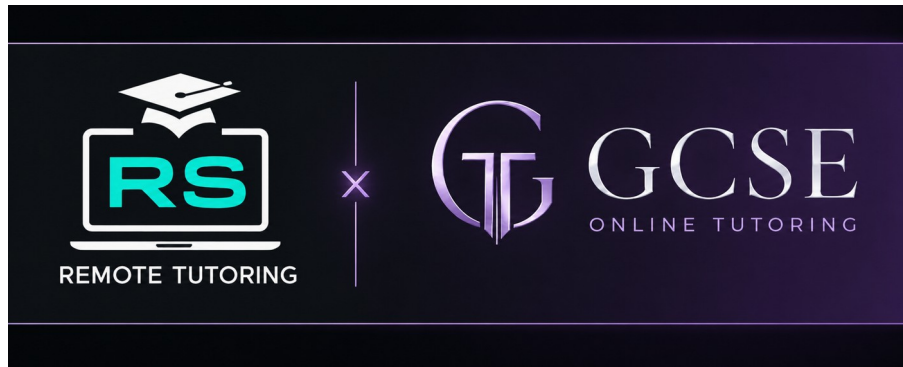




GCSE MATHEMATICS

FOUNDATION TIER

STATISTICS

PRACTICE BOOK

Modules 30-32 | 135 original questions | Formula and method guides, full answers and marking guidance

FREE WEBSITE EDITION

Student name: _____

Target grade: _____ Start date: _____ Completion date: _____

www.gcseonlinetutoring.uk | www.rsremotetutoring.co.uk

Aligned to the AQA GCSE Mathematics (8300) specification. Independent educational resource - not produced, approved, endorsed or affiliated with AQA.

Copyright and licence note

Free for personal and household educational use. Tutors and schools must obtain the appropriate licence before copying for learners. Resale, paid redistribution and uploading to third-party websites are prohibited.



Unit 6 Contents and Study Plan

MODULES 30-32 • FREE WEBSITE EDITION

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

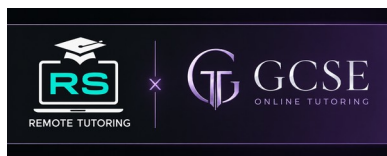
Name: _____ Date: _____ Score: ____ / ____

Work through each module in order: Core Skills, Exam Practice, Grade 4-5 Challenge and same-topic retrieval. Draw and annotate statistical diagrams on the working lines where requested. The method banks and complete answers are collected at the end.

Module	Topic	Specification	Score
30	Data Collection, Sampling and Presentation	S1, S2, S4	____ / 45
31	Averages, Spread and Comparing Distributions	S4, S5	____ / 45
32	Scatter Graphs, Correlation and Interpretation	S6	____ / 45

Suggested use: one question section per lesson; mark in a different colour; write one correction beside every error; repeat Mixed Retrieval one week later.

Copyright and licence note: Free Website Edition for personal and household educational use. Tutors and schools must obtain the appropriate licence before copying for learners. Resale, paid redistribution and third-party uploading are prohibited. For licensing enquiries, visit gcseonlinetutoring.uk or rsremotetutoring.co.uk.



Unit 6 Specification Coverage Map

INDEPENDENTLY AUTHORED PRACTICE MAP

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Every question is independently authored. This page identifies the GCSE Mathematics skills covered by the unit. It is not a reproduction or adaptation of an AQA question paper, mark scheme, examiner report or other assessment material.

Specification alignment	Coverage in this book	Typical assessed decisions
S1	Module 30	Population/sample, representative selection, bias and limitations
S2	Module 30	Complete/read tables and charts; select and critique displays
S4	Modules 30–31	Primary/secondary and discrete/continuous data; averages and spread
S5	Module 31	Interpret and compare distributions using centre and spread
S6	Module 32	Correlation, causation, best fit, interpolation/extrapolation



Data Collection, Sampling and Presentation

CORE SKILLS • PART A

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: ____ / ____

Same-module practice. Show calculations and give conclusions in context.

1. State the population when 60 pupils from a school are asked about homework time. [1 mark]

2. State the sample in a survey where 80 of 600 customers reply. [1 mark]

3. What is a census? [1 mark]

4. Give one advantage of a sample over a census. [1 mark]

5. Classify shoe size as discrete or continuous. [1 mark]

6. Classify journey time as discrete or continuous. [1 mark]

7. Is data collected by measuring your class primary or secondary? [1 mark]

8. Is a government-published table primary or secondary data for a student? [1 mark]



Data Collection, Sampling and Presentation

CORE SKILLS • PART B

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

9. Name a suitable method for choosing 20 names fairly from a register. [1 mark]

10. Why is asking only football-club members about favourite sports biased? [1 mark]

11. Write one non-overlapping response group for ages after 10-14. [2 marks]

12. Identify the problem: "How excellent was today's lesson?" [2 marks]

13. A pictogram key is one symbol = 8 pupils. What does half a symbol represent? [2 marks]

14. A category frequency is 18 out of 60. Find its pie-chart angle. [2 marks]

15. A time-series point rises from 42 to 55. Find the increase. [2 marks]



Data Collection, Sampling and Presentation

EXAM PRACTICE • PART A

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

1. A numbered population has 240 members. Describe how to take a simple random sample of 30. [3 marks]

2. A numbered population has 500 members. Describe how to take a simple random sample of 40. [3 marks]

3. A numbered population has 360 members. Describe how to take a simple random sample of 45. [3 marks]

4. A numbered population has 720 members. Describe how to take a simple random sample of 60. [3 marks]

5. A numbered population has 1000 members. Describe how to take a simple random sample of 80. [3 marks]



Data Collection, Sampling and Presentation

EXAM PRACTICE • PART B

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

6. A group contains 120 of 300 people. Find its allocation in a stratified sample of 50. [2 marks]

7. A group contains 84 of 240 people. Find its allocation in a stratified sample of 40. [2 marks]

8. A group contains 150 of 600 people. Find its allocation in a stratified sample of 72. [2 marks]

9. A researcher surveys the first 30 people entering a gym. Name the sampling method and one limitation. [3 marks]

10. A register has 400 names. A systematic sample of 40 is required. Find the interval. [3 marks]



Data Collection, Sampling and Presentation

EXAM PRACTICE • PART C

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

11. Design a question with response boxes to find weekly exercise time. [3 marks]

12. Frequencies for bus, walk, car are 12, 9, 15. Find the total and the angle for car. [3 marks]

13. A bar chart uses a broken vertical scale. Explain one danger. [2 marks]

14. Choose a diagram for temperature recorded each month and justify. [2 marks]

15. Choose a diagram for favourite subject categories and justify. [2 marks]



Data Collection, Sampling and Presentation

GRADE 4-5 CHALLENGE • PART A

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

1. A college has 540 Year 1 and 360 Year 2 students. Find the two allocations in a stratified sample of 75. [4 marks]

2. A survey asks online shoppers to volunteer feedback. Explain two possible sources of bias. [4 marks]

3. A pie chart has sectors 72° , 126° and 90° . Find the final angle and, if total frequency is 80, its frequency. [4 marks]

4. A pictogram shows $3\frac{1}{2}$ symbols with key one symbol=12. Find the frequency and explain why a clear key matters. [3 marks]

5. Monthly sales are 32, 35, 31, 40, 44, 47. Describe the overall trend and one fluctuation. [3 marks]



Data Collection, Sampling and Presentation

GRADE 4-5 CHALLENGE • PART B

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

6. A questionnaire offers age groups 10-20, 20-30, 30-40. Explain and correct the fault. [3 marks]

7. A school samples 10 pupils from each year group although year-group sizes differ greatly. Is it stratified? Explain. [4 marks]

8. Two charts display identical values but use different axis scales. Explain how to compare them fairly. [3 marks]

9. A frequency table totals 96 but the stated sample size is 100. Give two checks. [3 marks]

10. Plan a study of travel-to-school methods that could represent the whole school. [5 marks]



Data Collection, Sampling and Presentation

MIXED RETRIEVAL

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

1. Population 800, sample 10%. Find sample size. [1 mark]

2. One symbol represents 6. What do $4\frac{1}{2}$ symbols represent? [1 mark]

3. Frequency 25 of 100: find pie angle. [2 marks]

4. Name the best chart for values changing weekly. [1 mark]

5. Why should questionnaire intervals not overlap? [1 mark]



Averages, Spread and Comparing Distributions

CORE SKILLS • PART A

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

1. For [3, 5, 5, 7, 10], find the mean. [2 marks]

2. For [4, 6, 8, 8, 9], find the mean. [2 marks]

3. For [12, 15, 15, 15, 18], find the mean. [2 marks]

4. For [2, 4, 7, 9, 13], find the mean. [2 marks]

5. For [20, 21, 21, 24, 29], find the mean. [2 marks]

6. For [3, 5, 5, 7, 10], find the median and mode. [2 marks]

7. For [4, 6, 8, 8, 9], find the median and mode. [2 marks]

8. For [12, 15, 15, 15, 18], find the median and mode. [2 marks]



Averages, Spread and Comparing Distributions

CORE SKILLS • PART B

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: ____ / ____

Same-module practice. Show calculations and give conclusions in context.

9. For [2, 4, 7, 9, 13], find the median and mode. [2 marks]

10. For [20, 21, 21, 24, 29], find the median and mode. [2 marks]

11. For [3, 5, 5, 7, 10], find the range. [1 mark]

12. For [4, 6, 8, 8, 9], find the range. [1 mark]

13. For [12, 15, 15, 15, 18], find the range. [1 mark]

14. For [2, 4, 7, 9, 13], find the range. [1 mark]

15. For [20, 21, 21, 24, 29], find the range. [1 mark]



Averages, Spread and Comparing Distributions

EXAM PRACTICE • PART A

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

1. Values [1, 2, 3] have frequencies [4, 5, 1]. Find the mean. [3 marks]

2. Values [2, 4, 6] have frequencies [3, 4, 3]. Find the mean. [3 marks]

3. Values [0, 1, 2, 3] have frequencies [2, 5, 2, 1]. Find the mean. [3 marks]

4. Values [5, 10, 15] have frequencies [2, 3, 1]. Find the mean. [3 marks]

5. Values [1, 3, 5, 7] have frequencies [1, 2, 3, 2]. Find the mean. [3 marks]



Averages, Spread and Comparing Distributions

EXAM PRACTICE • PART B

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

6. The mean of 6 values is 8. Find their total. [2 marks]

7. The mean of 5 values is 12. Four values total 43. Find the fifth. [3 marks]

8. The ordered data are 3, 6, x , 11, 15 and the median is 8. Find x . [2 marks]

9. Data have lower quartile 12 and upper quartile 29. Find the IQR. [1 mark]

10. A box plot has minimum 4, LQ 9, median 14, UQ 22, maximum 30. Find range and IQR. [2 marks]



Averages, Spread and Comparing Distributions

EXAM PRACTICE • PART C

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

11. Scores are 5,6,7,7,8,9,42. Identify the outlier and explain its effect on the mean. [3 marks]

12. Class A median 18 and IQR 6; Class B median 21 and IQR 12. Compare. [3 marks]

13. Why may the median be better than the mean for house prices? [2 marks]

14. A grouped table has intervals $0 < x \leq 10$, $10 < x \leq 20$, $20 < x \leq 30$ with frequencies 4,7,9. State the modal class. [1 mark]

15. Explain why a mean estimated from grouped data may not be exact. [2 marks]



Averages, Spread and Comparing Distributions

GRADE 4-5 CHALLENGE • PART A

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: ____ / ____

Same-module practice. Show calculations and give conclusions in context.

1. The mean of 8 numbers is 14. One number 26 is removed. Find the new mean. [4 marks]

2. Group A: mean 12 for 20 people. Group B: mean 18 for 30 people. Find combined mean. [4 marks]

3. Five numbers have median 9, mode 7 and range 10. Give one possible ordered set. [4 marks]

4. Five ordered values are 4, 8, 11, 11, x. Their range is 15. Find x and state the median and mode. [4 marks]

5. The scores are 18, 20, 21, 22, 23 and 52. Identify the value that appears to be an outlier and explain its likely effect on the mean, median and range. [4 marks]



Averages, Spread and Comparing Distributions

GRADE 4-5 CHALLENGE • PART B

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

6. Machine A median 50, IQR 4, range 18. Machine B median 49, IQR 9, range 12. Give a balanced comparison. [4 marks]

7. Values 1,2,3,4 have frequencies 2,k,5,1 and mean 2.5. Find k. [5 marks]

8. The median of 10 ordered values is 14. What can be said about the 5th and 6th values? [3 marks]

9. A high outlier is added. State likely changes to mean, median and range. [3 marks]

10. A report says one class is “better” because its mean is 1 mark higher. Give two cautions. [3 marks]



Averages, Spread and Comparing Distributions

MIXED RETRIEVAL

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

1. Find the mean of 4,6,8. [1 mark]

2. Find median of 3,9,5,7. [2 marks]

3. Find range of 12,19,15. [1 mark]

4. $Q1=8, Q3=20$. Find IQR. [1 mark]

5. Which average is most affected by an outlier? [1 mark]



Scatter Graphs, Correlation and Interpretation

CORE SKILLS • PART A

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: ____ / ____

Same-module practice. Show calculations and give conclusions in context.

1. Describe correlation if points rise from left to right. [1 mark]

2. Describe correlation if points fall from left to right. [1 mark]

3. Describe correlation if points show no clear trend. [1 mark]

4. What does strong correlation look like? [1 mark]

5. Does correlation prove causation? [1 mark]

6. What is an outlier on a scatter graph? [1 mark]

7. What is interpolation? [1 mark]

8. What is extrapolation? [1 mark]



Scatter Graphs, Correlation and Interpretation

CORE SKILLS • PART B

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: ____ / ____

Same-module practice. Show calculations and give conclusions in context.

9. Why is extrapolation risky? [1 mark]

10. What should a line of best fit do? [1 mark]

11. Hours revised and mark show positive correlation. Interpret. [2 marks]

12. Age of car and value show negative correlation. Interpret. [2 marks]

13. Shoe size and exam mark show no correlation. Interpret. [2 marks]

14. A point lies far above the trend. What should be checked? [2 marks]

15. Name both axes needed for a scatter graph of temperature and ice-cream sales. [2 marks]



Scatter Graphs, Correlation and Interpretation

EXAM PRACTICE • PART A

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

1. A line of best fit is $y=5x+20$. Estimate y when $x=6$. [2 marks]

2. A line of best fit is $y=3x+18$. Estimate y when $x=12$. [2 marks]

3. A line of best fit is $y=4x+10$. Estimate y when $x=8$. [2 marks]

4. A line of best fit is $y=2x+30$. Estimate y when $x=15$. [2 marks]

5. A line of best fit is $y=1.5x+12$. Estimate y when $x=25$. [2 marks]



Scatter Graphs, Correlation and Interpretation

EXAM PRACTICE • PART B

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: ____ / ____

Same-module practice. Show calculations and give conclusions in context.

6. Observed x-values run from 4 to 18. Is predicting at $x=12$ interpolation or extrapolation? [1 mark]

7. Observed x-values run from 4 to 18. Is predicting at $x=25$ interpolation or extrapolation? [1 mark]

8. A line of best fit predicts 72, but the actual value is 68. State whether the actual value is above or below the prediction and by how much. [2 marks]

9. Two variables correlate because both increase with age. Explain a possible third-variable issue. [3 marks]

10. A scatter graph uses 8 people. Give one limitation. [2 marks]



Scatter Graphs, Correlation and Interpretation

EXAM PRACTICE • PART C

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

11. Describe how to estimate y from a drawn line of best fit at $x=10$. [2 marks]

12. Why should a best-fit line not be forced through the origin? [2 marks]

13. A point (30,90) is far from all others. State one effect on the trend. [2 marks]

14. A prediction is made for a different population. Give one caution. [2 marks]

15. Rainfall and umbrella sales correlate positively. Give a sensible contextual interpretation. [2 marks]



Scatter Graphs, Correlation and Interpretation

GRADE 4-5 CHALLENGE • PART A

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: ____ / ____

Same-module practice. Show calculations and give conclusions in context.

1. A line $y=2.4x+35$ models revision hours x and marks y . Estimate for 10 hours and state whether valid if data cover 2-12 hours. [4 marks]

2. The same model is used for 40 hours. Explain two concerns. [4 marks]

3. A study finds strong positive correlation between screen time and tiredness. Explain why “screen time causes tiredness” is not established. [4 marks]

4. Graph A has points tightly around a downward line; Graph B is loosely upward. Compare. [3 marks]

5. A best-fit line predicts 48 at $x=7$. An outlier at (7,80) is added. Explain why the prediction should not automatically become 80. [3 marks]



Scatter Graphs, Correlation and Interpretation

GRADE 4-5 CHALLENGE • PART B

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

6. Data pairs are (1,8),(2,11),(3,14),(4,17). Find an exact linear rule and predict at $x=6$; label the prediction type. [4 marks]

7. A report omits three inconvenient points. Explain the statistical problem. [4 marks]

8. A curved pattern is visible. Why may a straight best-fit line be unsuitable? [3 marks]

9. Two studies show different correlations. Give three features to compare before deciding which is more reliable. [4 marks]

10. Design a scatter-graph investigation of height and arm span. [5 marks]



Scatter Graphs, Correlation and Interpretation

MIXED RETRIEVAL

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Same-module practice. Show calculations and give conclusions in context.

1. Points rise left to right: name correlation. [1 mark]

2. Observed range 5-20; prediction at 15? [1 mark]

3. Observed range 5-20; prediction at 30? [1 mark]

4. Does correlation prove cause? [1 mark]

5. What balances around a best-fit line? [1 mark]



Data Collection, Sampling and Presentation

FORMULAS AND METHOD BANK

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use these methods before checking the answer tables. Write the setup first, substitute values, calculate, then give a final answer with units.

When to use it	Formula / method
Stratified allocation	$\text{group size} \div \text{population size} \times \text{sample size}.$
Pie-chart angle	$\text{category frequency} \div \text{total frequency} \times 360^\circ.$
Frequency from angle	$\text{sector angle} \div 360^\circ \times \text{total frequency}.$
Systematic interval	$\text{population size} \div \text{required sample size}.$
Representative sampling	Use a sampling frame and random selection; include groups in the correct proportions.
Questionnaire checklist	Neutral wording; one idea; suitable time frame; exhaustive, non-overlapping response boxes.
Diagram choice	Categories: bar/pie/pictogram. Time order: time series. Discrete numerical frequencies: vertical line chart.

Marking reminder: a correct setup can earn method marks even when a later arithmetic error occurs.



Averages, Spread and Comparing Distributions

FORMULAS AND METHOD BANK

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use these methods before checking the answer tables. Write the setup first, substitute values, calculate, then give a final answer with units.

When to use it	Formula / method
Mean	sum of values $\div$ number of values.
Frequency-table mean	$\Sigma fx \div \Sigma f$.
Median	Order data; take the middle value, or mean of the two middle values.
Range	maximum–minimum.
Interquartile range	upper quartile–lower quartile.
Combined mean	$(\text{mean}_1 \times \text{number}_1 + \text{mean}_2 \times \text{number}_2) \div \text{total number}$.
Comparison sentence	Compare a measure of centre and a measure of spread, both in context.
Grouped estimate	Use class midpoints; the result is an estimate.
Outliers	Check context; they strongly affect the mean and range.

Marking reminder: a correct setup can earn method marks even when a later arithmetic error occurs.



Scatter Graphs, Correlation and Interpretation

FORMULAS AND METHOD BANK

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use these methods before checking the answer tables. Write the setup first, substitute values, calculate, then give a final answer with units.

When to use it	Formula / method
Correlation	Positive: both tend to increase. Negative: one tends to decrease as the other increases. None: no clear trend.
Strength	Stronger correlation means points lie closer to the trend.
Best-fit line	Draw through the centre of the trend with roughly balanced points above/below; it need not pass through the origin.
Estimate	Read from the line, not by joining individual points.
Interpolation	Prediction inside the observed x-range; usually safer.
Extrapolation	Prediction outside the observed x-range; state the danger.
Causation warning	Correlation alone does not prove that one variable causes the other.
Outliers	Identify, check and discuss; do not remove without justification.
Good conclusion	State direction, strength, context, unusual points and limitations.

Marking reminder: a correct setup can earn method marks even when a later arithmetic error occurs.



Data Collection, Sampling and Presentation

CORE SKILLS • PART A - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
1	All pupils at the school.	1	B1: correct result or statement.
2	The 80 customers who replied.	1	B1: correct result or statement.
3	A study that collects data from every member of the population.	1	B1: correct result or statement.
4	It is usually quicker and cheaper.	1	B1: correct result or statement.
5	Discrete.	1	B1: correct result or statement.
6	Continuous.	1	B1: correct result or statement.
7	Primary.	1	B1: correct result or statement.
8	Secondary.	1	B1: correct result or statement.



Data Collection, Sampling and Presentation

CORE SKILLS • PART B - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: ____ / ____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
9	Number the names and use a random-number generator.	1	B1: correct result or statement.
10	The sample is not representative of the population.	1	B1: correct result or statement.
11	15–19, for example.	2	M1 method; A1 answer.
12	It is leading/biased.	2	M1 method; A1 answer.
13	4 pupils.	2	M1 method; A1 answer.
14	$18/60 \times 360^\circ = 108^\circ$.	2	M1 method; A1 answer.
15	$55 - 42 = 13$.	2	M1 method; A1 answer.



Data Collection, Sampling and Presentation

EXAM PRACTICE • PART A - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
1	Give each member a unique number, generate 30 different random numbers, and select the matching members.	3	M1 setup; M1 process; A1 conclusion.
2	Give each member a unique number, generate 40 different random numbers, and select the matching members.	3	M1 setup; M1 process; A1 conclusion.
3	Give each member a unique number, generate 45 different random numbers, and select the matching members.	3	M1 setup; M1 process; A1 conclusion.
4	Give each member a unique number, generate 60 different random numbers, and select the matching members.	3	M1 setup; M1 process; A1 conclusion.
5	Give each member a unique number, generate 80 different random numbers, and select the matching members.	3	M1 setup; M1 process; A1 conclusion.
6	$120/300 \times 50 = 20.$	2	M1 method; A1 answer.
7	$84/240 \times 40 = 14.$	2	M1 method; A1 answer.
8	$150/600 \times 72 = 18.$	2	M1 method; A1 answer.



Data Collection, Sampling and Presentation

EXAM PRACTICE • PART B - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
9	Opportunity/convenience sampling; early gym users may not represent all users.	3	M1 setup; M1 process; A1 conclusion.
10	$400 \div 40 = 10$; choose a random start from 1 to 10, then every 10th name.	3	M1 setup; M1 process; A1 conclusion.
11	Example: "How many hours do you exercise in a usual week?" with exhaustive, non-overlapping intervals.	3	M1 setup; M1 process; A1 conclusion.
12	Total=36; car angle= $15/36 \times 360^\circ = 150^\circ$.	3	M1 setup; M1 process; A1 conclusion.
13	It can exaggerate differences unless the break is made very clear.	2	M1 method; A1 answer.
14	A time-series line graph, because time order and trend matter.	2	M1 method; A1 answer.
15	A bar chart or pie chart; the data are categorical.	2	M1 method; A1 answer.



Data Collection, Sampling and Presentation

GRADE 4-5 CHALLENGE - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
1	Total=900. Year 1: $540/900 \times 75 = 45$; Year 2:30.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
2	Volunteers may have unusually strong views; people without internet/access at that time are excluded.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
3	Angle= $360 - 288 = 72^\circ$; frequency= $72/360 \times 80 = 16$.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
4	$3.5 \times 12 = 42$; without a key the symbols cannot be converted reliably.	3	M1 setup; M1 process; A1 conclusion.
5	Overall upward trend; a fall occurs from 35 to 31.	3	M1 setup; M1 process; A1 conclusion.
6	Groups overlap at 20 and 30; use 10-19, 20-29, 30-39, for example.	3	M1 setup; M1 process; A1 conclusion.
7	Not proportional stratified sampling; allocations should reflect each group's population share.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
8	Read the numerical scales/values, not visual bar heights alone; use a common scale if redrawing.	3	M1 setup; M1 process; A1 conclusion.
9	Look for an omitted category/non-response and re-add every frequency.	3	M1 setup; M1 process; A1 conclusion.
10	Use a sampling frame and proportional stratified random sample by year; ask a neutral categorical question.	5	M1 setup; M2-M4 development; A1 conclusion.



Data Collection, Sampling and Presentation

MIXED RETRIEVAL - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: ____ / ____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Marks	Check
1	$0.10 \times 800 = 80.$	1	B1: correct result or statement.
2	27.	1	B1: correct result or statement.
3	$25/100 \times 360^\circ = 90^\circ.$	2	M1 method; A1 answer.
4	Time-series line graph.	1	B1: correct result or statement.
5	So each response fits one clear category.	1	B1: correct result or statement.



Averages, Spread and Comparing Distributions

CORE SKILLS • PART A - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
1	Sum=30; mean= $30 \div 5 = 6$.	2	M1 method; A1 answer.
2	Sum=35; mean= $35 \div 5 = 7$.	2	M1 method; A1 answer.
3	Sum=75; mean= $75 \div 5 = 15$.	2	M1 method; A1 answer.
4	Sum=35; mean= $35 \div 5 = 7$.	2	M1 method; A1 answer.
5	Sum=115; mean= $115 \div 5 = 23$.	2	M1 method; A1 answer.
6	Median=5; mode=5.	2	M1 method; A1 answer.
7	Median=8; mode=8.	2	M1 method; A1 answer.
8	Median=15; mode=15.	2	M1 method; A1 answer.



Averages, Spread and Comparing Distributions

CORE SKILLS • PART B - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
9	Median=7; mode=2.	2	M1 method; A1 answer.
10	Median=21; mode=21.	2	M1 method; A1 answer.
11	$10-3=7$.	1	B1: correct result or statement.
12	$9-4=5$.	1	B1: correct result or statement.
13	$18-12=6$.	1	B1: correct result or statement.
14	$13-2=11$.	1	B1: correct result or statement.
15	$29-20=9$.	1	B1: correct result or statement.



Averages, Spread and Comparing Distributions

EXAM PRACTICE • PART A - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
1	$\Sigma fx = 17$, $\Sigma f = 10$; mean $= 17/10 = 1.7$.	3	M1 setup; M1 process; A1 conclusion.
2	$\Sigma fx = 40$, $\Sigma f = 10$; mean $= 40/10 = 4$.	3	M1 setup; M1 process; A1 conclusion.
3	$\Sigma fx = 12$, $\Sigma f = 10$; mean $= 12/10 = 1.2$.	3	M1 setup; M1 process; A1 conclusion.
4	$\Sigma fx = 55$, $\Sigma f = 6$; mean $= 55/6 = 9.16667$.	3	M1 setup; M1 process; A1 conclusion.
5	$\Sigma fx = 36$, $\Sigma f = 8$; mean $= 36/8 = 4.5$.	3	M1 setup; M1 process; A1 conclusion.
6	$6 \times 8 = 48$.	2	M1 method; A1 answer.
7	Required total $= 60$; fifth $= 60 - 43 = 17$.	3	M1 setup; M1 process; A1 conclusion.
8	The middle value is x , so $x = 8$.	2	M1 method; A1 answer.



Averages, Spread and Comparing Distributions

EXAM PRACTICE • PART B - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
9	$29 - 12 = 17$.	1	B1: correct result or statement.
10	Range = $30 - 4 = 26$; IQR = $22 - 9 = 13$.	2	M1 method; A1 answer.
11	42; it pulls/increases the mean.	3	M1 setup; M1 process; A1 conclusion.
12	B typically scores higher, but A is more consistent.	3	M1 setup; M1 process; A1 conclusion.
13	Extreme prices can distort the mean; median is resistant to outliers.	2	M1 method; A1 answer.
14	$20 < x \leq 30$.	1	B1: correct result or statement.
15	Each value is treated as the class midpoint; actual values are unknown.	2	M1 method; A1 answer.



Averages, Spread and Comparing Distributions

GRADE 4-5 CHALLENGE - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: ____ / ____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
1	Original total=112; new total=86 over 7 values; mean= $86/7 \approx 12.29$.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
2	$(12 \times 20 + 18 \times 30) / 50 = 780 / 50 = 15.6$.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
3	7, 7, 9, 12, 17: median=9, mode=7 and range= $17 - 7 = 10$.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
4	$x=19$; median=11 and mode=11.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
5	52 is the possible outlier. It increases the mean substantially, has little or no effect on the median, and increases the range.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
6	A has higher typical value and smaller middle spread; B has smaller total range, so conclusions about consistency depend on measure used.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
7	$\Sigma fx = 2 + 2k + 15 + 4 = 21 + 2k$; $\Sigma f = 8 + k$. $21 + 2k = 2.5(8 + k)$, so $k=2$.	5	M1 setup; M2-M4 development; A1 conclusion.
8	Their mean is 14, so their sum is 28.	3	M1 setup; M1 process; A1 conclusion.
9	Mean increases, median changes little or may stay the same, range increases.	3	M1 setup; M1 process; A1 conclusion.
10	Compare spread/sample sizes and consider outliers; a small mean difference may not be meaningful.	3	M1 setup; M1 process; A1 conclusion.



Averages, Spread and Comparing Distributions

MIXED RETRIEVAL - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: ____ / ____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Marks	Check
1	$(4+6+8)/3=6$.	1	B1: correct result or statement.
2	Order 3,5,7,9; median= $(5+7)/2=6$.	2	M1 method; A1 answer.
3	$19-12=7$.	1	B1: correct result or statement.
4	12.	1	B1: correct result or statement.
5	The mean.	1	B1: correct result or statement.



Scatter Graphs, Correlation and Interpretation

CORE SKILLS • PART A - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
1	Positive correlation.	1	B1: correct result or statement.
2	Negative correlation.	1	B1: correct result or statement.
3	No correlation.	1	B1: correct result or statement.
4	Points lie close to a trend line.	1	B1: correct result or statement.
5	No.	1	B1: correct result or statement.
6	A point far from the overall pattern.	1	B1: correct result or statement.
7	Estimating within the observed data range.	1	B1: correct result or statement.
8	Predicting outside the observed data range.	1	B1: correct result or statement.



Scatter Graphs, Correlation and Interpretation

CORE SKILLS • PART B - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
9	The relationship may not continue beyond the data.	1	B1: correct result or statement.
10	Follow the trend with roughly balanced points above and below.	1	B1: correct result or statement.
11	Students who revise more tend to score higher.	2	M1 method; A1 answer.
12	Older cars tend to have lower values.	2	M1 method; A1 answer.
13	Shoe size does not help predict exam mark.	2	M1 method; A1 answer.
14	Check for recording error or a genuine unusual case.	2	M1 method; A1 answer.
15	Temperature on one axis and ice-cream sales on the other, with units.	2	M1 method; A1 answer.



Scatter Graphs, Correlation and Interpretation

EXAM PRACTICE • PART A - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
1	$y = 5 \times 6 + 20 = 50.$	2	M1 method; A1 answer.
2	$y = 3 \times 12 + 18 = 54.$	2	M1 method; A1 answer.
3	$y = 4 \times 8 + 10 = 42.$	2	M1 method; A1 answer.
4	$y = 2 \times 15 + 30 = 60.$	2	M1 method; A1 answer.
5	$y = 1.5 \times 25 + 12 = 49.5.$	2	M1 method; A1 answer.
6	Interpolation.	1	B1: correct result or statement.
7	Extrapolation.	1	B1: correct result or statement.
8	The actual value is 4 below the prediction.	2	M1 method; A1 answer.



Scatter Graphs, Correlation and Interpretation

EXAM PRACTICE • PART B - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
9	Age may influence both; neither variable necessarily causes the other.	3	M1 setup; M1 process; A1 conclusion.
10	The small sample may not represent the population.	2	M1 method; A1 answer.
11	Move vertically from $x=10$ to the line, then horizontally to read y .	2	M1 method; A1 answer.
12	Only do so if context/the relationship justifies $y=0$ when $x=0$.	2	M1 method; A1 answer.
13	It may distort the line/correlation, especially with a small sample.	2	M1 method; A1 answer.
14	The relationship for the original population may not apply.	2	M1 method; A1 answer.
15	Higher rainfall is associated with more umbrella sales; rainfall plausibly influences demand.	2	M1 method; A1 answer.



Scatter Graphs, Correlation and Interpretation

GRADE 4-5 CHALLENGE - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: _____ / _____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
1	$y=59$; it is interpolation, so more defensible than extrapolation.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
2	This is far outside the range; linear trend may fail and marks have a maximum.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
3	Observational correlation cannot rule out confounders or reverse causation.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
4	A has strong negative correlation; B has weak positive correlation.	3	M1 setup; M1 process; A1 conclusion.
5	Best fit represents the overall trend, not one exceptional point.	3	M1 setup; M1 process; A1 conclusion.
6	$y=3x+5$; $y=23$. Since 6 is beyond observed x , extrapolation.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
7	Selective removal can create misleading correlation; exclusions need objective justification.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
8	The relationship is non-linear, so a straight line gives systematic errors.	3	M1 setup; M1 process; A1 conclusion.
9	Sample size, sampling method/population, data quality/range and outliers.	4	M1 setup; M1 development; A1 accuracy; A1 conclusion.
10	Measure both variables in consistent units for a representative sample, plot paired values, describe trend/outliers, and avoid claiming causation.	5	M1 setup; M2-M4 development; A1 conclusion.



Scatter Graphs, Correlation and Interpretation

MIXED RETRIEVAL - ANSWERS

FOUNDATION TIER • SHOW CLEAR WORKING • WRITE UNITS WHERE REQUIRED

Name: _____ Date: _____ Score: ____ / ____

Use the formula/method guides in the consolidated solutions section. Award method marks where the setup is correct.

Q	Answer / concise method	Mark s	Check
1	Positive.	1	B1: correct result or statement.
2	Interpolation.	1	B1: correct result or statement.
3	Extrapolation.	1	B1: correct result or statement.
4	No.	1	B1: correct result or statement.
5	The plotted points should be roughly balanced above and below.	1	B1: correct result or statement.