IQM4004

LEVEL 4 · CONTROLLED ASSESSMENT

INTO QUALIFICATIONS

Statistics and Data Analysis

Final Written Examination

Candidate question paper

Duration
2 hours

Total marks
100

Assessment window
Sample assessment

Assessment set
Set S of 2026

Response instruction
Follow the response instructions shown for each section.

Release timing
exam release

Paper
IQM4004 A3

Assessment set ID
2026-S

INTO QUALIFICATIONS LEARNER ID

DELIVERY CENTRE ID (OPTIONAL)

EXAM DATE
_____

ASSESSMENT SET
Set S of 2026

Do not open this paper until instructed. Follow the response instructions in this paper.

FOR MARKER USE ONLY

Marker initials	**Mark / 100**

About this sample assessment

Weighting: 40% of module

AI condition: Level 1 – Controlled Assessment: no AI permitted at any stage.

SAMPLE ASSESSMENT / 2026-S — Assess statistical knowledge, calculations, analysis/interpretation, applied methods and evidence-based decision-making across business/finance contexts.

Instructions for candidates

Section A: answer all five short questions (40 marks). Sections B, C and D: answer one question from the two offered in each section (20 marks each). Total 100. Show working, state units and explain interpretations.

Permitted materials: Closed-book examination. No candidate-provided materials, notes, books or electronic/web-enabled devices permitted. The approved IQM4004 2026-S formula booklet is included at the end of this pack.

Permitted calculator: Required: non-programmable, non-graphing scientific calculator. Calculators with CAS, text/image/document storage or internet capability, and phones, tablets and smart watches, are not permitted.

Section A · A1

Compulsory short question · 8 marks.

A1 [8 marks]

A shop recorded daily orders of 12, 15, 15, 18 and 30. Calculate the mean, median and range, and state which centre measure is less affected by the largest value.

Section A · A2

Compulsory short question · 8 marks.

A2 [8 marks]

A price of £240 is increased by 6% and then reduced by 6%. Find the final price and net percentage change.

Section A · A3

Compulsory short question · 8 marks.

A3 [8 marks]

A customer survey receives 180 responses from 240 randomly selected customers. Calculate the response rate. Give one possible non-response concern.

Section A · A4

Compulsory short question · 8 marks.

A4 [8 marks]

Weekly sales (units) are 40, 44, 48 and 52. First calculate the three successive two-week averages for weeks 1–2, 2–3 and 3–4. Then calculate the centred moving average for week 2 as the mean of the averages for weeks 1–2 and 2–3, and the centred moving average for week 3 as the mean of the averages for weeks 2–3 and 3–4. State both results and explain one use.

Section A · A5

Compulsory short question · 8 marks.

A5 [8 marks]

A sample gives an estimated mean order value of £32 and standard error £1.50. Use 1.96 to calculate an approximate 95% interval and interpret it cautiously.

Section B

Answer exactly one of the two alternatives.

B1 [20 marks]

A warehouse records staff training hours x and picking errors per 1,000 orders y for 6 teams: (1,18), (2,16),(3,15),(4,12),(5,10),(6,9). Describe a suitable graph, calculate/interpret the direction of association, identify one limitation and explain what additional data would help.

Response guidance: Answer one alternative in this section; show working and evaluate in context.

B2 [20 marks]

Quarterly customer complaints over eight quarters are 44, 42, 40, 39, 36, 35, 33, 30. Describe the pattern, calculate absolute change and percentage change, propose an appropriate visualisation and explain why trend alone does not prove a service intervention caused improvement.

Response guidance: Answer one alternative in this section; show working and evaluate in context.

Section C

Answer exactly one of the two alternatives.

C1 [20 marks]

A regression output for monthly sales (£000) on advertising (£000) is intercept 18, slope 3.2, r=0.70, p=0.04. Predict sales at ad spend 7; interpret slope, r and p at 5%; state one forecasting limitation.

Response guidance: Answer one alternative in this section; show working and evaluate in context.

C2 [20 marks]

A business tests whether mean delivery time differs from 30 minutes. Sample n=36, mean 32, standard deviation 6. State H0 and H1, calculate standard error, form an approximate 95% interval using 1.96, and explain the decision and one assumption.

Response guidance: Answer one alternative in this section; show working and evaluate in context.

Section D

Answer exactly one of the two alternatives.

D1 [20 marks]

Campaign X yields average weekly profit £8,200 with standard deviation £1,100; Campaign Y yields £8,600 with standard deviation £2,400. Recommend whether to move all budget to Y, considering objective, variability, sample/context evidence and a sensible next test.

Response guidance: Answer one alternative in this section; show working and evaluate in context.

D2 [20 marks]

An AI demand forecast predicts high sales for neighbourhoods with historical loyalty-card activity. The vendor cannot explain feature weights and the records under-represent new residents. Evaluate whether the business should use it for store investment; address bias, privacy, uncertainty and safeguards.

IQM4004 Statistics and Data Analysis

Final Written Examination Formula Booklet

SAMPLE ASSESSMENT / 2026-S

Descriptive statistics

- Mean: $\bar{x} = (\Sigma x) / n$
- Range = maximum − minimum
- For an ordered list, the median is the middle value (or the mean of the two middle values when n is even).

Rates and percentage change

- Rate or proportion = part / whole
- Percentage = (part / whole) × 100
- Percentage change = ((new value − original value) / original value) × 100

Moving averages

Two-period average = (value at period t + value at period t+1) / 2

A centred moving average is assigned to the period between two successive two-period averages: the mean of the averages for weeks 1–2 and 2–3 is centred on week 2, and the mean of the averages for weeks 2–3 and 3–4 is centred on week 3.

Approximate interval for a mean

Approximate 95% interval = estimated mean ± 1.96 × standard error

Standard error of a mean, when a sample standard deviation s and sample size n are supplied: $SE = s / \sqrt{n}$

Association and correlation

Pearson correlation: $r = \Sigma[(x - \bar{x})(y - \bar{y})] / \sqrt{[\Sigma(x - \bar{x})^2 \times \Sigma(y - \bar{y})^2]}$

The sign of r indicates direction and |r| indicates the strength of linear association. Correlation does not by itself establish causation. For a fitted linear model, predicted value: y-hat = a + bx, where a is the intercept and b is the slope.

Notation

Σ means sum; n is the number of observations; $\bar{x}$ and $\bar{y}$ are sample means; s is a sample standard deviation; √ denotes the square root.