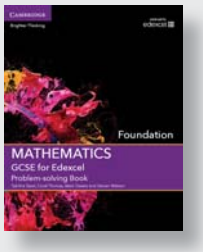

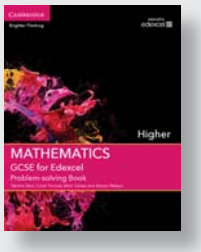

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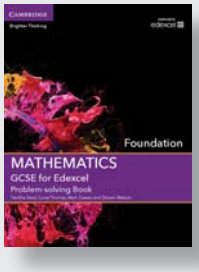

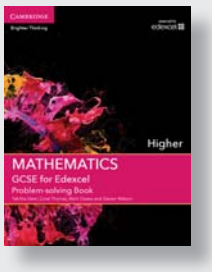

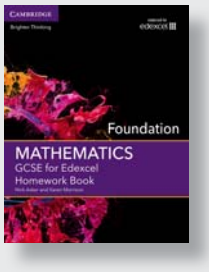

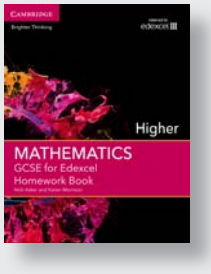

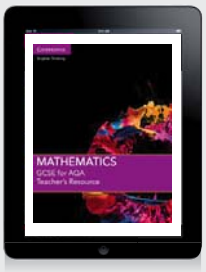

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GCSE Mathematics for AQA

Launchpad

A flow chart of concepts covered in the chapter. Each step tests a different skill, progressing from least to most advanced. Students can assess their most appropriate starting point in the chapter, encouraging them to take ownership of their learning.

What you will learn

Short objectives to show the content and mathematical skills covered in the chapter.

Using mathematics

Shows how the content of the chapter relates to the world of work, making maths relevant beyond the classroom.

Key vocabulary

Key terms are highlighted for ease of learning, and gathered in a glossary at the back of the student book for quick reference.

Before you start...

Lists the prerequisite knowledge for the chapter. Includes questions on each concept to assess whether students can recall the necessary knowledge and skills.

Sample pages from AQA Foundation student book.

Student books

- Written from scratch and approved for the 2015 AQA (8300) GCSE Mathematics specification
- A 'Launchpad' feature at the beginning of each chapter directs students to their best starting point to optimise progress and allows for both independent and personalised learning
- Topics and problems are introduced through a wide variety of contexts, showing how maths relates to the real world
- Thousands of questions, including multiple-choice questions, cover all assessment objectives, offering extensive questions to master key skills
- A 'Work it out' feature encourages students to explore and discuss common errors, helping to draw out misconceptions

Problem-solving books

- Questions with worked solutions draw out the reasoning, interpreting, estimating and communication skills required to effectively solve problems
- Each chapter focuses on a different technique to equip students with a problem-solving toolkit that they can apply to any question, encouraging students to develop problem-solving 'muscle memory'
- All questions have star ratings to show the level of difficulty, allowing students to track their progress
- Questions are colour-coded to show which strands of maths they cover, with questions covering multiple topics to prepare students for the synoptic nature of the exams

Homework books

- Offer practice questions for students across the full GCSE Mathematics curriculum
- Contain exercises that correspond to each section of the student book, offering hundreds of additional questions for further practice
- Questions assess a variety of skills, including recall, interpretation, problem-solving and mathematical reasoning
- Questions increase in difficulty throughout each exercise and chapter to build confidence and allow for progression
- Ideally sized for school bags

Teacher's resource

Our FREE digital teacher's resource for both the Foundation and Higher tiers contains everything necessary to plan and deliver the 2015 AQA (8300) GCSE Mathematics qualification.

GCSE Mathematics for AQA course structure

Student books

Student books have a strong focus on the development of problem-solving skills, mathematical reasoning and fluency.

Foundation: 9781107448049
Higher: 9781107448032

GCSE Mathematics Online

GCSE Mathematics Online for AQA is packed with flexible resources that include lesson notes, walkthroughs, animations, games, worksheets, quick quizzes and levelled assessments.

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Student book and online subscription bundle

Contains our print student book and GCSE Mathematics Online subscription service for AQA.

Foundation: 2 Years 9781107447950; **3 Years** 9781107569195
Higher: 2 Years 9781107447943; **3 Years** 9781107569140

Problem-solving books

Problem-solving books contain a variety of questions to develop students' problem-solving and reasoning skills within the context of the GCSE curriculum.

Foundation: 9781107450103
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Homework books

Homework books are affordable standalone resources and ideal companions to the student books.

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Teacher's resource

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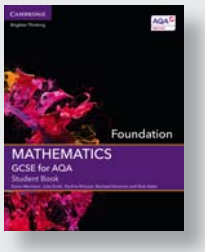

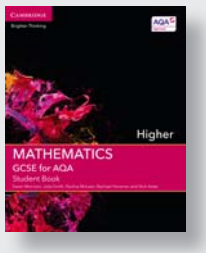

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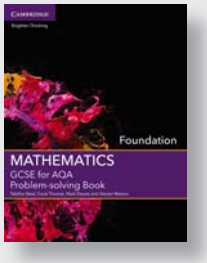

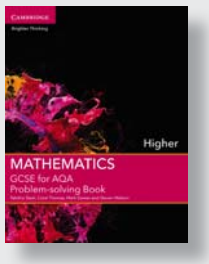

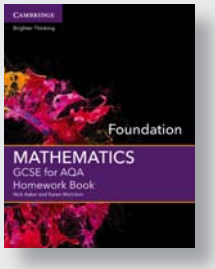

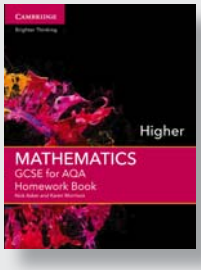

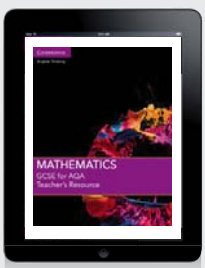

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AS/A Level Mathematics & Further Mathematics for OCR A

OCR'S PUBLISHER PARTNER FOR MATHEMATICS

The resources

These OCR resources provide detailed coverage of the linear specifications, supporting teachers and students every step of the way by offering a firm foundation for study beyond A Level. In particular, the resources include:

- A structured pedagogical approach, assisting teachers in delivering expanded content in a clear and effective way
- A deeper, more synoptic understanding of mathematics that helps students to develop essential skills in problem-solving, modelling and proof to help meet the new requirements
- Cambridge Elevate editions which encourage adaptations of the student book, alongside other useful resources

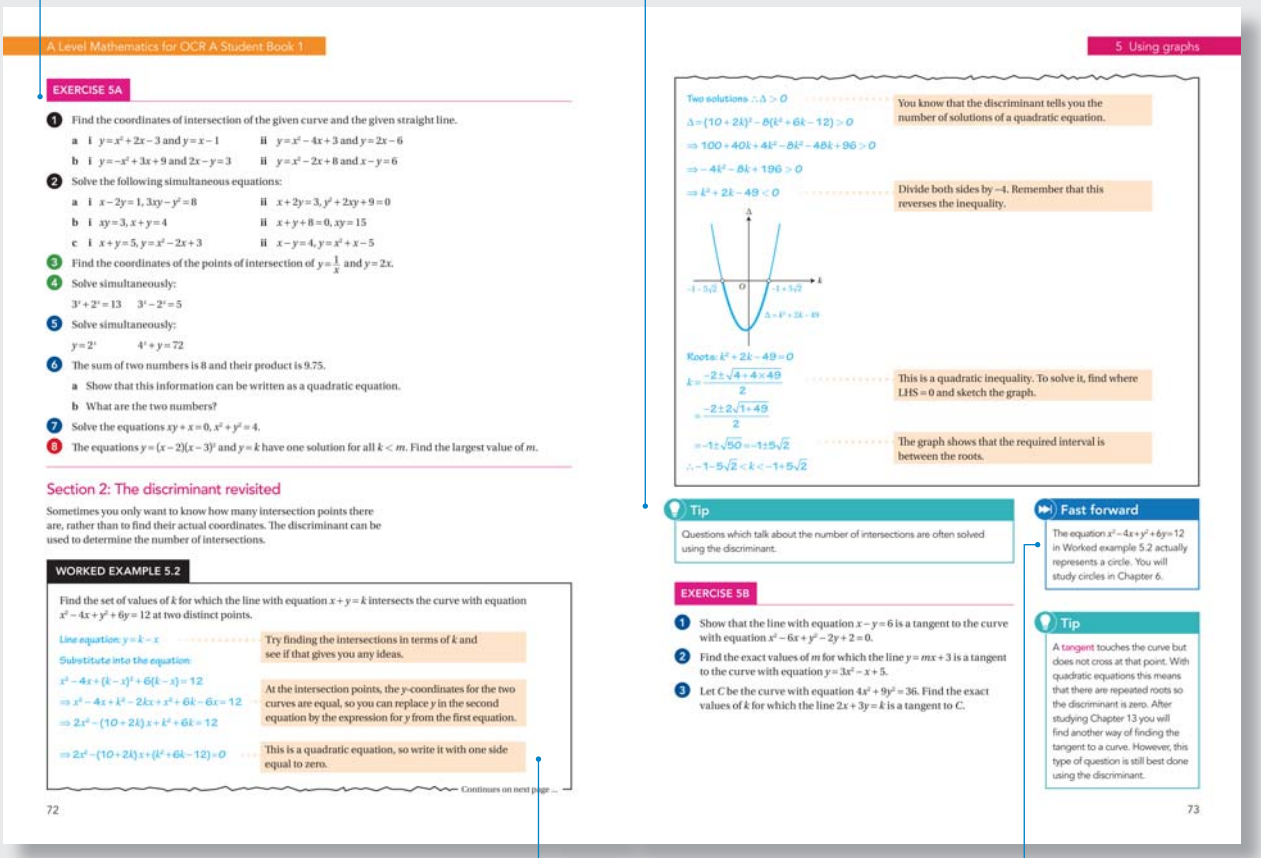
Student books

Colour-coded exercises

Exercises are colour-coded and designed to provide careful progression, ranging from basic fluency to practice questions.

Tip

Offers useful guidance to students, including ways of calculating or checking and using technology.



A Level Mathematics for OCR A Student Book 1

EXERCISE 5A

1 Find the coordinates of intersection of the given curve and the given straight line.
a i $y = x^2 + 2x - 3$ and $y = x - 1$ ii $y = x^2 - 4x + 3$ and $y = 2x - 6$
b i $y = -x^2 + 3x + 9$ and $2x - y = 3$ ii $y = x^2 - 2x + 8$ and $x - y = 6$

2 Solve the following simultaneous equations:
a i $x - 2y = 1, 3xy - y^2 = 8$ ii $x + 2y = 3, y^2 + 2xy + 9 = 0$
b i $xy = 3, x + y = 4$ ii $x + y + 8 = 0, xy = 15$
c i $x + y = 5, y = x^2 - 2x + 3$ ii $x - y = 4, y = x^2 + x - 5$

3 Find the coordinates of the points of intersection of $y = \frac{1}{x}$ and $y = 2x$.

4 Solve simultaneously:
$3^x + 2^x = 13$ $3^x - 2^x = 5$

5 Solve simultaneously:
$y = 2^x$ $4^x + y = 72$

6 The sum of two numbers is 8 and their product is 9.75.
a Show that this information can be written as a quadratic equation.
b What are the two numbers?

7 Solve the equations $xy + x = 0, x^2 + y^2 = 4$.

8 The equations $y = (x - 2)(x - 3)^2$ and $y = k$ have one solution for all $k < m$. Find the largest value of m.

Section 2: The discriminant revisited

Sometimes you only want to know how many intersection points there are, rather than to find their actual coordinates. The discriminant can be used to determine the number of intersections.

WORKED EXAMPLE 5.2

Find the set of values of k for which the line with equation $x + y = k$ intersects the curve with equation $x^2 - 4x + y^2 + 6y = 12$ at two distinct points.

Line equation: $y = k - x$ — Try finding the intersections in terms of k and see if that gives you any ideas.

Substitute into the equation:
$x^2 - 4x + (k - x)^2 + 6(k - x) = 12$
$\Rightarrow x^2 - 4x + k^2 - 2kx + x^2 + 6k - 6x = 12$
$\Rightarrow 2x^2 - (10 + 2k)x + k^2 + 6k = 12$ — At the intersection points, the y-coordinates for the two curves are equal, so you can replace y in the second equation by the expression for y from the first equation.

$\Rightarrow 2x^2 - (10 + 2k)x + (k^2 + 6k - 12) = 0$ — This is a quadratic equation, so write it with one side equal to zero.

Continues on next page ...

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5 Using graphs

Two solutions $\therefore \Delta > 0$
$\Delta = (10 + 2k)^2 - 8(k^2 + 6k - 12) > 0$ — You know that the discriminant tells you the number of solutions of a quadratic equation.
$\Rightarrow 100 + 40k + 4k^2 - 8k^2 - 48k + 96 > 0$
$\Rightarrow -4k^2 - 8k + 196 > 0$
$\Rightarrow k^2 + 2k - 49 < 0$ — Divide both sides by −4. Remember that this reverses the inequality.

Roots: $k^2 + 2k - 49 = 0$
$k = \frac{-2 \pm \sqrt{4 + 4 \times 49}}{2}$ — This is a quadratic inequality. To solve it, find where LHS = 0 and sketch the graph.
$= \frac{-2 \pm 2\sqrt{1 + 49}}{2}$
$= -1 \pm \sqrt{50} = -1 \pm 5\sqrt{2}$ — The graph shows that the required interval is between the roots.
$\therefore -1 - 5\sqrt{2} < k < -1 + 5\sqrt{2}$

Tip
Questions which talk about the number of intersections are often solved using the discriminant.

Fast forward
The equation $x^2 - 4x + y^2 + 6y = 12$ in Worked example 5.2 actually represents a circle. You will study circles in Chapter 6.

EXERCISE 5B

1 Show that the line with equation $x - y = 6$ is a tangent to the curve with equation $x^2 - 6x + y^2 - 2y + 2 = 0$.

2 Find the exact values of m for which the line $y = mx + 3$ is a tangent to the curve with equation $y = 3x^2 - x + 5$.

3 Let C be the curve with equation $4x^2 + 9y^2 = 36$. Find the exact values of k for which the line $2x + 3y = k$ is a tangent to C.

Tip
A tangent touches the curve but does not cross at that point. With quadratic equations this means that there are repeated roots so the discriminant is zero. After studying Chapter 13 you will find another way of finding the tangent to a curve. However, this type of question is still best done using the discriminant.

73

Pages from A Level Mathematics for OCR A Student Book 1

Worked examples

The left-hand side shows students how to set out their working. The right-hand side explains the more difficult steps and helps them to better understand why a particular method was chosen.

Fast forward

Links to topics that students may cover in greater detail later on in their studies.

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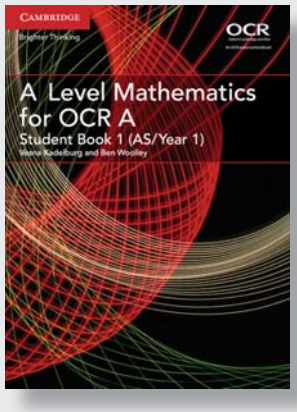

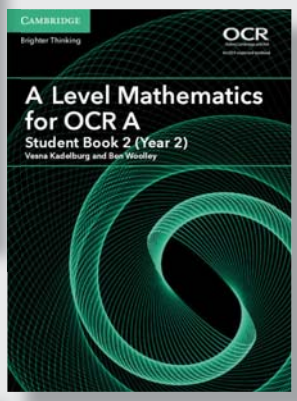

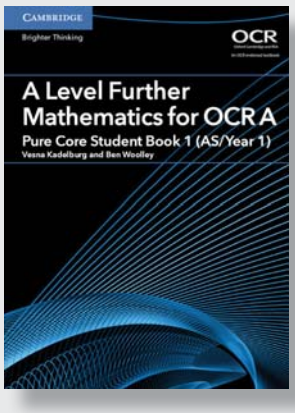

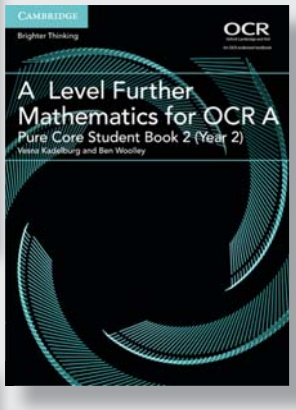

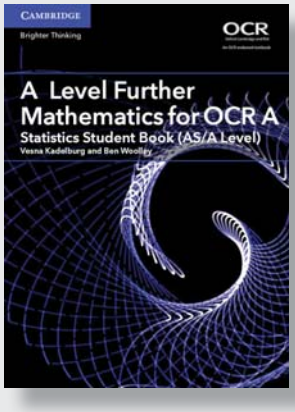

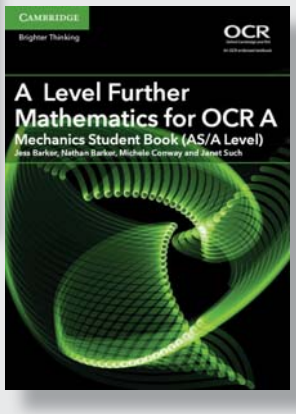

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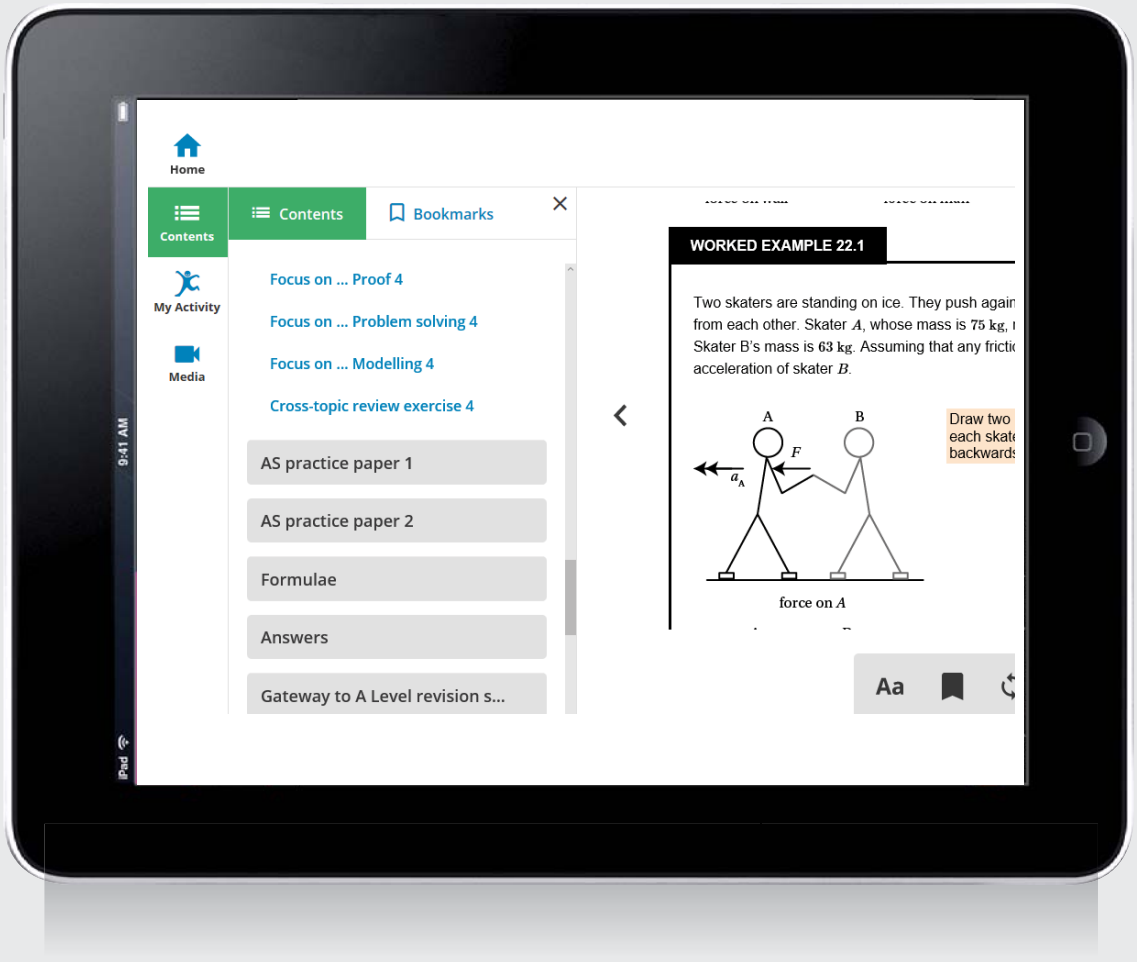

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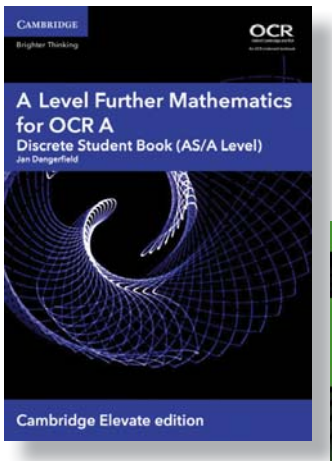

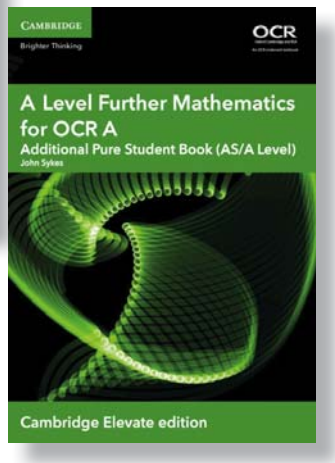

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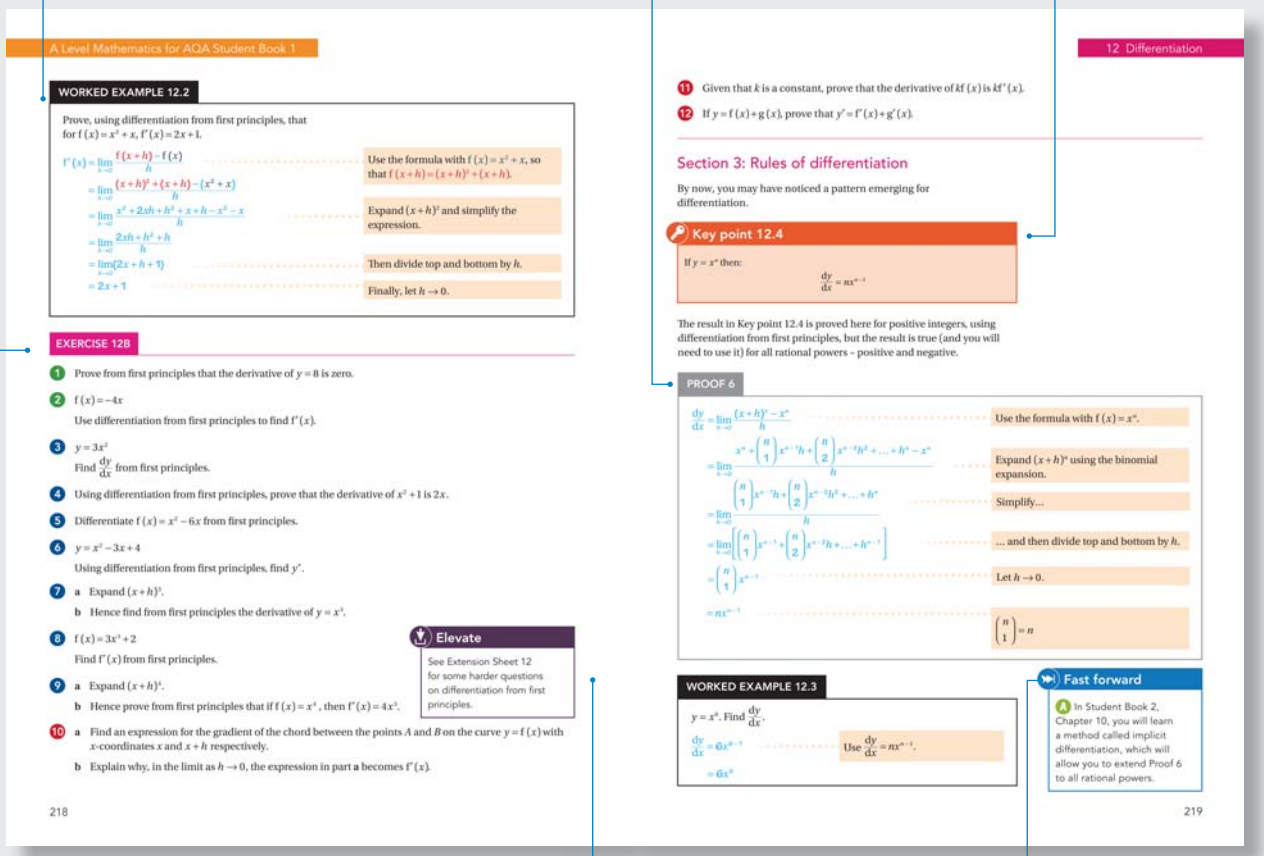

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Fast forward

Links to topics that students may cover in greater detail later on in their studies.

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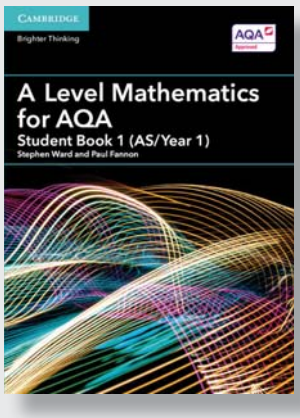

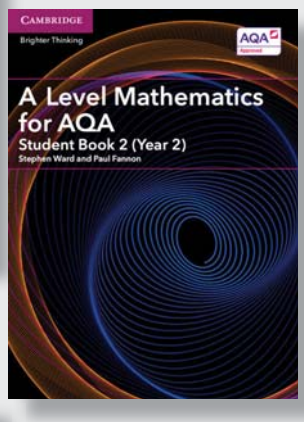

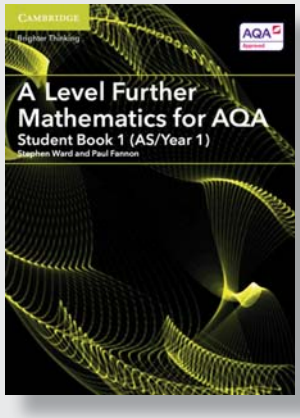

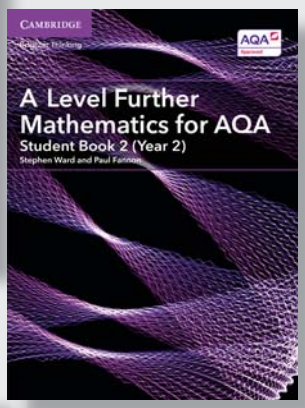

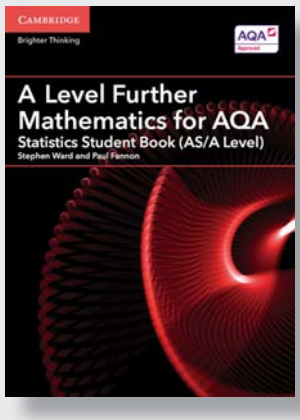

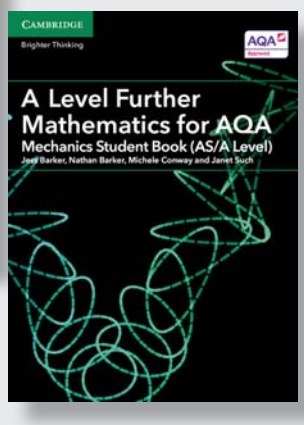

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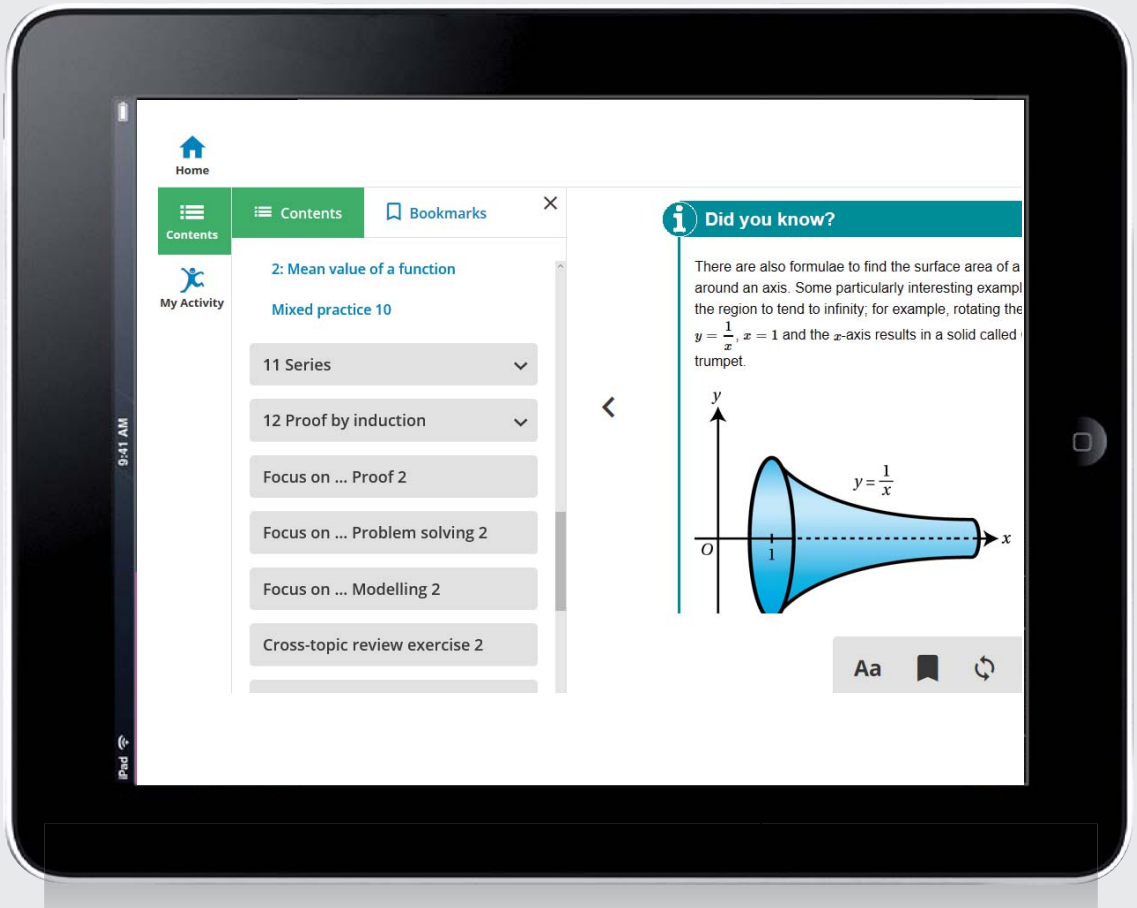

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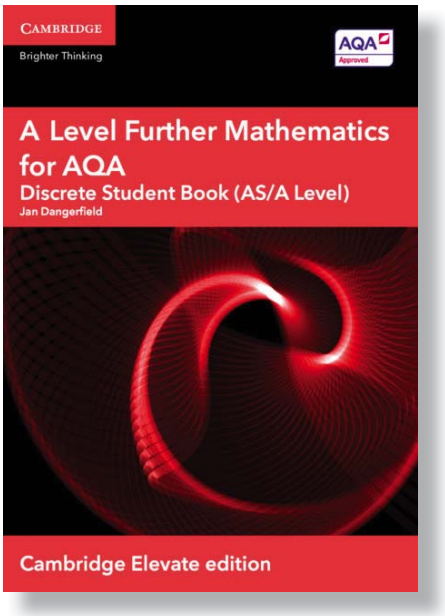

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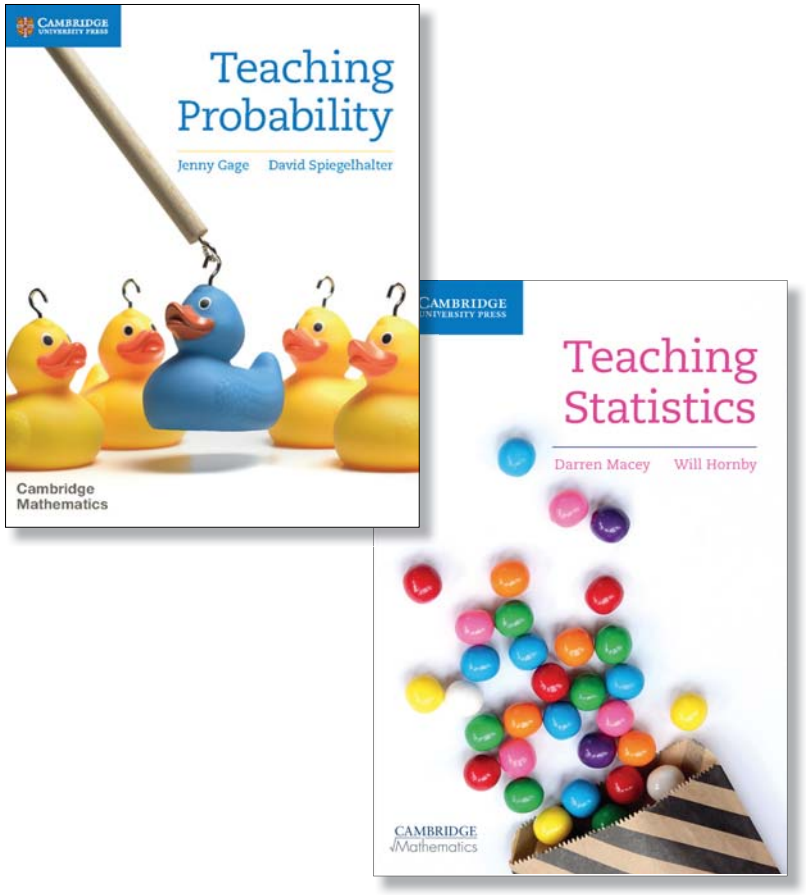

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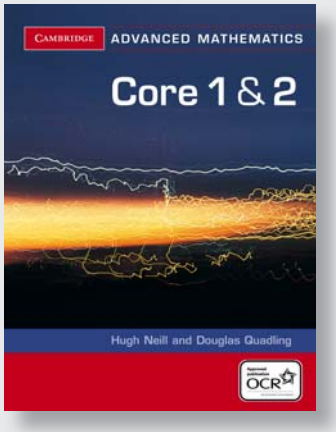

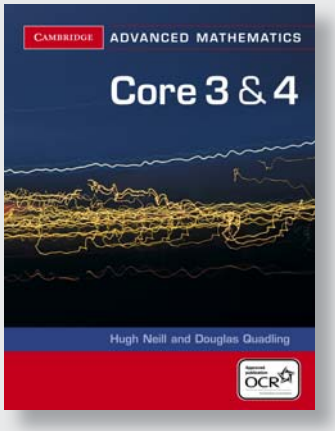

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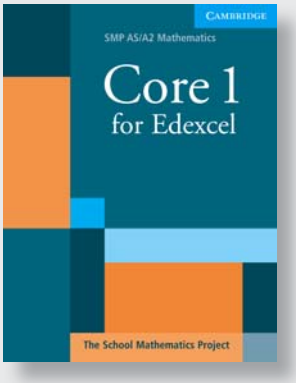

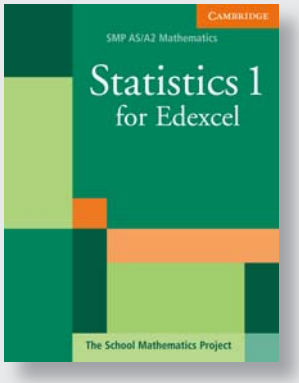

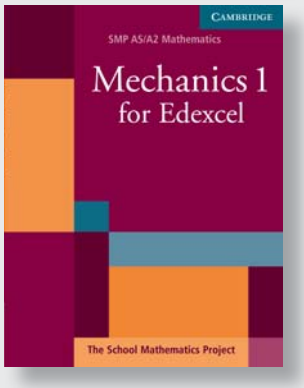

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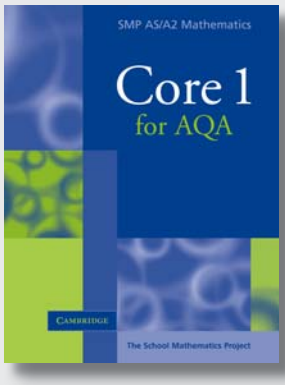

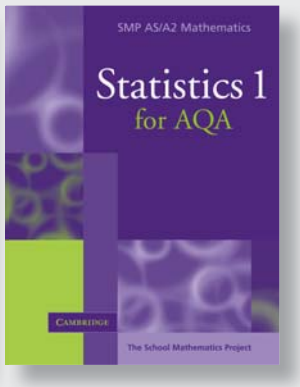

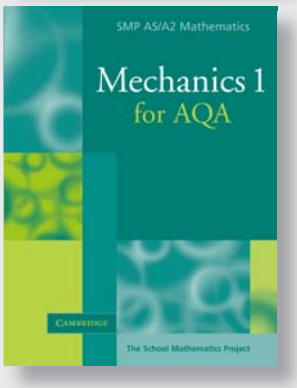

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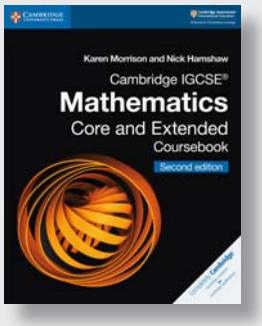

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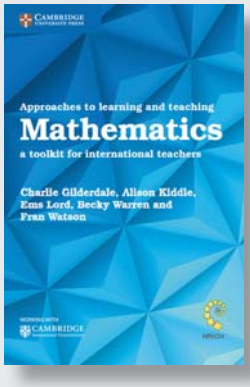

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