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Getting Started Guide

Mathematics in Context

Pearson Edexcel Level 3 Certificate in Mathematics in Context (7MC0)

Issue 1

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Acknowledgements

Core Maths Support Programme for teacher and student quotes on pages 5 and 6.

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1. About Core Maths

1.1 Why offer Core Maths?

Mathematics can be inspiring. Mathematics can be purposeful. Mathematics can develop real skills for life, work and study.

Core Maths is a new family of qualifications designed to deliver all of the above. Offering these qualifications can bring benefits to your learners, teaching staff and your centre.

For learners

- **Encourages independent learning:**

  Throughout the year, we've tried to make the students independent and although this is something that they struggled with at first, they're now really enjoying being able to tackle open ended problems with no definitive answer. *Core Maths teacher*

  Students are bringing their own real life problems such as buying a car or converting currency for a sixth form trip to lessons. *Core Maths teacher*

- **Keeps GCSE skills alive:** The study of Core Maths helps maintain the skills that students acquired during their GCSE Mathematics studies and enables them to extend those skills in new directions.

  I can see why we learnt it in GCSE … *Core Maths student*

- **Supports other Level 3 studies:** Reformed A Levels in subjects including the sciences, Psychology, Geography, Business and Economics require students to have acquired competence in quantitative skills. Assessment of quantitative skills forms an explicit part of the overall assessment for these qualifications. Core Maths will enable students to feel more comfortable with the maths they will encounter in their other subjects.
- **University recognition:** With UCAS points awarded at the same level as an AS, a Core Maths qualification demonstrates continued study of maths and will be well received by many universities.

  Looks good on my UCAS application … *Core Maths student*

- **Progression to university**: Research has shown that many students on starting their undergraduate studies are ill-prepared for the quantitative demands of their courses. Students who have continued to study maths throughout the post-16 phase by taking qualifications such as Core Maths will be better prepared for the maths in their HE studies.
- **Preparation for work**: It is early days in the life of this new qualification but endorsements are coming in from employers who value its emphasis on real-life problem solving.

For teaching staff

- **Positive impacts at GCSE**: The experience of teachers in the Core Maths Support Programme indicates that delivering Core Maths supports staff with developing problem solving techniques applicable for GCSE (9–1) Mathematics.

  Being able to develop my practice as a teacher, especially with regard to teaching problem solving, this is starting to change how I teach other maths classes. *Core Maths teacher*

- **Professional development**:

  One of the most exciting things about teaching Core Maths is the freedom it gives you to try out new approaches. You're not restricted in the same

> way by a huge amount of material that you need to cover. *Core Maths Support Programme Lead Teacher*
>
> For the first time I feel I am teaching authentic mathematics. *Core Maths teacher*

For the centre

- **Performance tables**: Core Maths achievements contribute to the Level 3 Maths measures and form part of the Technical Baccalaureate measure.
- **Widen your Level 3 course offering**: For many centres the post-16 maths offering is limited to A Level Maths and perhaps Further Maths. These courses may be open only to those who have achieved the very highest grades at GCSE. Core Maths expands the range of Level 3 maths qualifications you are able to offer, which may broaden the appeal to a wider spectrum of prior attainment and potentially encompass all students with a "pass" grade at GCSE.

1.2 The wider context

The background

The introduction of Core Maths qualifications is part of the Government's response to concerns about very low levels of participation in mathematics post-16. Only a fifth of students in England currently continue to study mathematics at any level after GCSE, the lowest rate of 24 developed countries surveyed. International Us show that England's performance in mathematics has stagnated. Thirty per cent of businesses reported dissatisfaction with the standard of school and college leavers' numeracy and yet mathematics is vital to many careers and is linked to higher earnings.

The Government's broad ambition is that by 2020, the 'vast majority' of 16-19 year-olds will study mathematics. This ambition has been given fresh impetus by the commissioning in March 2016 of a study into the feasibility of compulsory maths study for all students to 18.

The Department for Education's intentions has been for the study of Core Maths to comprise a two-year course. This is to help ensure that students' maths skills remain honed, bridging the gap in mathematics learning and use between completion of GCSE Mathematics and commencement of higher education, training or employment.

The first students to study Core Maths qualifications began their courses in autumn 2014 and will be assessed in summer 2016. Further centres joined the early programme in September 2015. Wider roll out continues from September 2016 on.

Core Maths is a performance table category which signifies qualifications suitable for students who have achieved grade C or above in GCSE Mathematics by the end of Key Stage 4 and who are not studying AS or A Level Mathematics.

Purpose

The Department for Education Core Maths Technical Guidance of 2014 states that:

> Core Maths qualifications should consolidate and build on students' mathematical understanding and develop further mathematical understanding and skills in the application of maths to authentic problems, thereby offering progression from GCSE mathematics. Qualifications should provide a sound basis for the mathematical demands that students will face at university and within employment across a broad range of academic, professional and technical fields.

Core Maths qualifications are distinct from AS and A Level mathematics which are orientated towards preparation for higher study with a significant mathematical

focus. Core Maths qualifications on the other hand are intended for learners who achieve A* to C in GCSE Mathematics but who choose not to study AS or A Level Mathematics.

> Core Maths courses should prepare students for the varied contexts they are likely to encounter in vocational and academic study and in further employment and life.

1.3 Higher education and UCAS

Recognition for Core Maths qualification among HE institutions is growing. Statements from universities outlining their position on Core Maths qualifications can be found on the Core Maths Support Programme website.

Mathematics in Context has been awarded UCAS points at the same tariff as AS Mathematics. The new tariff for Core Maths qualifications for HE courses commencing from September 2017 onwards is given in Table 1.

Table 1: UCAS points for Core Maths qualifications for HE course commencing from September 2017

Grade	Tariff
Grade A	20
Grade B	16
Grade C	12
Grade D	10
Grade E	6

1.4 Our approach to Core Maths: Mathematics in Context

The Pearson Edexcel Level 3 Certificate in Mathematics in Context is designed to support learners whose main study and higher education progression interests do not have a mathematical focus but where nonetheless mathematical application is important such as biology, geography, business, social sciences and a range of vocational subjects.

The content has been carefully selected to support the mathematical needs of these subjects and to provide a progression from GCSE Mathematics, allowing learners to consolidate their knowledge, skills and understanding of GCSE concepts and content and to extend their learning into areas of Level 3 content that are relevant to their future studies and lives.

The total number of guided learning hours for the qualification in 180.

Specification overview

The content for Mathematics in Context has been chosen for its relevance and application to a wide range of areas of study and employment, for its real world relevance and potential for application. The four content strands are:

- Applications of statistics
- Probability
- Linear programming
- Sequences and growth

The content draws on and extends a range of key concepts and skills from GCSE Mathematics and introduces learner to a selection of Level 3 concepts and techniques.

All learners study all four content strands. There is no optional content in the specification.

Assessment overview

Mathematics in Context is assessed via two written examinations.

Paper 1: Comprehension	Paper 2: Applications
Total marks: **60** Weighting: **40%** Exam time: **1 hour 40 minutes**	Total marks: **80** Weighting: **60%** Exam time: **1 hour 40 minutes**

1.5 Research and key principles

This specification has been designed to meet the requirements of the Department for Education Core Maths Technical Guidance to be recognised as a Core Maths qualification for performance tables.

The specification for the Pearson Core Maths qualification, Mathematics in Context, has been developed in consultation with the teaching community, higher education and employers. We engaged with a broad range of stakeholders including:

- HE lecturers representing a range of subjects that use mathematics including Psychology, Geography, Business, Economics, Pharmacy, Chemistry, Biosciences, Medical Studies, Engineering, Computing
- Teachers from across different types of centre
- Employer representatives.

In our consultation we found support for:

- Consolidating and building learners' basic mathematical skills
- Developing mathematical confidence
- Developing ability to apply and solve problems in context
- Improving skills in understanding mathematical information
- A common set of content
- Significant emphasis on statistics and probability
- Incorporating algebra via engaging and purposeful real contexts.

Drawing on feedback from stakeholders our Mathematics in Context specification has been built on the following key principles:

- Four content strands selected on the basis of their **relevance and application** to a wide range of areas of study and employment:
    - Applications of Statistics enables learners to use data to understand the world, in readiness for study in many disciplines
    - Understanding of Probability and risk is a vital life skill with relevance to science, engineering, computer science, business and finance, gaming and everyday life
    - Linear programming develops learners' ability to use algebra and graphs to model real world contexts
    - Sequences and growth extends learners' financial maths skills and introduces applications of this topic to other real world phenomena
- **A common body of content** maximises learners' progression options by developing skills and understanding with usefulness in a wide range of disciplines and walks of life

- All content carefully selected for its real world relevance and potential for application enabling centres and teachers to provide **enriching and purposeful learning experiences** so that all learners are motivated to make progress
- The assessment of **mathematical comprehension** in Paper 1 develops learners' ability to respond to the mathematics they encounter in their wider studies and lives, preparing them for higher education and employment
- Themes from Paper 1 **link into Paper 2 Applications** to foster a deep engagement with the context and develop learners' ability to apply mathematics to solve real world problems
- The use of **extended themed tasks** in both Paper 1 and Paper 2 develops learners' skills of sustained analysis and application of mathematics in readiness for higher study in areas such as the biological and social sciences
- **Questions** at a range of demand within each themed task motivate students and give them confidence while building up to challenge them appropriately
- **Adult, real world, context based tasks** throughout offer a fresh mathematics assessment experience for learners
- Use of **authentic extracts and data** from a range of sources motivate learners to engage with the mathematics all around them

1.6 Support for delivering the specification

This Getting Started Guide provides an overview of the Mathematics in Context specification, to help you get to grips with the content and assessment of this new qualification, and is designed to help you understand what these mean for you and your students.

We are providing a package of support to help you plan and implement the new specification.

- **Planning:** In addition to the Planning section in this guide, we are providing a **scheme of work** which you can adapt to suit your situation. We are also providing **mapping documents** to highlight where content from other mathematics qualifications features in the specification. Both the scheme of work and the mapping documents include references to existing teaching and learning resources that you may find useful for Core Maths. An assumed knowledge listing is also available.
- **Teaching**: To support you with delivering this specification, we are providing four sets of **comprehension teaching and practice** material. Topic practice on each of the content strands of the specification are also available. Our **guides** for teachers and for learners & parents may be useful for briefing colleagues and for open evenings and learner recruitment respectively.
- **Assessing**: We know understanding the standard expected of students by the time they sit the examination is important. In addition to the approved sample assessment materials (SAMs), extra assessment materials in the form of **specimen papers** are available to support formative assessment and provide practice. **Past papers** from 2016 are now also available. **Exemplar** student work with examiner commentaries for the sample assessment materials is also being provided. **examWizard** has been updated with the sample assessment materials and specimen papers and is available now. **ResultsPlus** provides the most detailed analysis available of your students' exam performance and will be available from 2017.

- **Training**: Presentations from our online launch and Getting Ready to Teach events are available online. Our **Collaborative Networks** include dedicated post-16 hubs and provide opportunities for local networking and sharing best practice.
- **Personal, local support**: Personal and ongoing support from **Graham Cumming** and the Mathematics Emporium is available at www.edexcelmaths.com/.

These support documents are available on the Teaching support tab of the Mathematics in Context pages at www.edexcel.com/coremaths and on the Emporium website at www.edexcelmaths.com

2. Planning

2.1 Curriculum and delivery models

Mathematics in Context has been designed to be an integral part of a post-16 Study Programme. The qualification will complement the studies of a student taking three other AS Levels, and is also recognised as the 'Level 3 Mathematics Qualification' in the Technical Baccalaureate Performance Measure. The thematic approach of the qualification and its delivery marries well with the approach of a BTEC Study Programme.

The qualification was initially intended to span two years of post-16 education in line with the Department for Education's intentions. Under this approach, the 180 guided learning hours would be split over a two-year programme of study, with the examination in the summer of the second year. The main benefit of this form of delivery is that students will have a steady diet of mathematics throughout their Level 3 studies, thus maintaining and developing their GCSE skills and equipping them with the necessary mathematical tools for further study or employment.

However, the flexibility of the qualification means that its delivery can be adapted to suit different centres' and indeed different students' needs.

Table 2: Possible delivery models in a two-year programme of study

Year 1	Year 2	Maximum UCAS points (new tariff)
GCSE retake class, improve grade	Mathematics in Context Level 3 Certificate (100% of guided learning hours)	20
Co-teach GCSE Higher and Mathematics in Context Level 3 Certificate		20
Mathematics in Context (60% of guided learning hours)	Mathematics in Context (40% of guided learning hours) plus examination	20
Mathematics in Context (100% of guided learning hours)	AS Mathematics	20 + 20*
Mathematics in Context (100% of guided learning hours)	Level 3 Extended Project Qualification	20 + 28 (EPQ attracts more points than Core Maths and is graded to A*)
Content embedded within vocational subjects, with examination at end of Year 2		20 + vocational tariff

* It is for an individual higher education institution to decide whether it counts both qualifications as contributing to a points offer, for example, if it considers the two qualifications to be doing different things. It is important for the centre to have a rationale for why the student is doing this combination based on providing a programme that gives the best educational preparation for the chosen progression pathway.

2.2 Enrolling students

There are various routes for recruiting students to study Mathematics in Context.

It may be prudent to target specific groups of students for whom the qualification will be particularly useful. This would include students embarking on a scientific programme of study, or those working towards the Technical Baccalaureate.

Some centres have had success in recruiting students who had originally opted for AS Mathematics in their programme of study. Such centres offer an initial period of study common to both AS Mathematics and Mathematics in Context which allows students and teachers to assess suitability for each course before fully enrolling.

There are advantages and disadvantages to making Mathematics in Context a compulsory part of a study programme. Whilst securing numbers, a compulsory track could result in students not being as engaged as they would be if they had opted for the qualification, and may impact on retention. Individual centres have the ability to decide their own enrolment criteria to suit their students.

With Mathematics in Context being part of an institution's curriculum offer, every opportunity should be given to promote the qualification to students. Taster days, open evenings and prospectus entries may all already be highlighting the advantages for studying maths beyond GCSE, and this can be extended to include the endorsement of Mathematics in Context as an alternative to AS Mathematics. Our free Guide for Learners & Parents may be useful for such purposes.

2.3 Planning and delivering Mathematics in Context

Teaching time

The planned teaching time for the qualification is 180 guided learning hours. Our free scheme of work suggests an estimated teaching time of between 135 and 160 hours with the balance of the 180 guided learning hours being used for consolidation and revision. The scheme of work has a suggested course plan which consists of 12 themed topic areas, spread out over five terms. However, the segmented themes mean that this can easily be adapted to fit any mode of delivery.

Within the published scheme of work, each themed topic is broken down into suggested teaching time, specification references, overview and resource links. The overview gives some pedagogical notes along with other contexts for the teacher.

Collaboration

Mathematics in Context brings with it the opportunity for collaborative planning. The course has been designed to be relevant and appealing to post-16 learners, with four content strands selected on the basis of their relevance and application to a wide range of areas of study and employment:

- Applications of statistics
- Probability
- Linear programming
- Sequences and growth

These strands are found throughout Level 3 study in subject areas other than mathematics, and as such, collaborative planning inter-faculty would be most beneficial to centres.

Resource mapping

The qualification website provides resource mapping between Mathematics in Context and GCSE Mathematics (both 9-1 and 2010), GCSE Statistics and A Level Mathematics.

Mixed ability groupings

The qualification is designed to be accessible for any student who has achieved a C or above (or 4 and above) at GCSE. The assumed knowledge for the course is GCSE (9-1) Foundation Tier. The qualification website provides a spreadsheet containing this assumed knowledge referenced to GCSE (9-1) and GCSE 2010.

Students with a variety of mathematical skills will be able to engage with this course and succeed.

Scaffolded approaches to support students depending on their ability are important to ensure full participation.

Comprehension skills

Paper 1 of the final examination focuses on comprehension skills. Throughout the course, students build up a tool kit of mathematical skills which can be applied in various contexts. The comprehension develops learners' ability to respond to the data and mathematics they encounter in their wider studies and lives, preparing them for higher education and employment.

Students are given a pre-release source booklet (released 15 April) containing two real-life contexts. Learners are required to comprehend, interpret and analyse the extracts in order to answer questions about them. The pre-release offers students the opportunity to familiarise themselves with the contexts of the questions, so that in the examination they are being assessed on the mathematics not on the framing topic of the questions.

To support the teaching of this aspect of the course, Pearson has produced a suite of comprehension resources. These materials are designed to support teaching and learning of mathematical comprehension skills. They may be used for classroom discussion, teaching and learning and/or student practice. They provide comprehension practice on four topics and come with teacher notes, comprehension passage and questions, mark scheme and one or more spreadsheets.

You may wish to consider bringing into lessons articles from the media and issues of current affairs where mathematics and/or statistics features, for discussion and the development of comprehension skills.

2.4 Suggested resources

Core Maths Support Programme

The Core Maths Support Programme provides a range of resources to support you with the introduction of Core Maths including:

- Case studies from a wide range of schools and colleges
- Frequently asked questions
- Teaching and learning resources designed specifically for Core Maths
- Sources of other resources that you may find useful
- The Journal of Core Maths

General resources

We have produced a range of free materials to support you with introducing Mathematics in Context. See section 1.6 'Support for delivering the specification' above.

Our scheme of work includes links to a range of free third party teaching and learning resources which you may find useful.

Some of the main sources of teaching and learning resources for Core Maths qualifications includes the following:

- Core Maths Support Programme
- Nuffield Foundation
- MEI Critical Maths

Resources to support the development of comprehension skills

Newspapers, news sites, magazines and journals provide a ready source of articles that can be used to support the development of comprehension skills in your learners.

Teaching and learning materials, research and other articles from learners' other subject studies may also provide a source of comprehension extracts for use in the classroom.

A large number of popular maths books exist. Selected extracts may interest your student and be suitable for use in the classroom. These books include:

- Hannah Fry, *The Mathematics of Love: Patterns, Proofs and the Search for the Ultimate Equation*. Simon & Schuster, 2015
- Steven D Levitt and Stephen J Dubner, *Freakonomics: A Rogue Economist Explores the Hidden Side of Everything*. Penguin, 2007
- Rob Eastaway and John Haigh, *How to Take a Penalty: The Hidden Mathematics of Sport*. Robson Books Ltd, 2005
- Rob Eastaway and Jeremy Wyndham, *Why do Buses Come in Threes?: The Hidden Mathematics of Everyday Life*. Robson Books Ltd, 2005
- Gerd Gigerenzer, *Risk Savvy: How to Make Good Decisions*. Penguin, 2015
- Nate Silver, *The Signal and the Noise: The Art and Science of Prediction*. Penguin, 2013
- Jordan Ellenberg, *How Not to be Wrong: The Hidden Maths of Everyday Life*. Penguin, 2015

2.5 Implications for funding

At the time of writing:

- 16-19 funding works on the basis of the number of hours planned for a student each year in their study programme, both for qualifications and for activity that does not relate to qualifications such as enrichment activity, tutorials and work experience. Institutions may want to ensure that they are recording sufficient planned hours for students to count as full time, particularly in Year 2. Detailed guidance is available from the Education Funding Agency on 16-19 Funding: how it works.
- Large Technical Baccalaureate programmes which include Mathematics in Context (or an AS or A level in Mathematics) can attract a 10% or 20% funding uplift for 2016/17. Detailed guidance is available from the Education Funding Agency on the large programme weighting.
- The study of Mathematics in Context meets the 16-19 condition of funding for 2016/17. From the 1 August 2015, full time students starting their study programme who have a grade D GCSE or equivalent qualification in maths and/or English had to be enrolled on a GCSE rather than an approved stepping stone qualification. The Mathematics in Context qualification can be offered as an *alternative* to GCSE where an institution thinks it appropriate. (It is not considered a 'stepping stone' qualification.) Detail guidance is available from the Education Funding Agency on the 16-19 condition of funding.

Q: What impact will the new GCSE grading system have on the condition of funding?

- A new grading system is being introduced from 2017 at GCSE to replace the A to U system with a new 9 to 1 scale. Under the new system, a good pass, currently a C grade, will become a grade 5 under the new scale. The new good pass is comparable to a high C or low B under the current system. The government intends to align the 16-18 maths and English funding condition with the new GCSE good pass in maths and English.
- A phased approach will be taken. For students studying in academic years 2017/18 and 2018/19 the funding condition will be based on the new GCSE grade 4. Beyond this the funding condition will be revised to reflect the new GCSE good pass (grade 5). The specific date from which this will take effect will be confirmed closer to the time.
- In 2017/18 and 2018/19 then, students with a grade 4 will be exempt from the condition of funding. We do not yet know what numerical grade will be aligned to the current grade D, and therefore which students will be expected to be enrolled on a GCSE (or on the Core Maths qualification as an alternative to GCSE) rather than an approved stepping stone qualification.
- We will update you as soon as we know more.

Q: What are the funding implications of a student combining the study of Mathematics in Context with improving their GCSE Mathematics grade?

- Mathematics in Context can be taken alongside GCSE Mathematics. 16-19 funding works on the basis of the number of hours planned for a student each year in their study programme so the hours the qualifications will take to teach, including any reductions for overlap, need to be recorded as part of their study programme.
- See the EFA's Funding guidance for young people 2016 to 2017: Funding regulations (page 30) for more information if a student with a C grade in GCSE Mathematics is retaking or resitting the qualification in order to improve their grade.

Q: Can a student start out studying AS or A Level Mathematics and then switch to a Core Maths qualification such as Mathematics in Context or vice versa?

- Students can transfer from one qualification to another within their study programme. However, an institution can only change the planned hours recorded for a student in certain circumstances.
- See the EFA's Funding guidance for young people academic year 2016 to 2017 Funding rates and formula (page 15) for more information on transfers.

Q: What are the funding implications around delivering Mathematics in Context over one year instead of two years?

- None. However, institutions may want to ensure that they are recording sufficient planned hours for students to count as full time, particularly in Year 2.

3. Content guidance

The Department for Education's Core Maths Technical Guidance states that the content of a Core Maths specification must draw on a careful selection of GCSE content at Higher Tier. This content comprises up to 80% of the assessment. A minimum of 20% of the assessment is based on concepts and topics beyond GCSE Mathematics.

In accordance with these details, the content of our specification is drawn from a range of GCSE (9–1) Mathematics content areas: statistics, probability, algebra, ratio, proportion and rates of change.

The qualification is designed to support post-16 students who have already achieved at least a grade C in GCSE Mathematics. Students are expected to be familiar with, and be able to apply, relevant content from the GCSE (9-1) Higher specification that links into the four content areas of the specification:

- Application of statistics
- Probability
- Linear programming
- Sequences and growth

Refer to the specification for the detailed content.

3.1 Applications of statistics

All the statistics content from the Higher Tier GCSE (9-1) specification is incorporated into the Applications of statistics content area.

Students who followed the GCSE Foundation Tier route will need to master box plots, cumulative frequency tables and graphs and histograms along with quartiles and inter-quartile range. See Table 3.

Topics not covered at GCSE are moving averages, variance and standard deviation, knowledge of independent and dependent variables, product moment correlation coefficient, linear regression and Spearman's rank correlation coefficient. See Table 4.

All the necessary statistical formulae are given on the formula sheet contained in the source booklet for both papers. Within questions some values, for example, $\sum x$, will be given to candidates to keep repetitive calculations to a minimum.

3.2 Probability

All the probability content from the Higher Tier GCSE (9-1) specification is incorporated into the probability content for Mathematics in Context.

Students who followed the Foundation Tier route will need to master conditional probability. See Table 3.

Topics not covered at GCSE are the use of the various formulae for probability using set notation along with the need to understand and interpret risk (see Table 4). Risk can be quantified as the probability of event multiplied by the cost of the event.

3.3 Linear programming

In order to make progress with the linear programming content, students will need to be familiar with the form y = *mx* + *c* of a straight line graph, be able to draw such graphs and be able to form and solve linear equations, simultaneous equations and linear inequalities; all of these concepts form part of the content for both tiers for the GCSE (9-1) specification.

Students who followed the Foundation Tier route will need to master the solution of linear inequalities in two variables and be able to represent the solution set on a graph. See Table 3.

Topics not covered at GCSE are the formulation of a problem as a linear program with up to three variables, the solution and interpretation of two-variable problems graphically and the consideration of such problems that have integer values. Students will be expected to be able to write down the objective function for a linear programming problem. See Table 4.

3.4 Sequences and growth

The use and understanding of percentages will play a part in this content area. Therefore, students should be able to carry out all percentage work from ratio, proportion and rates of change content in the GCSE (9-1) specification. This includes expressing one quantity as a percentage of another, working with percentage increase and decrease, simple and compound interest. Being able to set up, solve and interpret answers to growth and decay problems also follows directly on from work done at GCSE level. The use of roots, integer and fractional indices is also expected. Students who followed the Higher route should already be confident in being able to recognise, sketch and interpret graphs of quadratic functions, simple cubic functions, reciprocal functions and functions of the form $y = k^x$.

Students who followed the Foundation route will need to become familiar with these functions. See Table 3.

The work on sequences expected in this qualification builds on the work done on linear sequences (both tiers at GCSE) and quadratic sequences (just Higher Tier) at GCSE. All students will additionally have to cover sequences generated by a relation of the form $x_{n+1} = f(x_n)$, the golden ratio, arithmetic series and geometric series, as well as the use of sigma notation. See Table 4.

Table 3: GCSE (9–1) Mathematics Higher Tier topics that students who progress to Mathematics in Context from GCSE (9-1) Mathematics Foundation Tier will need to cover

GCSE 2015	Topic
A12	Exponential function
A14	Plot and interpret exponential graphs
A22	Linear inequalities in two variables Represent solution set on a graph
A24	Other sequences
A25	Quadratic sequences
P9	Conditional probability
S3	Histograms Cumulative frequency graphs
S4	Box plots Quartiles and inter-quartile range

Table 4: Mathematics in Context topics not covered in GCSE (9–1) Mathematics Higher Tier

Maths in Context	Topic
A2	Moving averages
A5	Variance and standard deviation
A7	Explanatory (independent) and response (dependent) variables
A8	Product moment correlation coefficient
A9	Linear regression
A10	Spearman's rank
P6	Probability formulae
P7	Risk
LP9	Linear programs with up to three variables
LP10	Solve and interpret two-variable problems graphically
LP11	Problems with integer value solutions
SG7	Sequences generated by $x_{n+1} = f(x_n)$ Golden ratio
SG8	Sigma notation
SG9	Arithmetic series
SG10	Geometric series

4. Assessment guidance

The Core Maths Technical Guidance stipulates that Core Maths qualifications must be linear, comprise a minimum of 80% external examination assessment and include synoptic assessment.

4.1 Overview

The assessment structure

The Mathematics in Context qualification will be assessed via two written papers.

Paper 1: Comprehension	**Paper 2: Applications**
Total marks: **60** Weighting: **40%** Exam time: **1 hour 40 minutes**	Total marks: **80** Weighting: **60%** Exam time: **1 hour 40 minutes**
Source booklet (including formulae sheet)	Source booklet (including formulae sheet)
Section A Section B	Section A Section B

Grading

The qualification will be graded and certificated on a five-grade scale from A (the highest) to E (the lowest). An unclassified U result may also be recorded.

Sample papers

As well as the accredited sample assessment materials (SAMs), extra assessment materials in the form of specimen papers are available.

Assessment materials from the summer 2016 exam series will be published on the Pearson website and Maths Emporium.

4.2 Paper 1: Comprehension

Paper 1 consists of Section A and Section B. A source booklet including formulae sheet is provided.

Paper 1 will have a source booklet. The source booklet will contain data sources from two real-life contexts. More than one source may be provided for a given context.

The source booklet will be pre-released. It will be available for centres to download from our website (qualifications.pearson.com) no later than 15 April for the examinations in May/June of that year.

It would be desirable for students to spend some time in class becoming familiar with the contexts described by the data sources in the booklet. A clean copy of the source booklet will be provided for use in the examination. Students must not bring their own copy into the examination.

The two sections in Paper 1 will each cover one of the two contexts in the source booklet. Students will be required to comprehend, interpret and analyse data in both Section A and Section B of the paper. A reference to the source document that they need to use to answer any question is always given in bold prior to the question (or group of questions).

Paper 1 may assess content from all content areas.

4.3 Paper 2: Applications

Paper 2 consists of Section A and Section B. A source booklet including formula sheet is provided.

The source booklet provided with Paper 2 will not be available for pre-release. This source booklet will contain new source material relevant to one of the contexts met in Paper 1. The source material from Paper 1 will not be repeated in the source booklet for Paper 2 unless it is required to answer a question on Paper 2.

Section A (20 marks) will contain questions relating to one of the contexts in Paper 1 and the data in the source booklet will be needed in order to answer some but not necessarily all of the questions in this section.

Section B (60 marks) will contain three tasks (20 marks each). Each task will have a separate theme.

Paper 2 may assess content from all content areas.

4.4 Question types

In both papers, question style and length will vary. Some questions will involve carrying out calculations for which working should always be shown. Other questions will require written answers or graphs to be drawn or a combination of calculations, graph drawing and interpretation. Whenever a decision is required students should give reasons for their decision. Similarly, giving answers in the context of the problem will be a fundamental requirement of many questions.

Whilst all questions will be set within a real-life context, students will not be expected to be familiar with all such contexts used. They should, however, be used to analysing and interpreting data and graphs.

4.5 Assessment objectives

The assessment objectives state that students should be able to:

- make decisions about which methods and techniques are best used to understand and address specific problems (AO1)
- use techniques correctly to generate answers and solutions (AO1)
- interpret and explain answers and solutions in the context of the problem (AO1)
- address authentic issues and questions by applying mathematical approaches with purpose to generate solutions, insights and answers (AO2)
- evaluate the relevance of solutions in the context of the situation, establish how they can be used and communicate findings accurately and meaningfully (AO2)
- make judgements about strategies and methods to achieve a solution (AO3)
- interpret new situations in terms of mathematical and quantitative characteristics (AO3)
- explain mathematical reasoning and conclusions to others and justify specific approaches taken to the problem. Interpret conclusions on the basis of mathematical understanding and explain limitations to answers and conclusions (AO3).

Questions set will therefore enable students to demonstrate these skills.

Table 5: Assessment objectives and weighting breakdown

	Students must:	Paper 1	Paper 2	Total for the qualification
AO1	Use a range of mathematical methods and techniques, including using contemporary calculator technology and knowledge and use of a spreadsheet, to find solutions to mathematical and non-mathematical problems.	10–16%	9–18%	25–29%
AO2	Use a variety of mathematical and statistical approaches to represent and analyse relatively well-defined situations, including complex and unfamiliar situations. This includes identifying and understanding quantifiable information and related assumptions in that situation, using mathematical and statistical representations and techniques appropriately, and deriving new information to draw meaningful conclusions about the situation.	10–16%	18–29%	30–40%
AO3	Generate and apply mathematical solutions to non-routine questions and problems taking creative approaches where appropriate, and test and evaluate answers and conclusions.	10–16%	18–29%	30–40%
		40%	60%	100%

4.6 Formulae

A formulae sheet, containing the formulae listed in Appendix 3 of the specification, will be provided for students in the exams within the formulae sheet which forms part of the source booklet in each paper.

4.7 Technology skills

Use of calculators

Students will be expected to have a scientific calculator with them in the examination and be able to use their calculator efficiently.

Calculators must be:	Calculators must not:

• of a size suitable for use on the desk
• either battery or solar powered
• free of lids, cases and covers which have printed instructions or formulas.
	• be designed or adapted to offer any of these facilities:
	  ○ language translators
	  ○ symbolic algebra manipulation
	  ○ symbolic differentiation or integration
	  ○ communication with other machines or the internet
	• be borrowed from another candidate during an examination for any reason
	• have retrievable information stored in them, including (but not limited to):
	  ○ databanks
	  ○ dictionaries
	  ○ mathematical formulas
	  ○ text.

Spreadsheets

Students are expected to be familiar with the use of spreadsheets and may be asked to comment on the use of formulae within a spreadsheet or provide an appropriate formula for a cell within a spreadsheet.

5.8 Rules for sitting and resitting

The assessment for Mathematics in Context is a linear assessment. The assessment is available in May/June each year from 2016. Students must complete both papers in the same May/June session in any single year.

Students may resit the assessment as many times as they wish.