London Chamber of Commerce & Industry

IAB LCCI Level 3 Certificate in Business Statistics

Qualification Number: 610/3033/8
Specification Version 3 (January 2026)
Regulated by the Office of Qualifications and Examinations Regulation (Ofqual)

Document history

The below table highlights updates made to the IAB LCCI Level 3 Certificate in Business Statistics since its first publication in June 2023.

Version	Date	Changes and updates	Authorised by
Version 3.0	January 2026	Revision of specification format with changes to layout and credit value	Professional Standards Committee
Version 2.0	September 2025	Review and minor revisions to format	Chief Executive Officer
Version 1.0	June 2023	IAB LCCI Document specification created	IAB Board

Contents

1. About IAB & LCCI

Since our establishment in 1973, the IAB have provided accessible, high-quality qualifications that meet the needs of a modern global economy. Our long-standing reputation for credibility and rigour reflects our commitment to ensuring every qualification we offer supports learners to develop the knowledge and skills required for professional competence.

Our close collaboration with governments, employers, and education partners worldwide informs the development of our qualifications and ensures they remain relevant to current and emerging industry practice. Each programme is designed with a clear purpose: to deliver practical, job-ready skills that enable learners to progress directly into meaningful employment or further professional study.

As an internationally recognised awarding organisation with deep expertise in the finance and business sectors, the IAB offer structured pathways that support learners at every stage of their career. Our Ofqual-regulated qualifications at Levels 1–3 provide a solid foundation for entry into the profession, while our Level 4 and above qualifications enable advancement into more specialised or senior roles.

Rooted in real-world expectations and developed with input from industry practitioners, our qualifications emphasise accuracy, professional standards, and the practical competencies required by employers. Through studying with the IAB learners have the potential to achieve professional membership and invest in a trusted route to professional achievement and long-term career progression.

The London Chamber of Commerce and Industry (LCCI) have a heritage of over 120 years and a proud history rooted in advancing professional education. In 2023 the IAB became the awarding body for LCCI qualifications, marking a new chapter in the IAB offering. As with IAB, at the heart of our approach with LCCI was a simple but powerful principle, getting learners 'Job Ready' bridging the gap between classroom learning and workplace readiness, ensuring that students graduate with work-relevant skills, greater confidence, and job-readiness.

LCCI qualifications are built to reflect the complexity and diversity of modern business roles equipping learners not only for careers in bookkeeping, accountancy, and payroll, but also for positions across finance operations, business support, and commercial environments. This broader, Levels 1 -3 skills-based approach makes LCCI qualifications adaptable and relevant, opening more doors for learners and aligning closely with real-world employer expectations.

Upon being awarded IABLCCI Levels 2 and 3, learners can achieve AIAB and MIAB professional recognition respectively from the IAB should they wish to demonstrate their professional status.

1.1 Raising the standards in business and finance

In addition to our responsibility as an awarding organisation the IAB is also a professional membership organisation. Our members must meet published IAB Professional Standards and abide by IAB Byelaws as a condition of membership recognition. These required standards are monitored and regulated by the IAB to ensure integrity and best practice amongst our members to protect the public interest and maintain public confidence.

1.2 Registering for an IAB LCCI qualification

IAB LCCI qualifications are available through a global network of approved centres which ensures learners can access high quality teaching and assessment across the globe. Details of IAB LCCI approved centres can be found on our website at www.iablcci.org.uk/centres/.

Further details about the requirements of an IAB LCCI accredited centre can be found at Section 6 of this specification.

2. IAB LCCI Level 3 Certificate in Business Statistics

2.1 Qualification at a glance

Qualification Title	IAB LCCI Level 3 Certificate in Business Statistics
Level	Level 3
Objective	To enhance a learner's statistical knowledge and abilities enabling them to handle, understand, analyse and interpret business data and question statistical methods and models.
Qualification Number	610/3033/8
Qualification Type	Vocationally Related Qualification This qualification is not part of an apprenticeship
Entry Requirements	Although there are no formal entry requirements it is recommended that learners have completed and achieved the Level 2 Certificate in Business Statistics or equivalent. For learners studying in a local language B1 level of English on the Common European Framework of Reference (CEFR) or equivalent is recommended.
Total Qualification Time (How long it takes)	160 hours
Guided Learning Hours	135 hours
Method of Assessment	1 x online examination taken under controlled conditions (2 hours)
Progression Routes	• Allows progression to more advanced administrative, business and management qualifications and supports progression into the job market in areas such as forecasting, data collection and analysis, finance and accountancy. • Further study such as the IAB level 4 suite of qualifications thereby further developing knowledge and skills at a higher level.
Availability	England and International (via Accredited Centres)
Target Groups	Learners who: • work in, or want to work in, business and research environments. • Learners will be aiming for a career in business and finance where they will be sourcing and analysing business related data
Career Opportunities	Trainee Data analyst Business support analyst Market research assistant

	Accounts/Finance assistant Junior Operations Analyst Quality control Data technician

2.2 Why study this qualification?

The IAB LCCI Level 3 Certificate in Business Statistics qualification is internationally recognised and has been designed to enhance the numeracy skills and knowledge of learners around statistical methods and concepts and in probability, including an awareness of the potential and limitations of data and methods.

Learners will source and analyse business related data applying statistical techniques to plan and control business operations, evaluate and manage risk and support the decision-making process.

It will give learners an appreciation and understanding of data analysis, including its limitations, in a business and finance environment.

2.3 Who would benefit from this qualification?

This qualification is ideal for learners who work in or want to work in business and research environments and wish to develop a critical perspective on statistics, including recognition of collection errors, misleading forms of presentation, improper analysis and invalid inferences and conclusions.

The qualification will give learners a suitable foundation for first year undergraduate programmes in business, finance and related roles.

2.4 What does the qualification cover?

The IAB LCCI Level 3 Certificate in Business Statistics includes content relating to the following:

1. Management Information: The external and Internal Business Environment
   - Data collection
   - Descriptive statistics
2. Business Planning Models
   - Correlation and regression
   - Time-based data
3. Risk Management and Business Decision Making
   - Probability, including the normal distribution
   - Estimation and confidence intervals
   - Significance testing
   - Chi squared test

4. Quality Assurance and Control
    - Quality control

Learners will be encouraged to actively engage in the process of enquiry, communicate clearly using standard statistical conventions and notations and develop as effective and independent learners.

For full details of Unit content please refer to Section 5 of this specification.

2.5 What progression routes are available after this qualification?

IAB LCCI qualifications are designed to allow learners to pursue different routes as outlined below.

Enter a chosen field of work, pursue a promotion, or change their field of work

The IAB LCCI Level 3 Certificate in Business Statistics supports progression to employment. It is designed to support learners' knowledge and understanding of statistics relevant to their portfolio of learning in business, finance and accounting. Together with other IAB LCCI Level 3 qualifications this qualification will allow progression to more advanced administrative, business and management qualifications and supports progression into the job market in areas such as forecasting, data collection and analysis, finance and accountancy.

Progress to further study, such as the next IAB level qualification or externally with a professional body or education provider

This qualification allows progression to IAB's level 4 suite of qualifications as well as qualifications across the LCCI suites.

Completing different IAB LCCI qualifications could potentially lead to gaining an IAB LCCI Diploma. Please refer to the 'Exemptions' section of this specification for information on recognition from external providers.

2.6 Entry Requirements

There are no formal entry requirements for this qualification. However, it is recommended that learners have completed and achieved the Level 2 Certificate in Business Statistics or equivalent.

Where learners are studying in a local language the IAB recommends learners have B1 level of English on the Common European Framework of Reference (CEFR) or equivalent. This will support access to the assessment materials and be able to communicate responses effectively.

3. Qualification Structure

The following table sets out the qualification structure, units, sizing information, and assessment type for the IAB LCCI Level 3 Certificate in Business Statistics. Further details of each unit are included at Section 5 of this specification.

IAB LCCI Level 3 Certificate in Business Statistics	
Level	**3**
Guided Learning Hours (GLH)	**135**
Total Qualification Time (TQT)	**160**
Assessment Method	**Online examination (2 hours)**

3.1 Qualification Framework

This is a Level 3 qualification defined with reference to the Regulated Qualifications Framework (RQF). IAB LCCI qualifications comply with level descriptors set by the regulators.

The descriptors below set out the generic knowledge and skills associated with the typical holder of a qualification at this level.

Knowledge & Understanding Descriptor The learner:	Skills Descriptor The learner can:
• Has factual, procedural and theoretical knowledge and understanding of a subject or field of work to complete tasks and address problems that while well-defined, may be complex and non-routine. • Can interpret and evaluate relevant information and ideas. • Is aware of the nature of the area of study or work. • Is aware of different perspectives or approaches within the area of study or work.	• Identify, select and use appropriate cognitive and practical skills, methods and procedures to address problems that while well-defined, may be complex and non-routine. • Use appropriate investigation to inform actions. • Review how effective methods and actions have been.

3.2 Total Qualification and Guided Learning Hours

For all regulated qualifications, the total number of hours that learners are expected to undertake to complete and show achievement for the qualification is specified – this is known as the Total Qualification Time (TQT) and indicates the size of a qualification. The TQT value includes both guided learning and unsupervised learning.

This qualification has a TQT value of 160 hours.

Incorporated within the TQT is the number of Guided Learning Hours (GLH) that a centre delivering the qualification is expected to provide. Guided learning means activities that directly or immediately involve tutors and assessors in teaching, supervising, and invigilating learners, for example lectures, tutorials, online instruction and supervised study.

This qualification has a GLH value of 135 hours.

The GLH is provided by the IAB as a recommendation. Some learners may require more or less guidance than the set value. Centres approved to deliver IAB LCCI qualifications may adapt these as required. However, centres must assure themselves that learners are provided with adequate guidance defined by the needs of their students and that any restrictions such as funding requirements are met.

In addition to guided learning, there may be other required learning that is directed by tutors or assessors but is unsupervised. This includes, for example, private study, preparation for assessment and undertaking assessment when not under supervision, such as preparatory reading, revision and independent research.

3.3 Exemptions

IAB are continuously gaining new and updated exemptions for our LCCI qualifications from professional bodies and organisations. For the latest list of agreements, and to check this specific qualification, please contact our awarding team via awarding@iablcci.org.uk.

4. Assessment

4.1 Assessment at a glance

IAB LCCI Level 3 Certificate in Business Statistics	
• One online examination set and marked by the IAB	**100% of the total qualification**

Overview of content

1. Management Information: The external and Internal Business Environment
   - Data collection
   - Descriptive statistics
2. Business Planning Models
   - Correlation and regression
   - Time-based data
3. Risk Management and Business Decision Making
   - Probability, including the normal distribution
   - Estimation and confidence intervals
   - Significance testing
   - Chi squared test

a) Quality Assurance and Control
   - Quality control

Overview of assessment

- One online examination set and marked by the IAB, contributing to 100% of the overall grade of the qualification.
- The examination must be taken at approved training centres and assessment venues under controlled conditions
- The examination will be 2 hours.
- The examination will consist of 100 marks.
- Learners will be graded Pass/Merit/Distinction. A result of Fail will be recorded where learners do not achieve the required marks for a Pass.
- The examination contains 30 questions.
- Learners are required to answer all questions.
- The questions comprise short open response, calculations, chart/diagram construction/drawing and chart/diagram interpretation questions
- Learners are expected to have available a calculator with at least the following

  keys: +, −, ×, ÷, , x^2, x, $\frac{1}{x}$, $x^{\underline{y}}$, ln x, e^x, $x!$, sine, cosine and tangent and their inverses in degrees and decimals of a degree, and in radians; memory.
- Calculators with a facility for symbolic algebra, differentiation and/or

integration are not permitted
- Assessment is in English language.
- A formulae sheet will be provided
- Bilingual dictionaries are permitted for use in the exam
- Examinations for this qualification will use the dollar ($) as standard currency.

4.2 Assessment Objectives (AO)

Assessment Objectives have been developed for this qualification to ensure that examinations are appropriately targeted. They describe the abilities that learners should be able to demonstrate. Each question targets one or more assessment objectives. They are applied to the examination in the proportions below:

Learners must:		% of qualification
AO1	**Memorise** Recall statistical procedures used in a business context Recall statistical terms and definition Recall statistical processes and formulae	5
AO2	**Perform procedures** Select and use calculations using descriptive statistics Select and use statistical calculations involving correlation, regression and time-based data Select and use calculations involving probability Select and use calculations involving estimation, confidence intervals and statistical tests Present business data using suitable tables, charts, graphs and diagrams	50
AO3	**Communicate understanding** Demonstrate understanding of statistical concepts and conclusions Demonstrate understanding of the use of appropriate scales, axes and labels on graphs and charts Draw out the main points from tables, charts, graphs and diagrams Identify correlations/associations/trends	35

AO4	**Analyse** Analyse data collected from primary and secondary sources Recognise patterns, make inferences and forecast outcomes Distinguish different forms of statistical distributions Interpret results to establish acceptance or otherwise of a given hypothesis	10

4.3 Schedule of assessments

Examinations are scheduled in advance throughout the year. Centres should refer to the published examination timetable available at www.iablcci.org.uk/centres/ for scheduled examination dates.

4.4 Student Entry

Learners should only be entered for an assessment when it is believed they hold the skills and knowledge expected to pass the examination. For details on how to enter learners for the examination for this qualification please contact the IAB awarding team at awarding@iablcci.org.uk.

The closing date for entries is approximately six weeks before the start of each examination series.

4.5 Delivering Assessments under controlled conditions

The IAB 'Assessment Delivery Policy' applies to all IAB LCCI qualifications and assessments and must be followed by accredited centres to ensure that IAB LCCI assessments are delivered in accordance with the requirements.

A copy of this Policy is made available to centres upon accreditation approval. The Policy can also be requested from the IAB awarding team at awarding@iablcci.org.uk.

4.6 Marking and Moderation

Marking is undertaken by the IAB. Moderation is a process undertaken following the marking of assessments prior to a result being released to learners. Moderation acts as a filter, which ensures that an assessment outcome (for example a mark and / or grade) is fair, valid, and reliable. It also ensures that assessment criteria have been applied consistently, and that any differences in academic judgement between individual markers can be acknowledged and addressed. It provides consistency in marking within cohorts and throughout the academic year and is undertaken by a separate independent tutor.

4.7 Achievement and grading

The IAB LCCI Level 3 Certificate in Business Statistics is certificated on a three-grade scale: Pass/Merit/Distinction. The below table illustrated the grade that will be awarded based on the percentage score achieved by the learner in the assessment.

Distinction	Merit	Pass	Fail
90% and above	75%-89%%	60%-74%%	59% and below

4.8 Performance descriptors

The below table provides descriptions of required learner performance associated with each grade.

Grade	Descriptor
Pass	Learners can recall statistical procedures, terms, definitions, processes and formulae in a business context, showing an understanding of statistical concepts. Learners can select appropriate statistical calculations most of the time and apply them to a business context. Learners can carry out computations using statistical methods with some numerical errors, presenting solutions and data using tables, graphs, charts and diagrams with occasional errors. Learners can analyse data and use further information provided, recognising patterns. They can sometimes make inferences and draw on evidence to interpret results.
Merit	Learners can recall and utilise statistical procedures, terms, definitions, processes and formulae in a business context demonstrating a good understanding of statistical concepts. Learners can accurately collect raw data and use this in carrying out appropriate statistical calculations which have been set in a business context. Learners can carry out simple computations accurately and can carry out complex calculations in a limited context. They can present solutions and data using tables, graphs, charts and diagrams. Learners can use data and information to recognise patterns and use this to make business forecasts.

Distinction	Learners can recall and communicate thorough understanding of statistical procedures, terms, definitions, processes and formulae in a business context, and explain statistical concepts. Learners can consistently select appropriate statistical techniques and interpret outcomes accurately most of the time, applying these in a business context. Learners carry out both computations using statistical methods and present tables, graphs, charts and diagrams appropriately and accurately. Learners can analyse complex data to make reasoned interpretations and judgements most of the time.

4.9 Resitting the qualification

Learners can re-sit the examination for the IAB LCCI Level 3 Certificate in Business Statistics. It is strongly advised that learners do not register to undertake a re-sit until they have received the results from their previous examination.

4.10 Enquiry of results and Appeals

The IAB 'Enquiries and Appeals Policy' must be followed if a learner has an enquiry about a result or wishes to appeal against an assessment decision or reasonable adjustments or special consideration request decisions.

A copy of this Policy is made available to centres upon accreditation approval. The Policy can also be requested from the IAB awarding team at awarding@iablcci.org.uk.

5. Units

5.1 Knowledge, skills and understanding

The following skills should be developed throughout the course of study.

Skills	Students should:
	a) Use and apply statistical techniques in a range of business contexts, including market research, financial data, manufacturing, business forecasting and economic indicators
	b) Select and justify appropriate statistical methods and tests as an aid in solving business problems and business decisions
	c) Collect, analyse and interpret results of diagrams, charts and graphs and information in the context of business situations

5.2 Unit content

The following content must be covered to prepare students for the final assessment of this qualification. Learners will need to apply their knowledge and understanding of the following content and interpret and analyse their findings and results in a business context.

1. Managing Information: The external and Internal Business Environment

Subject content	What students need to learn:
1.1 Data Collection	a) Planning for data collection
	b) The difference between primary and secondary sources of business data
	c) The difference between a census and a survey and their relative advantages and disadvantages
	d) The need for a pilot survey before conducting a large scale survey
	e) The sample frames
	f) The determinants of sample size
	g) The different methods of sampling: • Random • Systematic

	• Multistage • quota
	h) Advantages and disadvantages of the various sampling methods
	i) The role of stratification in sample design
	j) Advantages and disadvantages of the different methods of data collection including: • Observation • Telephone • Interview • Postal questionnaire • Email survey • Internet survey
	k) Statistical bias
	l) Principles of questionnaire design
	m) Non-response and the methods of attempting to overcome this problem when dealing with business data
1.2 Descriptive Statistics	a) Calculations: • the mean, mode and standard deviation for grouped data • coefficient of variation
	b) Diagrams, charts and graphs: • a histogram, dealing with unequal class intervals
	c) Interpretation of the measures of location and dispersion including the coefficient of variation
	d) Skewness by calculation or graphically

2. Business Planning Models

Subject content	What students need to learn:
	a) Response and explanatory variables

2.1 Correlation and regression	b) Scatter diagram, interpreting the relationship shown including the possible presence of outliers
	c) Calculations: • Regression equation • The product moment correlation coefficient • The coefficient of determination • Spearman's rank correlation coefficient
	d) Plot a least squares regression line
	e) Forecasting and forecast accuracy
	f) Testing for significance of a correlation coefficient
	g) Meaning and interpretation of regression and correlation coefficients
2.2 Time-based data	a) Components of a time series
	b) Calculations: • Suitable moving average to identify the trend • The seasonal factors using either the additive or multiplicative model • Weighted index number for price, quantity, cost and value • Laspeyres and Paasche index numbers including their advantages and disadvantages
	c) Diagrams, charts and graphs: • Times series graph • The trend on the time series graph
	d) Choice of additive or multiplicative model
	e) Seasonally adjusted values and their accuracy
	f) Forecasting future values and their accuracy
	g) A national index of retail prices
	h) Change of base year and its effects
	i) Index linking for comparative purposes

3. Risk Management and Business Decision Making

Subject content	What students need to learn:
3.1 Probability including the	a) Uses of probability and its application within a business environment

normal distribution	b) Probability concepts including mutually exclusive and independent events
	c) The addition and multiplication rules of probability
	d) Presentation of business outcomes including the use of tabulation and Venn and tree diagrams
	e) Problems involving conditional probability
	f) Problems involving mathematical expectation
	g) Characteristics of normally distributed data
	h) Conversion of a general normal distribution to a standard normal distribution
	i) Use of normal distribution tables
	j) Combinations of two or more independent normal distributions and including applications in a business context
3.2 Estimation and confidence intervals	a) Concept of a sampling distribution and a confidence interval
	b) Confidence interval for a mean using the normal distribution for large samples
	c) Confidence interval for a mean using the t distribution for small samples
	d) Confidence interval for a proportion
	e) Sample number required to obtain a confidence interval of a given size for a stated probability
3.3 Statistical test	a) Stages for carrying out statistical tests
	b) Use of a confidence interval in a statistical test
	c) Type I and Type II errors and which of these might arise because of a statistical test
	d) One tailed and two tailed statistical tests

	e) Choice of an appropriate statistical test: • single mean test for large samples using the normal distribution • single mean test for small samples using the t distribution • single proportion test • two means test for large samples using the normal distribution • two means test for small samples using the t distribution • paired comparison test using the t distribution • two proportion tests
3.4 Chi squared test	a) The appropriate use of a chi-squared test
	b) Chi-squared test for association using contingency tables
	c) Test for goodness of fit when percentages are given
	d) Differences between observed and expected values
	e) Interpretation of the outcome of a Chi-squared test

4. Quality Assurance and Control

Subject content	What students need to learn:
4.1 Quality control	a) Advantages to management of setting up quality control charts
	b) The use of control charts for mean
	a) Diagrams, charts and graphs: • a mean chart using the normal distribution 0.025 point for the warning line and 0.001 point for the action line and interpreting the results • interpretation of results

6. Delivering IAB Qualifications

6.1 Delivery guidance

In delivering this qualification, teachers are encouraged to use a variety of examples and scenarios drawn from the business environment.

Business scenarios and short case studies can be useful when used in small-group work as they give learners the opportunity to work with their peers to identify key issues and how they can be addressed. This is particularly useful in developing the skills required when analysing different approaches to specific business contexts.

Examinations for this qualification will use the dollar ($) as standard currency.

6.2 Staffing and physical resource requirements for centres

The IAB, in line with regulatory requirements, has a Centre Agreement in place which covers the two-way obligations between the IAB as the Awarding Body and each centre delivering our LCCI qualifications. A key section of this agreement is to ensure a professional approach to the delivery of teaching, learning and assessment, leading to the best learner experience.

Each centre engaged with the IAB LCCI is required to ensure viable levels of staffing, managerial and financial resources are in place to enable it to effectively and efficiently deliver the Qualifications as required by the Awarding Organisation.

6.3 Quality assurance

Any centre approved to offer IAB LCCI qualifications is subject to a rigorous quality assurance regime to ensure compliance with the requirements set out in the Centre Agreement and any regulatory conditions. This regime includes but is not limited to policy and procedure review, performance review, on-site monitoring visits and virtual interviews to assess how well that centre operates in delivering learning for IAB qualifications.

7. IAB Policy & Procedure

Policies and Procedures are in place to provide a framework and outline the IAB's approach and objectives for key areas along with defined processes to be followed. These documents ensure credibility, compliance, consistency, and quality in the design, delivery, and awarding of LCCI qualifications. Relevant policies are issued to accredited centres alongside Centre Agreements. These can also be accessed by contacting our awarding team via awarding@iablcci.org.uk

Examples of the Policies that can be found include but are not limited to:

- Adverse Effects
- Anti-Bribery and Anti-Corruption
- Assessment Delivery
- Complaints
- Conflict of interest
- Contingency Plan
- Enquiries and appeals
- Equality & Diversity and Inclusion
- Malpractice & Maladministration
- Plagiarism, Collusion and Cheating
- Reasonable Adjustments
- Recognition of Prior Learning
- Results and Certification
- Sanctions
- Special Considerations
- Withdrawal of approval

Centres delivering LCCI qualifications should refer to the relevant Policy for guidance as appropriate.

8. Equality and Diversity

The IAB is committed to ensuring an inclusive, safe and welcoming environment for all learners undertaking its qualifications. Our Equality, Diversity and Inclusion Policy requires all learners to have equal opportunity to access our qualifications and assessments, and our qualifications to be awarded in a way that is fair to every learner.

Accredited centres delivering LCCI qualifications must have a Policy relating to equal opportunities, diversity and inclusion to ensure a positive learning environment is provided to all learners. This is reviewed and assessed as part of our monitoring process which may include on-site inspections.

8.1 Reasonable Adjustments and Special Considerations

A **reasonable adjustment** request can be made where a person with a disability would be at a substantial disadvantage in undertaking an assessment. The awarding organisation is required to take reasonable steps to overcome that disadvantage.

A **special consideration** takes into account a circumstance such as temporary injury, illness or other indisposition at the time of the examination/assessment, which has had, or is likely to have had, a material effect on a learner's ability to take an assessment or demonstrate their level of attainment in an assessment.

Further information and guidance on how to apply can be found in the relevant IAB Policy and Procedure as detailed in Section 7 of this Specification.

9. Support, training and resources

9.1 Training

The IAB offers support to teachers on standard of delivery and preparing learners to meet the assessment requirements.

9.2 Specifications, Sample Assessment Materials and Teacher Support Materials

The IAB LCCI Level 3 Certificate in Business Statistics Sample Assessment Materials are available from the IAB.

In addition, a glossary of terms including International Accounting Standards terminology used in the content of the IAB LCCI suite of qualifications can be found in the centre area of our website or by contacting the IAB

Please contact our awarding team via awarding@iablcci.org.uk for a list of all the support documents available.

10. Appendix

Appendix 1: Formulae Sheet

The formula for the **median of grouped data** is:
Median = $L + [(N/2 - C) / F] * h$

where:
L = lower boundary of the median class
N = total number of observations
C = cumulative frequency of the class preceding the median class
F = frequency of the median class
h = class width (size)

The formula for the **mean of ungrouped data** is:
Mean = x_i / n

where:
x_i is the sum of all observations (i.e., $x_1+x_2+x_3+...+x_n$).
n is the total number of observations

The formula for the **mean of grouped data** is:
Mean, $\bar{x}$ = $\Sigma f i / N$

where:
$\bar{x}$ is the mean value of the set of given data,
f is the frequency of each group,
i is the midpoint of each group,
N is the total number of observations

The formula for **standard deviation for grouped data** is:
Standard deviation = $\Sigma^{n}_{i}(m_i-\mu)^2 / (N-1)$

where:
n_i = frequency of each group
m_i = midpoint of each group
μ = mean of the grouped data
N = total number of observations

The formula for **standard deviation for ungrouped data** is:
Standard deviation = $[\Sigma^{n}_{i}(x-\mu)^2 / N]$

The formula for **quartile deviation** is:

$QD = (Q_3-Q_1) / 2$

The formula for **mean deviation** is:

For **ungrouped data**:
$MD = (|x_i - x|) / n$

where xi represents each value,
x is the mean of the data
n is the number of data points

For **grouped data**:
$MD = (f_i |x_i - x|) / f_i$
Where f_i is the frequency of each data point

The formula for the **coefficient of variation** of a sample is:
$CV = (s / x) \times 100$

where:
s = standard deviation of the sample
x = mean of the sample

The formula for **product moment coefficient** is:
For a set of n pairs of values (x_1, y_1):

$$r = \frac{S_{xy}}{\sqrt{S_{xx}S_{yy}}} = \frac{\Sigma(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\{\Sigma(x_i - \bar{x})^2\}\{\Sigma(y_i - \bar{y})^2\}}} = \frac{\Sigma x_i y_i - \frac{(\Sigma x_i)(\Sigma y_i)}{n}}{\sqrt{\left(\Sigma x_i^2 - \frac{(\Sigma x_i)^2}{n}\right)\left(\Sigma y_i^2 - \frac{(\Sigma y_i)^2}{n}\right)}}$$

The formula for **Spearman's rank correlation coefficient** is:

$$r_S = 1 - \frac{6\Sigma d^2}{n(n^2 - 1)}$$

The formula for **Least squares regression line** is:

$$\hat{y} = a + bx$$

$$b = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{n\sum x^2 - \left(\sum x\right)^2}$$

$$a = \frac{\sum y}{n} - \frac{b\sum x}{n}$$

The formula for **Laspeyres price index** is:
[(observation price x base quantity)] / [(base price x base quantity)]

The formula for **Paasche price index** is:
[(observation price x observation quantity)] / [(base price x observation quantity)]

Probability formulae
Multiplication rule
P(A and B) = P(A) * P(B|A)
where P(B|A) is the conditional probability of B given A

Addition rule
P(A or B) = P(A) + P(A) - P(A and B)

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This document is published by the Institute of Accountants and Bookkeepers, trading as IAB.