

## 03 The full syllabus continued

### PAPER C03 FUNDAMENTALS OF BUSINESS MATHEMATICS

#### Syllabus overview

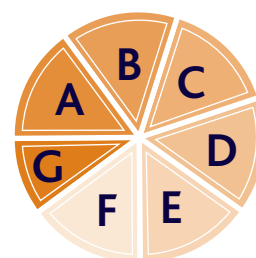
This paper primarily deals with the tools and techniques to understand the mathematics associated with managing business operations. Probability and risk play an important role in developing business strategy. Preparing forecasts and establishing the relationships between variables are an integral part of budgeting and planning.

Financial mathematics provides an introduction to interest rates and annuities and to investment appraisal for projects. Preparing graphs and tables in summarised formats and using spreadsheets are important in both the calculation of data and the presentation of information to users.

#### Syllabus structure

The syllabus comprises the following topics and study weightings:

A	Basic mathematics	15%
B	Probability	15%
C	Summarising and analysing data	15%
D	Relationships between variables	15%
E	Forecasting	15%
F	Financial mathematics	15%
G	Spreadsheets	10%



### C03 – A. Basic mathematics (15%)

#### Learning outcomes

On completion of their studies students should be able to:

Lead	Component	Level
1. demonstrate the use of basic mathematics.	(a) calculate answers using formulae;	3
	(b) calculate percentages and proportions;	3
	(c) calculate answers to appropriate decimal places or significant figures.	3
2. solve equations and inequalities.	(a) solve simple equations, including two variable simultaneous equations and quadratic equations;	3
	(b) prepare graphs of linear and quadratic equations;	3
	(c) solve simple inequalities.	3

### Assessment strategy

There will be a two hour computer based assessment, comprising 45 compulsory questions, each with one or more parts.

A variety of objective test question styles and types will be used within the assessment.

### Indicative syllabus content

- Use of formulae, including negative powers as in the formula for the learning curve.
  - Order of operations in formulae, including brackets, powers and roots.
  - Percentages and ratios.
  - Rounding of numbers.
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- Basic algebraic techniques and solution of equations, including simultaneous equations and quadratic equations.
  - Graphs of linear and quadratic equations.
  - Manipulation of inequalities.

## C03 – B. Probability (15%)

## Learning outcomes

On completion of their studies students should be able to:

Lead	Component	Level
1. calculate probability.	(a) calculate simple probability;	3
	(b) demonstrate the addition and multiplication rules of probability;	3
	(c) calculate a simple conditional probability.	3
2. demonstrate the use of probability where risk and uncertainty exists.	(a) calculate an expected value;	3
	(b) demonstrate the use of expected value tables in decision making;	3
	(c) explain the limitations of expected values;	2
	(d) explain the concepts of risk and uncertainty.	2

## C03 – C. Summarising and analysing data (15%)

## Learning outcomes

On completion of their studies students should be able to:

Lead	Component	Level
1. apply techniques for summarising data.	(a) explain the difference between data and information;	2
	(b) identify the characteristics of good information;	2
	(c) tabulate data;	3
	(d) prepare graphs, charts and diagrams;	3
	(e) calculate for both ungrouped and grouped data: arithmetic mean, median, mode, range, variance, standard deviation and coefficient of variation;	3
	(f) explain the concept of frequency distribution;	2
	(g) prepare graphs/diagrams of normal distribution;	3
	(h) explain the properties of normal distribution;	2
	(i) demonstrate the use of normal distribution tables.	3
2. apply techniques for analysing data.	(a) apply the Pareto distribution and the '80:20' rule;	3
	(b) explain how and why indices are used;	2
	(c) calculate indices using either base or current weights;	3
	(d) apply indices to deflate a series.	3

### Indicative syllabus content

- Probability and its relationship with proportion and percent.
  - Addition and multiplication rules of probability theory.
  - Venn diagrams.
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- Expected values and expected value tables.
  - Risk and uncertainty.

### Indicative syllabus content

- Data and information.
  - Tabulation of data.
  - Graphs, charts and diagrams: scatter diagrams, histograms, bar charts and ogives.
  - Summary measures of central tendency and dispersion for both grouped and ungrouped data.
  - Frequency distributions.
  - Normal distribution.
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- Pareto distribution and the '80:20 rule'.
  - Index numbers.

## C03 – D. Relationships between variables (15%)

## Learning outcomes

On completion of their studies students should be able to:

Lead	Component	Level	
1. calculate correlation coefficient for bivariate data.	(a) prepare a scatter diagram;	3	
	(b) calculate the correlation coefficient and the coefficient of determination between two variables.	3	
2. apply techniques of simple regression.	(a) calculate the regression equation between two variables;	3	
	(b) apply the regression equation to predict the dependent variable, given a value of the independent variable.	3	

## C03 – E. Forecasting (15%)

## Learning outcomes

On completion of their studies students should be able to:

Lead	Component	Level	
1. demonstrate techniques used for forecasting.	(a) prepare a time series graph;	3	
	(b) identify trends and patterns using an appropriate moving average;	2	
	(c) identify the components of a time series model;	2	
	(d) prepare a trend equation using either graphical means or regression analysis.	3	
2. prepare forecasts.	(a) calculate seasonal factors for both additive and multiplicative models;	3	
	(b) explain when each of the additive or multiplicative models is appropriate;	2	
	(c) calculate predicted values given a time series model;	3	
	(d) identify the limitations of forecasting models.	2	

### Indicative syllabus content

- Scatter diagrams.
  - Correlation coefficient: Spearman's rank correlation coefficient and Pearson's correlation coefficient.
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- Simple linear regression.

### Indicative syllabus content

- Time series analysis – graphical analysis.
  - Trends in time series – graphs, moving averages and linear regressions.
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- Seasonal variations using both additive and multiplicative models.
  - Forecasting and its limitations.

### C03 – F. Financial mathematics (15%)

Learning outcomes			
On completion of their studies students should be able to:			
Lead	Component	Level	
1. calculate present and future values of cash flows.	(a) calculate future values of an investment using both simple and compound interest;	3	
	(b) calculate an annual percentage rate of interest given a monthly or quarterly rate;	3	
	(c) calculate the present value of a future cash sum;	3	
	(d) calculate the present value of an annuity and a perpetuity.	3	
2. apply financial mathematical techniques.	(a) calculate loan/mortgage repayments and the value of the loan/mortgage outstanding;	3	
	(b) calculate the future value of regular savings and/or the regular investment needed to generate a required future sum;	3	
	(c) calculate the net present value (NPV) and the internal rate of return (IRR) of a project;	3	
	(d) explain whether and why a project should be accepted or rejected.	2	

### C03 – G. Spreadsheets (10%)

Learning outcomes			
On completion of their studies students should be able to:			
Lead	Component	Level	
1. apply spreadsheets to calculate and present data.	(a) explain the features and functions of spreadsheet software;	2	
	(b) explain the use and limitations of spreadsheet software in business;	2	
	(c) apply spreadsheet software to the normal work of a Chartered Management Accountant.	3	

### Indicative syllabus content

- Simple and compound interest.
  - Present value (including using formulae and CIMA tables).
  - Annuities and perpetuities.
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- Loans and mortgages.
  - Sinking funds and savings funds (including using formulae for the sum of a geometric progression).
  - Discounting to find net present value (NPV) and internal rate of return (IRR).
  - The concept of shareholder value.
  - Interpretation of NPV and IRR.

### Indicative syllabus content

- Features and functions of commonly used spreadsheet software: workbook, worksheet, rows, columns, cells, data, text, formulae, formatting, printing, graphics and macros.  
Note: knowledge of Microsoft Excel type spreadsheet vocabulary/formulae syntax is required. Formulae tested will be that which is constructed by users rather than pre-programmed formulae.
- Advantages and disadvantages of spreadsheet software, when compared to manual analysis and other types of software application packages.
- Use of spreadsheet software in the day-to-day work of the Chartered Management Accountant: budgeting, forecasting, reporting performance, variance analysis, what-if analysis, discounted cash flow calculations.