



Institute
and Faculty
of Actuaries

A Guide to CM1 and CM2 Examinations

for the 2019 examinations

1 February 2019

Contents	
Introduction to Actuarial Statistics (CM1 and CM2)	2
What is covered in CS1 and CS2?	3
How have CM1 and CM2 been developed?	3
The timing of the CM1 and CM2 examinations	4
What is the format of the CM examinations	5
What examinations should I have passed before sitting CM1 and CM2?	5
I want to sit the examination. What do I need to do?	5
Professional conduct during the CM examinations	6
What should I know before sitting CM1 and CM2?	7
Microsoft Excel	7
Word Processing	7
Loading data for CM1	7
Loading data for CM2	8
On completion of the examination	8
Final grading	9

Introduction to Actuarial Mathematics (CM1 and CM2)

This guide should help answer your questions about CM1 and CM2, including:

- the format of the online examinations;
- guidance on how to take the examinations;
- administrative information; and
- technical information.

If you have any further questions that are not covered in this guide, please contact the Education Services Team: education.services@actuaries.org.uk

Important note:

Specimen CM1 and CM2 examination papers are available on the IFoA website.

<https://www.actuaries.org.uk/studying/curriculum-2019>

What is covered in CM1 and CM2?

Subjects CM1 and CM2 are a fundamental part of the Core Principles subjects.

CM1 provides a grounding in the principles of actuarial modelling, focusing on deterministic models and their application to financial products. It will equip you with the knowledge of:

- the basic principles of actuarial modelling,
- theories of interest rates and
- the mathematical techniques used to model and value cashflows which are either certain or are contingent on mortality, morbidity and/or survival.

CM2 provides a grounding in the principles of actuarial modelling, focusing on stochastic and asset-liability models and the valuation of financial derivatives. It will equip you with the knowledge of:

- the theories of behaviour of financial markets,
- measures of risk,
- determining reserves for a non-life insurer and
- pricing options.

Subjects CM1 and CM2 include both theory and application of the ideas using Microsoft Excel.

How have CM1 and CM2 been developed?

CM1 and CM2 have been influenced by external direction and guidance: the Actuarial Profession Standards (APs), the International Standard of Actuarial Practice, the Actuaries' Code, the regulators, Sarbanes Oxley and Solvency II requirements. A summary of these are set out for reference below. While these subjects were taken into consideration when developing the syllabus for the Core Principles subjects, knowledge of these standards will not be directly tested in the CM1 and CM2 examinations.

- **Actuarial Profession Standards (APs)**

The latest standards can be found on the IFoA website:

<https://www.actuaries.org.uk/upholding-standards/standards-and-guidance/actuarial-profession-standards-apss>

- **The Actuaries' Code**

The Actuaries Code can be found on the IFoA website:

<https://www.actuaries.org.uk/upholding-standards/standards-and-guidance/actuaries-code>

The Code requires us to “perform professional duties competently and with care” and to “ensure that their communication, whether written or oral, is clear...”.

- **International Standards of Actuarial Practice (ISAP)**

The latest ISAPs can be found on the International Actuarial Association's website:

<https://www.actuaries.org/iaa/IAA/Publications/ISAPs/IAA/Publications/05ISAPs.aspx?hkey=334b21a7-a3ac-4e0e-8294-3cbc755ab14a>

- **The regulators**
In reviewing a firm's practices, the regulators expect to see acceptable standards of documentation, agreed by the firm, and documented.
- **Sarbanes Oxley (SOX or SarBox)**
This is American legislation which governs the need for full documentation of internal processes and controls.
- **Solvency II**
This framework for insurance companies includes emphasis on documentation and evidencing of the calculation work undertaken.

The timing of the CM1 and CM2 examinations

These can be found at <https://www.actuaries.org.uk/studying/examination-bookings/examination-dates>

These examinations are run to UK times only, so that we can provide assistance and technical support if required.

The two elements of each assessment take place over two consecutive days. You will see these referred to as the 'A' paper (sat in an examination centre in local time) and the 'B' paper (this is the online paper completed at home or in the office in UK time). When booking these two part examinations, your booking confirmation will show the date of the A examination. However your examination permit when issues, will show times and dates for both parts of the assessment.

Note: With effect from the April 2019 examinations the reading time that was available will now be included in the overall examination time. It is therefore up to candidates to manage their time between reading through the paper and starting to answer the questions. There is guidance on this at *Hints and Tips* at: <https://www.actuaries.org.uk/studying/prepare-your-examinationinations/revision-programme>

What is the format of the CM examinations

Details of the syllabus for CM1 and CM2 is at Appendix 1 and Appendix 2. Questions for the CM1 examination and the CM2 examination will be drawn from across the syllabus. Sample examination papers can be found at:

<https://www.actuaries.org.uk/studying/curriculum-2019/actuarial-mathematics>

Each of the CM1 and CM2 examination consists of two elements, Paper 'A' and Paper 'B':

- Paper A: a 3hrs and 15mins written examination paper. This is taken in an examination centre
- Paper B: a 1hr and 45mins paper. This is a problem based assessment, using Microsoft Excel with questions requiring Candidates to use data to answer questions. This can be taken at your workplace or at home, but during prescribed timings

For the problem based assessments all Candidates will need to be confident in the use of Microsoft Excel.

For the 2019 examinations (April and September) you will need to have access to the following. It is suggested you ensure you have access prior to the examinations:

Examination	Version of Microsoft Excel required	Any other requirements
CM1B	Microsoft Office 2007	None
CM2B	Microsoft Office 2007	None

What examinations should I have passed before sitting CM1 and CM2?

There are no pre-requisite requirements for CM1 or CM2. However the syllabus for CM1 lists a number of foundation topics such as summarising data sets, basic probability theory and random variables. These topics are assumed knowledge for CM1 and you may wish to ensure you are familiar with them before studying for CM1. Furthermore because CM2 builds on many of the principles covered in CM1, you may wish to ensure you are familiar with the topics covered in CM1 before studying CM2.

Candidates are advised that Formulae and Tables books may be required for these assessments. Whilst copies of these will be made available in examination centres for the A papers Candidates may use their personal copies for the online B examinations. You can purchase your copy through the e-shop at:

<https://www.actuaries.org.uk/shop>

I want to sit the examination. What do I need to do?

Information can be found on the IFoA website with respect to:

<https://www.actuaries.org.uk/studying/examination-bookings>

Professional conduct during the CM Examinations

It is important to note that professional conduct is required at all times and the following will apply:

- The Assessment Regulations apply to you when taking this examination, and these can be found as *Related Documents* at:

<https://www.actuaries.org.uk/studying/examination-bookings/making-your-examination-booking>

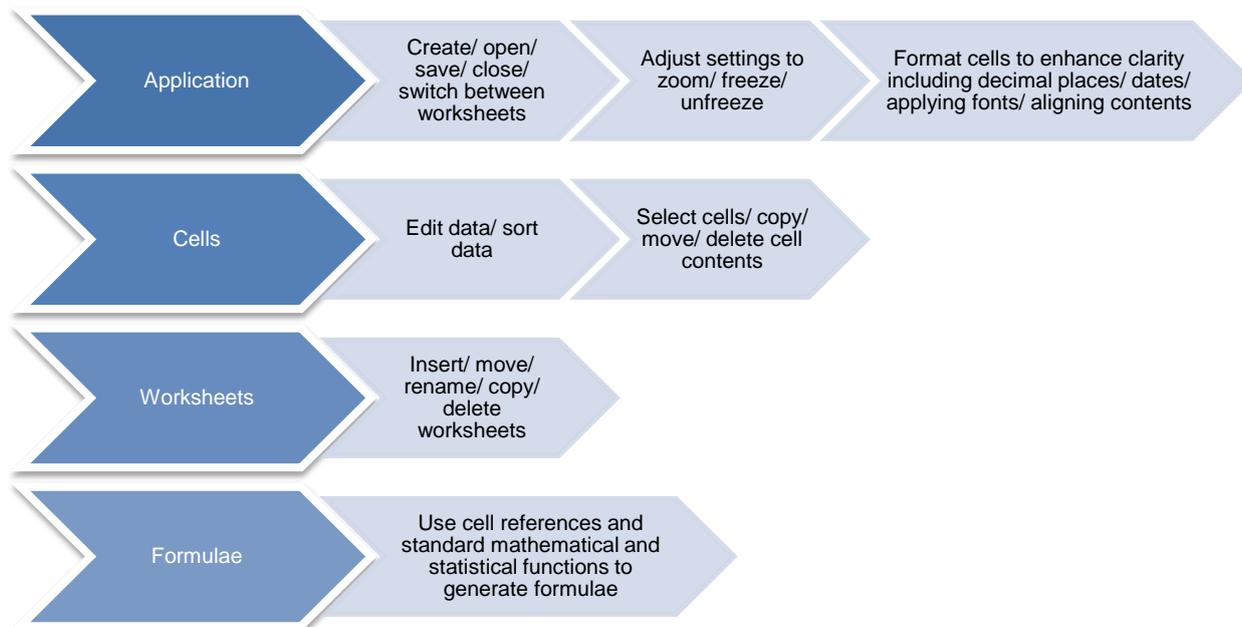
- Inappropriate behaviour during the CM examinations may lead to expulsion from the examination, with disciplinary consequences.
- You must not discuss the examination assignment, or disclose its contents to anyone. Failure to comply with this can result in disciplinary action being taken.
- You are not permitted to use electronic material that has been pre-prepared or copied in your examination submission (for example, pre-prepared Word or Excel documents).
- Only your first examination submissions will be accepted. Any examination submissions that are found to be modified or submitted after the examination deadline will not be accepted.

For the online examinations your attention is drawn to:

- Online examinations Online assessments will be supervised via the online platform and therefore do not require an invigilator present at the Candidate's chosen examination location. However where a number of candidates are taking the examination in a company office, they will need an invigilator to be provided by the company.
- Candidates must download the examination assignment and any associated materials at the start of the examination time stated. All given times are GMT/BST. Please note that these will not be available at any other time.
- Candidates may refer to any written or electronic reference material provided as part of the examination day guidance documentation. All required data will normally be supplied electronically at the start of the examination time. In some circumstances, data sets may be issued ahead of the examination.
- Candidates must not use an imported e-template unless provided as part of the examination material.
- File names must include the candidate's ARN and each file should also contain the candidate's ARN as a header or footer.
- Saving work is the candidate's responsibility. Failure to do so will not be considered a mitigating circumstance.
- It is the candidate's responsibility to ensure that all required files are submitted within the stated timelines. Late submissions and documents found to be modified outside the examination time will be investigated and may not be marked.
- Examination submissions will only be accepted in the specified file format e.g. If MS Word is specified then PDF submissions will not be accepted.
- Candidates are confirming by submitting the required files that all the material is entirely their own work and they wish this to be taken into account for the relevant assessment. Use of the internet is not permitted to help candidates during examination.

What should I know before sitting CM1 and CM2?

Microsoft Excel



Detailed knowledge of Excel is not part of the examination and hence extensive knowledge of Excel functions is not necessary. However, candidates will be expected to model calculations effectively using this software.

Therefore, a CM1/CM2 candidate should have experience of using Excel. Candidates who have limited experience or rarely have an opportunity to create spreadsheets are encouraged to practise before attending the examination; the sample exam assignments on the IFoA's website offer a good opportunity for such practice.

Exam assignments are constructed so as not to require advanced Excel techniques. However, candidates should be able to use the Excel functions listed below. Candidates are unlikely to be required, in any one examination, to use all of the functions listed here:

AVERAGE	SUM	COUNTIF	AND / OR
STDEV	PRODUCT	VLOOKUP / HLOOKUP	NOT
MIN / MAX	SUMPRODUCT	INDEX	ROUND
MEDIAN	SUMIF	OFFSET	ABS
LARGE / SMALL	COUNT	IF	INT
		GOALSEEK	

As well as the above built-in functions, candidates should know how to sort data and how to create and modify charts.

There is any number of Excel reference books available in addition to the Help facility provided in Excel. Candidates are recommended to look up the details of how to use the above features before the exam.

Good practice

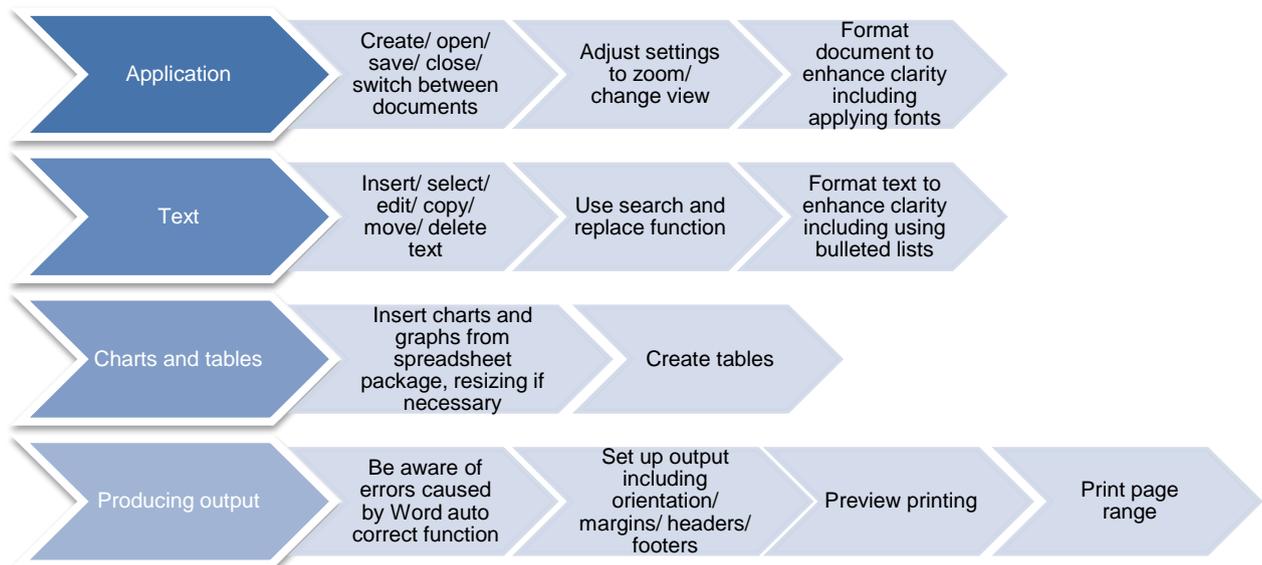
In Excel, or any other modelling package, there are good practice steps that should be followed. For the computer-based assessment, these help to:

- reduce the risk of errors within your model
- assist the examiners in reviewing your model, and
- facilitate appropriate marking and grading of your work.

The following principles should be followed in building any computer model and should be demonstrated in your exam assignment:

- Structure a worksheet so that it can be read from left to right and from top to bottom.
- Label each column/row where appropriate as clearly as possible so that your work on each sheet is clear and is clearly referenced.
- Ensure your final answers are clearly signposted for the examiners
- Keep all formulae as simple as possible – the calculations do not need to be performed in one formula and intermediate calculations can facilitate checking.
- In spreadsheets, avoid changes in cell formulae along rows/down columns. If this is not practical, make sure the changes are clearly flagged to other users who may have to make amendments.

Word Processing



Loading data for CM1 and CM2

Files to download

At the beginning of the examination you will be required to download the following files:

- The question paper. This will be a single document in PDF format
- Data files. These will be one or more files in Microsoft Excel format.

You will be required to input all your work on the data files as appropriate and save them using an appropriate naming convention.

The examination

You will be given one or more problems to model in Microsoft Excel. You do not need to include appropriate checks, unless instructed to do so, or an audit trail. However, your working must be set out and labelled clearly to enable the examiners to follow your approach.

On completion of the examination

Files to upload

At the end of the examination you will be required to upload the following files:

- Your completed models. These will be one or more files in Microsoft Excel format.

Additional guidance (if required) will be included with the exam instructions to cover key technical or modelling aspects needed for the particular situation in the problem to be modelled.

Final grading

The CM examinations will assess a candidate's overall performance over both papers. A Candidate, therefore, does not have to produce a pass standard for each separate paper, but does need to demonstrate a pass standard overall. Marks for the two elements of assessment for CM1 and CM2 will be combined and a single mark awarded for each subject.