GCSE ONLINE TUTORING

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GCSE MATHEMATICS
HIGHER TIER

UNIT 6: STATISTICS

20 chapters | 240 curated questions | 4-6 marks

Student name: ______________________________

Contents and publication statement

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HIGHER TIER

UNIT 6 | CHAPTER 1

Populations, samples and bias

12 curated questions | complete solutions

Chapter focus

Populations, sampling frames, bias, reliability and valid inference

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

This chapter is independently authored and specification-mapped. It does not reproduce OCR questions, mark schemes, logos or proprietary layouts.

Chapter 1: Populations, samples and bias

Q01 | 4 MARKS

A school wants to estimate weekly exercise among all 1550 students. It surveys the first 70 students entering the sports centre on Monday. Identify the population and sample, explain two sources of bias, and propose a more representative design. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

A school wants to estimate weekly exercise among all 1700 students. It surveys the first 45 students entering the sports centre on Monday. Identify the population and sample, explain two sources of bias, and propose a more representative design. Your solution must justify the main method or assumption and include a final check.

Chapter 1: Populations, samples and bias

Q03 | 4 MARKS

A school wants to estimate weekly exercise among all 1850 students. It surveys the first 60 students entering the sports centre on Monday. Identify the population and sample, explain two sources of bias, and propose a more representative design. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

A school wants to estimate weekly exercise among all 2000 students. It surveys the first 35 students entering the sports centre on Monday. Identify the population and sample, explain two sources of bias, and propose a more representative design. Your solution must justify the main method or assumption and include a final check.

Chapter 1: Populations, samples and bias

Q05 | 4 MARKS

A school wants to estimate weekly exercise among all 2150 students. It surveys the first 50 students entering the sports centre on Monday. Identify the population and sample, explain two sources of bias, and propose a more representative design. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

A school wants to estimate weekly exercise among all 2300 students. It surveys the first 65 students entering the sports centre on Monday. Identify the population and sample, explain two sources of bias, and propose a more representative design. Your solution must justify the main method or assumption and include a final check.

Chapter 1: Populations, samples and bias

Q07 | 4 MARKS

A school wants to estimate weekly exercise among all 2450 students. It surveys the first 40 students entering the sports centre on Monday. Identify the population and sample, explain two sources of bias, and propose a more representative design. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

A school wants to estimate weekly exercise among all 2600 students. It surveys the first 55 students entering the sports centre on Monday. Identify the population and sample, explain two sources of bias, and propose a more representative design. Your solution must justify the main method or assumption and include a final check.

Chapter 1: Populations, samples and bias

Q09 | 4 MARKS

A school wants to estimate weekly exercise among all 2750 students. It surveys the first 70 students entering the sports centre on Monday. Identify the population and sample, explain two sources of bias, and propose a more representative design. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

A school wants to estimate weekly exercise among all 2900 students. It surveys the first 45 students entering the sports centre on Monday. Identify the population and sample, explain two sources of bias, and propose a more representative design. Your solution must justify the main method or assumption and include a final check.

Chapter 1: Populations, samples and bias

Q11 | 5 MARKS

You must show your working.
A school wants to estimate weekly exercise among all 2950 students. It surveys the first 50 students entering the sports centre on Monday. Identify the population and sample, explain two sources of bias, and propose a more representative design. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
A school wants to estimate weekly exercise among all 3000 students. It surveys the first 55 students entering the sports centre on Monday. Identify the population and sample, explain two sources of bias, and propose a more representative design. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

The population is all 1550 students; the sample is the 70 early sports-centre entrants. It over-represents students who use sport facilities and those present at that time. Use an up-to-date whole-school sampling frame and select randomly, or stratify by relevant year groups, following up non-response. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

The population is all 1700 students; the sample is the 45 early sports-centre entrants. It over-represents students who use sport facilities and those present at that time. Use an up-to-date whole-school sampling frame and select randomly, or stratify by relevant year groups, following up non-response. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

The population is all 1850 students; the sample is the 60 early sports-centre entrants. It over-represents students who use sport facilities and those present at that time. Use an up-to-date whole-school sampling frame and select randomly, or stratify by relevant year groups, following up non-response. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

The population is all 2000 students; the sample is the 35 early sports-centre entrants. It over-represents students who use sport facilities and those present at that time. Use an up-to-date whole-school sampling frame and select randomly, or stratify by relevant year groups, following up non-response. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

The population is all 2150 students; the sample is the 50 early sports-centre entrants. It over-represents students who use sport facilities and those present at that time. Use an up-to-date whole-school sampling frame and select randomly, or stratify by relevant year groups, following up non-response. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

The population is all 2300 students; the sample is the 65 early sports-centre entrants. It over-represents students who use sport facilities and those present at that time. Use an up-to-date whole-school sampling frame and select randomly, or stratify by relevant year groups, following up non-response. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

The population is all 2450 students; the sample is the 40 early sports-centre entrants. It over-represents students who use sport facilities and those present at that time. Use an up-to-date whole-school sampling frame and select randomly, or stratify by relevant year groups, following up non-response. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

The population is all 2600 students; the sample is the 55 early sports-centre entrants. It over-represents students who use sport facilities and those present at that time. Use an up-to-date whole-school sampling frame and select randomly, or stratify by relevant year groups, following up non-response. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

The population is all 2750 students; the sample is the 70 early sports-centre entrants. It over-represents students who use sport facilities and those present at that time. Use an up-to-date whole-school sampling frame and select randomly, or stratify by relevant year groups, following up non-response. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

The population is all 2900 students; the sample is the 45 early sports-centre entrants. It over-represents students who use sport facilities and those present at that time. Use an up-to-date whole-school sampling frame and select randomly, or stratify by relevant year groups, following up non-response. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

The population is all 2950 students; the sample is the 50 early sports-centre entrants. It over-represents students who use sport facilities and those present at that time. Use an up-to-date whole-school sampling frame and select randomly, or stratify by relevant year groups, following up non-response. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

The population is all 3000 students; the sample is the 55 early sports-centre entrants. It over-represents students who use sport facilities and those present at that time. Use an up-to-date whole-school sampling frame and select randomly, or stratify by relevant year groups, following up non-response. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 2

Random, systematic and stratified sampling

12 curated questions | complete solutions

Chapter focus

Reproducible sampling methods and proportional allocation

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

Chapter 2: Random, systematic and stratified sampling

Q01 | 4 MARKS

A population has three strata of sizes 135, 180 and 225. Design a stratified sample of 60, showing proportional allocations that total exactly 60. Also state how a systematic sample of about 60 could be selected from a list of 540 people. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

A population has three strata of sizes 138, 186 and 234. Design a stratified sample of 47, showing proportional allocations that total exactly 47. Also state how a systematic sample of about 47 could be selected from a list of 558 people. Your solution must justify the main method or assumption and include a final check.

Chapter 2: Random, systematic and stratified sampling

Q03 | 4 MARKS

A population has three strata of sizes 141, 192 and 243. Design a stratified sample of 50, showing proportional allocations that total exactly 50. Also state how a systematic sample of about 50 could be selected from a list of 576 people. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

A population has three strata of sizes 144, 198 and 252. Design a stratified sample of 53, showing proportional allocations that total exactly 53. Also state how a systematic sample of about 53 could be selected from a list of 594 people. Your solution must justify the main method or assumption and include a final check.

Chapter 2: Random, systematic and stratified sampling

Q05 | 4 MARKS

A population has three strata of sizes 147, 204 and 261. Design a stratified sample of 56, showing proportional allocations that total exactly 56. Also state how a systematic sample of about 56 could be selected from a list of 612 people. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

A population has three strata of sizes 150, 210 and 270. Design a stratified sample of 59, showing proportional allocations that total exactly 59. Also state how a systematic sample of about 59 could be selected from a list of 630 people. Your solution must justify the main method or assumption and include a final check.

Chapter 2: Random, systematic and stratified sampling

Q07 | 4 MARKS

A population has three strata of sizes 153, 216 and 279. Design a stratified sample of 46, showing proportional allocations that total exactly 46. Also state how a systematic sample of about 46 could be selected from a list of 648 people. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

A population has three strata of sizes 156, 222 and 288. Design a stratified sample of 49, showing proportional allocations that total exactly 49. Also state how a systematic sample of about 49 could be selected from a list of 666 people. Your solution must justify the main method or assumption and include a final check.

Chapter 2: Random, systematic and stratified sampling

Q09 | 4 MARKS

A population has three strata of sizes 159, 228 and 297. Design a stratified sample of 52, showing proportional allocations that total exactly 52. Also state how a systematic sample of about 52 could be selected from a list of 684 people. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

A population has three strata of sizes 162, 234 and 306. Design a stratified sample of 55, showing proportional allocations that total exactly 55. Also state how a systematic sample of about 55 could be selected from a list of 702 people. Your solution must justify the main method or assumption and include a final check.

Chapter 2: Random, systematic and stratified sampling

Q11 | 5 MARKS

You must show your working.
A population has three strata of sizes 163, 236 and 309. Design a stratified sample of 56, showing proportional allocations that total exactly 56. Also state how a systematic sample of about 56 could be selected from a list of 708 people. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
A population has three strata of sizes 164, 238 and 312. Design a stratified sample of 57, showing proportional allocations that total exactly 57. Also state how a systematic sample of about 57 could be selected from a list of 714 people. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Use stratum size/total x 60. Raw allocations are 15.00, 20.00, 25.00; a largest-remainder allocation is 15, 20, 25, total 60. For systematic sampling use interval about 540/60=9.00, choose a random start in the first interval, then take approximately every 9th name. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Use stratum size/total x 47. Raw allocations are 11.62, 15.67, 19.71; a largest-remainder allocation is 11, 16, 20, total 47. For systematic sampling use interval about 558/47=11.87, choose a random start in the first interval, then take approximately every 11th name. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Use stratum size/total x 50. Raw allocations are 12.24, 16.67, 21.09; a largest-remainder allocation is 12, 17, 21, total 50. For systematic sampling use interval about 576/50=11.52, choose a random start in the first interval, then take approximately every 11th name. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Use stratum size/total x 53. Raw allocations are 12.85, 17.67, 22.48; a largest-remainder allocation is 13, 18, 22, total 53. For systematic sampling use interval about 594/53=11.21, choose a random start in the first interval, then take approximately every 11th name. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Use stratum size/total x 56. Raw allocations are 13.45, 18.67, 23.88; a largest-remainder allocation is 13, 19, 24, total 56. For systematic sampling use interval about 612/56=10.93, choose a random start in the first interval, then take approximately every 10th name. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Use stratum size/total x 59. Raw allocations are 14.05, 19.67, 25.29; a largest-remainder allocation is 14, 20, 25, total 59. For systematic sampling use interval about 630/59=10.68, choose a random start in the first interval, then take approximately every 10th name. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Use stratum size/total x 46. Raw allocations are 10.86, 15.33, 19.81; a largest-remainder allocation is 11, 15, 20, total 46. For systematic sampling use interval about 648/46=14.09, choose a random start in the first interval, then take approximately every 14th name. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Use stratum size/total x 49. Raw allocations are 11.48, 16.33, 21.19; a largest-remainder allocation is 12, 16, 21, total 49. For systematic sampling use interval about 666/49=13.59, choose a random start in the first interval, then take approximately every 13th name. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Use stratum size/total x 52. Raw allocations are 12.09, 17.33, 22.58; a largest-remainder allocation is 12, 17, 23, total 52. For systematic sampling use interval about 684/52=13.15, choose a random start in the first interval, then take approximately every 13th name. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Use stratum size/total x 55. Raw allocations are 12.69, 18.33, 23.97; a largest-remainder allocation is 13, 18, 24, total 55. For systematic sampling use interval about 702/55=12.76, choose a random start in the first interval, then take approximately every 12th name. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Use stratum size/total x 56. Raw allocations are 12.89, 18.67, 24.44; a largest-remainder allocation is 13, 19, 24, total 56. For systematic sampling use interval about 708/56=12.64, choose a random start in the first interval, then take approximately every 12th name. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Use stratum size/total x 57. Raw allocations are 13.09, 19.00, 24.91; a largest-remainder allocation is 13, 19, 25, total 57. For systematic sampling use interval about 714/57=12.53, choose a random start in the first interval, then take approximately every 12th name. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 3

Data types and measurement

12 curated questions | complete solutions

Chapter focus

Categorical, discrete and continuous data, accuracy and class boundaries

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

Chapter 3: Data types and measurement

Q01 | 4 MARKS

A table groups measured masses using 20 < m <= 25 kg, recorded to the nearest kilogram. State whether mass is discrete or continuous, give the true boundary interval for values recorded from 21 to 25, and explain why class boundaries matter in a histogram. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

A table groups measured masses using 23 < m <= 28 kg, recorded to the nearest kilogram. State whether mass is discrete or continuous, give the true boundary interval for values recorded from 24 to 28, and explain why class boundaries matter in a histogram. Your solution must justify the main method or assumption and include a final check.

Chapter 3: Data types and measurement

Q03 | 4 MARKS

A table groups measured masses using 26 < m <= 31 kg, recorded to the nearest kilogram. State whether mass is discrete or continuous, give the true boundary interval for values recorded from 27 to 31, and explain why class boundaries matter in a histogram. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

A table groups measured masses using 29 < m <= 34 kg, recorded to the nearest kilogram. State whether mass is discrete or continuous, give the true boundary interval for values recorded from 30 to 34, and explain why class boundaries matter in a histogram. Your solution must justify the main method or assumption and include a final check.

Chapter 3: Data types and measurement

Q05 | 4 MARKS

A table groups measured masses using 32 < m <= 37 kg, recorded to the nearest kilogram. State whether mass is discrete or continuous, give the true boundary interval for values recorded from 33 to 37, and explain why class boundaries matter in a histogram. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

A table groups measured masses using 20 < m <= 25 kg, recorded to the nearest kilogram. State whether mass is discrete or continuous, give the true boundary interval for values recorded from 21 to 25, and explain why class boundaries matter in a histogram. Your solution must justify the main method or assumption and include a final check. After completing the calculation, give one independent check that supports your result.

Chapter 3: Data types and measurement

Q07 | 4 MARKS

A table groups measured masses using 23 < m <= 28 kg, recorded to the nearest kilogram. State whether mass is discrete or continuous, give the true boundary interval for values recorded from 24 to 28, and explain why class boundaries matter in a histogram. Your solution must justify the main method or assumption and include a final check. After completing the calculation, give one independent check that supports your result.

Q08 | 4 MARKS

A table groups measured masses using 26 < m <= 31 kg, recorded to the nearest kilogram. State whether mass is discrete or continuous, give the true boundary interval for values recorded from 27 to 31, and explain why class boundaries matter in a histogram. Your solution must justify the main method or assumption and include a final check. After completing the calculation, give one independent check that supports your result.

Chapter 3: Data types and measurement

Q09 | 4 MARKS

A table groups measured masses using 29 < m <= 34 kg, recorded to the nearest kilogram. State whether mass is discrete or continuous, give the true boundary interval for values recorded from 30 to 34, and explain why class boundaries matter in a histogram. Your solution must justify the main method or assumption and include a final check. After completing the calculation, give one independent check that supports your result.

Q10 | 4 MARKS

A table groups measured masses using 32 < m <= 37 kg, recorded to the nearest kilogram. State whether mass is discrete or continuous, give the true boundary interval for values recorded from 33 to 37, and explain why class boundaries matter in a histogram. Your solution must justify the main method or assumption and include a final check. After completing the calculation, give one independent check that supports your result.

Chapter 3: Data types and measurement

Q11 | 5 MARKS

You must show your working.
A table groups measured masses using 33 < m <= 38 kg, recorded to the nearest kilogram. State whether mass is discrete or continuous, give the true boundary interval for values recorded from 34 to 38, and explain why class boundaries matter in a histogram. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
A table groups measured masses using 34 < m <= 39 kg, recorded to the nearest kilogram. State whether mass is discrete or continuous, give the true boundary interval for values recorded from 35 to 39, and explain why class boundaries matter in a histogram. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Mass is continuous. Values recorded as 21 through 25 kg have true boundaries 20.5 <= m < 25.5. Histograms use continuous widths and areas, so gaps or overlaps caused by using category labels instead of boundaries distort frequency density. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Mass is continuous. Values recorded as 24 through 28 kg have true boundaries 23.5 <= m < 28.5. Histograms use continuous widths and areas, so gaps or overlaps caused by using category labels instead of boundaries distort frequency density. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Mass is continuous. Values recorded as 27 through 31 kg have true boundaries 26.5 <= m < 31.5. Histograms use continuous widths and areas, so gaps or overlaps caused by using category labels instead of boundaries distort frequency density. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Mass is continuous. Values recorded as 30 through 34 kg have true boundaries 29.5 <= m < 34.5. Histograms use continuous widths and areas, so gaps or overlaps caused by using category labels instead of boundaries distort frequency density. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Mass is continuous. Values recorded as 33 through 37 kg have true boundaries 32.5 <= m < 37.5. Histograms use continuous widths and areas, so gaps or overlaps caused by using category labels instead of boundaries distort frequency density. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Mass is continuous. Values recorded as 21 through 25 kg have true boundaries 20.5 <= m < 25.5. Histograms use continuous widths and areas, so gaps or overlaps caused by using category labels instead of boundaries distort frequency density. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. A valid independent check uses substitution, an inverse operation, estimation, or the defining property as appropriate.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Mass is continuous. Values recorded as 24 through 28 kg have true boundaries 23.5 <= m < 28.5. Histograms use continuous widths and areas, so gaps or overlaps caused by using category labels instead of boundaries distort frequency density. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. A valid independent check uses substitution, an inverse operation, estimation, or the defining property as appropriate.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Mass is continuous. Values recorded as 27 through 31 kg have true boundaries 26.5 <= m < 31.5. Histograms use continuous widths and areas, so gaps or overlaps caused by using category labels instead of boundaries distort frequency density. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. A valid independent check uses substitution, an inverse operation, estimation, or the defining property as appropriate.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Mass is continuous. Values recorded as 30 through 34 kg have true boundaries 29.5 <= m < 34.5. Histograms use continuous widths and areas, so gaps or overlaps caused by using category labels instead of boundaries distort frequency density. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. A valid independent check uses substitution, an inverse operation, estimation, or the defining property as appropriate.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Mass is continuous. Values recorded as 33 through 37 kg have true boundaries 32.5 <= m < 37.5. Histograms use continuous widths and areas, so gaps or overlaps caused by using category labels instead of boundaries distort frequency density. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. A valid independent check uses substitution, an inverse operation, estimation, or the defining property as appropriate.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Mass is continuous. Values recorded as 34 through 38 kg have true boundaries 33.5 <= m < 38.5. Histograms use continuous widths and areas, so gaps or overlaps caused by using category labels instead of boundaries distort frequency density. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Mass is continuous. Values recorded as 35 through 39 kg have true boundaries 34.5 <= m < 39.5. Histograms use continuous widths and areas, so gaps or overlaps caused by using category labels instead of boundaries distort frequency density. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

Question	Score / marks	Repair target	Retest date
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HIGHER TIER

UNIT 6 | CHAPTER 4

Questionnaires and data collection

12 curated questions | complete solutions

Chapter focus

Neutral questions, response design, pilots and non-response

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

This chapter is independently authored and specification-mapped. It does not reproduce OCR questions, mark schemes, logos or proprietary layouts.

Chapter 4: Questionnaires and data collection

Q01 | 4 MARKS

A questionnaire asks: “Surely responsible students exercise at least 5 hours each week?” with response boxes 0-1, 1-3 and over 4 hours. Diagnose three design faults, rewrite the question neutrally, and propose non-overlapping exhaustive response intervals. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

A questionnaire asks: “Surely responsible students exercise at least 2 hours each week?” with response boxes 0-1, 1-3 and over 4 hours. Diagnose three design faults, rewrite the question neutrally, and propose non-overlapping exhaustive response intervals. Your solution must justify the main method or assumption and include a final check.

Chapter 4: Questionnaires and data collection

Q03 | 4 MARKS

A questionnaire asks: “Surely responsible students exercise at least 5 hours each week?” with response boxes 0-1, 1-3 and over 4 hours. Diagnose three design faults, rewrite the question neutrally, and propose non-overlapping exhaustive response intervals. Your solution must justify the main method or assumption and include a final check. After completing the calculation, give one independent check that supports your result.

Q04 | 4 MARKS

A questionnaire asks: “Surely responsible students exercise at least 2 hours each week?” with response boxes 0-1, 1-3 and over 4 hours. Diagnose three design faults, rewrite the question neutrally, and propose non-overlapping exhaustive response intervals. Your solution must justify the main method or assumption and include a final check. After completing the calculation, give one independent check that supports your result.

Chapter 4: Questionnaires and data collection

Q05 | 4 MARKS

A questionnaire asks: “Surely responsible students exercise at least 5 hours each week?” with response boxes 0-1, 1-3 and over 4 hours. Diagnose three design faults, rewrite the question neutrally, and propose non-overlapping exhaustive response intervals. Your solution must justify the main method or assumption and include a final check. Identify the key condition you used and explain why it applies here.

Q06 | 4 MARKS

A questionnaire asks: “Surely responsible students exercise at least 2 hours each week?” with response boxes 0-1, 1-3 and over 4 hours. Diagnose three design faults, rewrite the question neutrally, and propose non-overlapping exhaustive response intervals. Your solution must justify the main method or assumption and include a final check. Identify the key condition you used and explain why it applies here.

Chapter 4: Questionnaires and data collection

Q07 | 4 MARKS

A questionnaire asks: “Surely responsible students exercise at least 5 hours each week?” with response boxes 0-1, 1-3 and over 4 hours. Diagnose three design faults, rewrite the question neutrally, and propose non-overlapping exhaustive response intervals. Your solution must justify the main method or assumption and include a final check. Write one sentence interpreting your answer in the context of the question.

Q08 | 4 MARKS

A questionnaire asks: “Surely responsible students exercise at least 2 hours each week?” with response boxes 0-1, 1-3 and over 4 hours. Diagnose three design faults, rewrite the question neutrally, and propose non-overlapping exhaustive response intervals. Your solution must justify the main method or assumption and include a final check. Write one sentence interpreting your answer in the context of the question.

Chapter 4: Questionnaires and data collection

Q09 | 4 MARKS

A questionnaire asks: “Surely responsible students exercise at least 5 hours each week?” with response boxes 0-1, 1-3 and over 4 hours. Diagnose three design faults, rewrite the question neutrally, and propose non-overlapping exhaustive response intervals. Your solution must justify the main method or assumption and include a final check. Describe one common error in this calculation and how your working avoids it.

Q10 | 4 MARKS

A questionnaire asks: “Surely responsible students exercise at least 2 hours each week?” with response boxes 0-1, 1-3 and over 4 hours. Diagnose three design faults, rewrite the question neutrally, and propose non-overlapping exhaustive response intervals. Your solution must justify the main method or assumption and include a final check. Describe one common error in this calculation and how your working avoids it.

Chapter 4: Questionnaires and data collection

Q11 | 5 MARKS

You must show your working.
A questionnaire asks: “Surely responsible students exercise at least 3 hours each week?” with response boxes 0-1, 1-3 and over 4 hours. Diagnose three design faults, rewrite the question neutrally, and propose non-overlapping exhaustive response intervals. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
A questionnaire asks: “Surely responsible students exercise at least 4 hours each week?” with response boxes 0-1, 1-3 and over 4 hours. Diagnose three design faults, rewrite the question neutrally, and propose non-overlapping exhaustive response intervals. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Faults include leading wording, ambiguous overlap/gap around 1, 3 and 4 hours, and no stated time reference beyond an imprecise “week”. A neutral version is: During the last seven days, how many hours of exercise did you complete? Valid boxes include 0<=h<1, 1<=h<3, 3<=h<5, h>=5. Pilot the question before the main survey. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Faults include leading wording, ambiguous overlap/gap around 1, 3 and 4 hours, and no stated time reference beyond an imprecise “week”. A neutral version is: During the last seven days, how many hours of exercise did you complete? Valid boxes include 0<=h<1, 1<=h<3, 3<=h<5, h>=5. Pilot the question before the main survey. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Faults include leading wording, ambiguous overlap/gap around 1, 3 and 4 hours, and no stated time reference beyond an imprecise “week”. A neutral version is: During the last seven days, how many hours of exercise did you complete? Valid boxes include 0<=h<1, 1<=h<3, 3<=h<5, h>=5. Pilot the question before the main survey. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. A valid independent check uses substitution, an inverse operation, estimation, or the defining property as appropriate.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Faults include leading wording, ambiguous overlap/gap around 1, 3 and 4 hours, and no stated time reference beyond an imprecise “week”. A neutral version is: During the last seven days, how many hours of exercise did you complete? Valid boxes include 0<=h<1, 1<=h<3, 3<=h<5, h>=5. Pilot the question before the main survey. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. A valid independent check uses substitution, an inverse operation, estimation, or the defining property as appropriate.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Faults include leading wording, ambiguous overlap/gap around 1, 3 and 4 hours, and no stated time reference beyond an imprecise “week”. A neutral version is: During the last seven days, how many hours of exercise did you complete? Valid boxes include 0<=h<1, 1<=h<3, 3<=h<5, h>=5. Pilot the question before the main survey. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. The explanation must name the relevant condition and link it explicitly to the method used.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Faults include leading wording, ambiguous overlap/gap around 1, 3 and 4 hours, and no stated time reference beyond an imprecise “week”. A neutral version is: During the last seven days, how many hours of exercise did you complete? Valid boxes include 0<=h<1, 1<=h<3, 3<=h<5, h>=5. Pilot the question before the main survey. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. The explanation must name the relevant condition and link it explicitly to the method used.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Faults include leading wording, ambiguous overlap/gap around 1, 3 and 4 hours, and no stated time reference beyond an imprecise “week”. A neutral version is: During the last seven days, how many hours of exercise did you complete? Valid boxes include 0<=h<1, 1<=h<3, 3<=h<5, h>=5. Pilot the question before the main survey. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. The interpretation should include the correct units or geometric/statistical meaning where applicable.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Faults include leading wording, ambiguous overlap/gap around 1, 3 and 4 hours, and no stated time reference beyond an imprecise “week”. A neutral version is: During the last seven days, how many hours of exercise did you complete? Valid boxes include 0<=h<1, 1<=h<3, 3<=h<5, h>=5. Pilot the question before the main survey. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. The interpretation should include the correct units or geometric/statistical meaning where applicable.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Faults include leading wording, ambiguous overlap/gap around 1, 3 and 4 hours, and no stated time reference beyond an imprecise “week”. A neutral version is: During the last seven days, how many hours of exercise did you complete? Valid boxes include 0<=h<1, 1<=h<3, 3<=h<5, h>=5. Pilot the question before the main survey. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. A valid response identifies a plausible error and points to the step that prevents it.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Faults include leading wording, ambiguous overlap/gap around 1, 3 and 4 hours, and no stated time reference beyond an imprecise “week”. A neutral version is: During the last seven days, how many hours of exercise did you complete? Valid boxes include 0<=h<1, 1<=h<3, 3<=h<5, h>=5. Pilot the question before the main survey. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. A valid response identifies a plausible error and points to the step that prevents it.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Faults include leading wording, ambiguous overlap/gap around 1, 3 and 4 hours, and no stated time reference beyond an imprecise “week”. A neutral version is: During the last seven days, how many hours of exercise did you complete? Valid boxes include 0<=h<1, 1<=h<3, 3<=h<5, h>=5. Pilot the question before the main survey. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Faults include leading wording, ambiguous overlap/gap around 1, 3 and 4 hours, and no stated time reference beyond an imprecise “week”. A neutral version is: During the last seven days, how many hours of exercise did you complete? Valid boxes include 0<=h<1, 1<=h<3, 3<=h<5, h>=5. Pilot the question before the main survey. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 5

Frequency tables and grouped data

12 curated questions | complete solutions

Chapter focus

Tallying, class intervals, boundaries and cumulative totals

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

Chapter 5: Frequency tables and grouped data

Q01 | 4 MARKS

A grouped table has consecutive class widths [5, 5, 10, 20] and frequencies [8, 8, 15, 10]. Calculate every cumulative frequency, identify the modal class, and explain why the class with greatest frequency need not have the tallest histogram bar. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

A grouped table has consecutive class widths [5, 5, 10, 20] and frequencies [7, 9, 17, 7]. Calculate every cumulative frequency, identify the modal class, and explain why the class with greatest frequency need not have the tallest histogram bar. Your solution must justify the main method or assumption and include a final check.

Chapter 5: Frequency tables and grouped data

Q03 | 4 MARKS

A grouped table has consecutive class widths [5, 5, 10, 20] and frequencies [6, 10, 12, 10]. Calculate every cumulative frequency, identify the modal class, and explain why the class with greatest frequency need not have the tallest histogram bar. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

A grouped table has consecutive class widths [5, 5, 10, 20] and frequencies [5, 11, 14, 7]. Calculate every cumulative frequency, identify the modal class, and explain why the class with greatest frequency need not have the tallest histogram bar. Your solution must justify the main method or assumption and include a final check.

Chapter 5: Frequency tables and grouped data

Q05 | 4 MARKS

A grouped table has consecutive class widths [5, 5, 10, 20] and frequencies [8, 12, 16, 10]. Calculate every cumulative frequency, identify the modal class, and explain why the class with greatest frequency need not have the tallest histogram bar. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

A grouped table has consecutive class widths [5, 5, 10, 20] and frequencies [7, 8, 18, 7]. Calculate every cumulative frequency, identify the modal class, and explain why the class with greatest frequency need not have the tallest histogram bar. Your solution must justify the main method or assumption and include a final check.

Chapter 5: Frequency tables and grouped data

Q07 | 4 MARKS

A grouped table has consecutive class widths [5, 5, 10, 20] and frequencies [6, 9, 13, 10]. Calculate every cumulative frequency, identify the modal class, and explain why the class with greatest frequency need not have the tallest histogram bar. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

A grouped table has consecutive class widths [5, 5, 10, 20] and frequencies [5, 10, 15, 7]. Calculate every cumulative frequency, identify the modal class, and explain why the class with greatest frequency need not have the tallest histogram bar. Your solution must justify the main method or assumption and include a final check.

Chapter 5: Frequency tables and grouped data

Q09 | 4 MARKS

A grouped table has consecutive class widths [5, 5, 10, 20] and frequencies [8, 11, 17, 10]. Calculate every cumulative frequency, identify the modal class, and explain why the class with greatest frequency need not have the tallest histogram bar. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

A grouped table has consecutive class widths [5, 5, 10, 20] and frequencies [7, 12, 12, 7]. Calculate every cumulative frequency, identify the modal class, and explain why the class with greatest frequency need not have the tallest histogram bar. Your solution must justify the main method or assumption and include a final check.

Chapter 5: Frequency tables and grouped data

Q11 | 5 MARKS

You must show your working.
A grouped table has consecutive class widths [5, 5, 10, 20] and frequencies [8, 9, 15, 8]. Calculate every cumulative frequency, identify the modal class, and explain why the class with greatest frequency need not have the tallest histogram bar. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
A grouped table has consecutive class widths [5, 5, 10, 20] and frequencies [5, 11, 18, 9]. Calculate every cumulative frequency, identify the modal class, and explain why the class with greatest frequency need not have the tallest histogram bar. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Cumulative frequencies are [8, 16, 31, 41]. The greatest raw frequency is 15, so the modal class by table frequency is class 3. Histogram height is frequency density f/width; densities are ['8/5', '8/5', '3/2', '1/2'], so unequal widths can change which bar is tallest. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Cumulative frequencies are [7, 16, 33, 40]. The greatest raw frequency is 17, so the modal class by table frequency is class 3. Histogram height is frequency density f/width; densities are ['7/5', '9/5', '17/10', '7/20'], so unequal widths can change which bar is tallest. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Cumulative frequencies are [6, 16, 28, 38]. The greatest raw frequency is 12, so the modal class by table frequency is class 3. Histogram height is frequency density f/width; densities are ['6/5', '2', '6/5', '1/2'], so unequal widths can change which bar is tallest. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Cumulative frequencies are [5, 16, 30, 37]. The greatest raw frequency is 14, so the modal class by table frequency is class 3. Histogram height is frequency density f/width; densities are ['1', '11/5', '7/5', '7/20'], so unequal widths can change which bar is tallest. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Cumulative frequencies are [8, 20, 36, 46]. The greatest raw frequency is 16, so the modal class by table frequency is class 3. Histogram height is frequency density f/width; densities are ['8/5', '12/5', '8/5', '1/2'], so unequal widths can change which bar is tallest. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Cumulative frequencies are [7, 15, 33, 40]. The greatest raw frequency is 18, so the modal class by table frequency is class 3. Histogram height is frequency density f/width; densities are ['7/5', '8/5', '9/5', '7/20'], so unequal widths can change which bar is tallest. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Cumulative frequencies are [6, 15, 28, 38]. The greatest raw frequency is 13, so the modal class by table frequency is class 3. Histogram height is frequency density f/width; densities are ['6/5', '9/5', '13/10', '1/2'], so unequal widths can change which bar is tallest. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Cumulative frequencies are [5, 15, 30, 37]. The greatest raw frequency is 15, so the modal class by table frequency is class 3. Histogram height is frequency density f/width; densities are ['1', '2', '3/2', '7/20'], so unequal widths can change which bar is tallest. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Cumulative frequencies are [8, 19, 36, 46]. The greatest raw frequency is 17, so the modal class by table frequency is class 3. Histogram height is frequency density f/width; densities are ['8/5', '11/5', '17/10', '1/2'], so unequal widths can change which bar is tallest. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Cumulative frequencies are [7, 19, 31, 38]. The greatest raw frequency is 12, so the modal class by table frequency is class 2. Histogram height is frequency density f/width; densities are ['7/5', '12/5', '6/5', '7/20'], so unequal widths can change which bar is tallest. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Cumulative frequencies are [8, 17, 32, 40]. The greatest raw frequency is 15, so the modal class by table frequency is class 3. Histogram height is frequency density f/width; densities are ['8/5', '9/5', '3/2', '2/5'], so unequal widths can change which bar is tallest. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Cumulative frequencies are [5, 16, 34, 43]. The greatest raw frequency is 18, so the modal class by table frequency is class 3. Histogram height is frequency density f/width; densities are ['1', '11/5', '9/5', '9/20'], so unequal widths can change which bar is tallest. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 6

Two-way tables

12 curated questions | complete solutions

Chapter focus

Marginal totals, missing frequencies, proportions and association

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

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Chapter 6: Two-way tables

Q01 | 4 MARKS

In a two-way table of 330 people, 85 have attribute A, 110 have attribute B and 15 have both. Complete all four interior cells and marginal totals. Compare the proportion with B among A with the proportion with B among not A, and comment on association. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

In a two-way table of 360 people, 88 have attribute A, 116 have attribute B and 15 have both. Complete all four interior cells and marginal totals. Compare the proportion with B among A with the proportion with B among not A, and comment on association. Your solution must justify the main method or assumption and include a final check.

Chapter 6: Two-way tables

Q03 | 4 MARKS

In a two-way table of 390 people, 91 have attribute A, 122 have attribute B and 15 have both. Complete all four interior cells and marginal totals. Compare the proportion with B among A with the proportion with B among not A, and comment on association. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

In a two-way table of 420 people, 94 have attribute A, 83 have attribute B and 15 have both. Complete all four interior cells and marginal totals. Compare the proportion with B among A with the proportion with B among not A, and comment on association. Your solution must justify the main method or assumption and include a final check.

Chapter 6: Two-way tables

Q05 | 4 MARKS

In a two-way table of 450 people, 97 have attribute A, 89 have attribute B and 15 have both. Complete all four interior cells and marginal totals. Compare the proportion with B among A with the proportion with B among not A, and comment on association. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

In a two-way table of 480 people, 100 have attribute A, 95 have attribute B and 15 have both. Complete all four interior cells and marginal totals. Compare the proportion with B among A with the proportion with B among not A, and comment on association. Your solution must justify the main method or assumption and include a final check.

Chapter 6: Two-way tables

Q07 | 4 MARKS

In a two-way table of 510 people, 103 have attribute A, 101 have attribute B and 15 have both. Complete all four interior cells and marginal totals. Compare the proportion with B among A with the proportion with B among not A, and comment on association. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

In a two-way table of 540 people, 106 have attribute A, 107 have attribute B and 15 have both. Complete all four interior cells and marginal totals. Compare the proportion with B among A with the proportion with B among not A, and comment on association. Your solution must justify the main method or assumption and include a final check.

Chapter 6: Two-way tables

Q09 | 4 MARKS

In a two-way table of 570 people, 109 have attribute A, 113 have attribute B and 15 have both. Complete all four interior cells and marginal totals. Compare the proportion with B among A with the proportion with B among not A, and comment on association. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

In a two-way table of 600 people, 112 have attribute A, 119 have attribute B and 15 have both. Complete all four interior cells and marginal totals. Compare the proportion with B among A with the proportion with B among not A, and comment on association. Your solution must justify the main method or assumption and include a final check.

Chapter 6: Two-way tables

Q11 | 5 MARKS

You must show your working.
In a two-way table of 610 people, 113 have attribute A, 121 have attribute B and 15 have both. Complete all four interior cells and marginal totals. Compare the proportion with B among A with the proportion with B among not A, and comment on association. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
In a two-way table of 620 people, 114 have attribute A, 123 have attribute B and 15 have both. Complete all four interior cells and marginal totals. Compare the proportion with B among A with the proportion with B among not A, and comment on association. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Cells are both=15, A-only=70, B-only=95, neither=150. P(B within A)=15/85=0.176; P(B within not A)=95/245=0.388. The differing conditional proportions suggest a negative association, not causation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Cells are both=15, A-only=73, B-only=101, neither=171. P(B within A)=15/88=0.170; P(B within not A)=101/272=0.371. The differing conditional proportions suggest a negative association, not causation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Cells are both=15, A-only=76, B-only=107, neither=192. P(B within A)=15/91=0.165; P(B within not A)=107/299=0.358. The differing conditional proportions suggest a negative association, not causation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Cells are both=15, A-only=79, B-only=68, neither=258. P(B within A)=15/94=0.160; P(B within not A)=68/326=0.209. The differing conditional proportions suggest a negative association, not causation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Cells are both=15, A-only=82, B-only=74, neither=279. P(B within A)=15/97=0.155; P(B within not A)=74/353=0.210. The differing conditional proportions suggest a negative association, not causation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Cells are both=15, A-only=85, B-only=80, neither=300. P(B within A)=15/100=0.150; P(B within not A)=80/380=0.211. The differing conditional proportions suggest a negative association, not causation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Cells are both=15, A-only=88, B-only=86, neither=321. P(B within A)=15/103=0.146; P(B within not A)=86/407=0.211. The differing conditional proportions suggest a negative association, not causation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Cells are both=15, A-only=91, B-only=92, neither=342. P(B within A)=15/106=0.142; P(B within not A)=92/434=0.212. The differing conditional proportions suggest a negative association, not causation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Cells are both=15, A-only=94, B-only=98, neither=363. P(B within A)=15/109=0.138; P(B within not A)=98/461=0.213. The differing conditional proportions suggest a negative association, not causation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Cells are both=15, A-only=97, B-only=104, neither=384. P(B within A)=15/112=0.134; P(B within not A)=104/488=0.213. The differing conditional proportions suggest a negative association, not causation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Cells are both=15, A-only=98, B-only=106, neither=391. P(B within A)=15/113=0.133; P(B within not A)=106/497=0.213. The differing conditional proportions suggest a negative association, not causation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Cells are both=15, A-only=99, B-only=108, neither=398. P(B within A)=15/114=0.132; P(B within not A)=108/506=0.213. The differing conditional proportions suggest a negative association, not causation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 7

Bar, line and pie representations

12 curated questions | complete solutions

Chapter focus

Choosing, calculating and critically reading common displays

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

This chapter is independently authored and specification-mapped. It does not reproduce OCR questions, mark schemes, logos or proprietary layouts.

Chapter 7: Bar, line and pie representations

Q01 | 4 MARKS

Four categories have frequencies [13, 24, 25, 20]. Calculate the sector angle for each category for a pie chart, check that the angles total 360 degrees, and explain when a bar chart would communicate these data more effectively. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

Four categories have frequencies [16, 22, 25, 23]. Calculate the sector angle for each category for a pie chart, check that the angles total 360 degrees, and explain when a bar chart would communicate these data more effectively. Your solution must justify the main method or assumption and include a final check.

Chapter 7: Bar, line and pie representations

Q03 | 4 MARKS

Four categories have frequencies [12, 20, 25, 16]. Calculate the sector angle for each category for a pie chart, check that the angles total 360 degrees, and explain when a bar chart would communicate these data more effectively. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

Four categories have frequencies [15, 18, 25, 19]. Calculate the sector angle for each category for a pie chart, check that the angles total 360 degrees, and explain when a bar chart would communicate these data more effectively. Your solution must justify the main method or assumption and include a final check.

Chapter 7: Bar, line and pie representations

Q05 | 4 MARKS

Four categories have frequencies [18, 24, 25, 22]. Calculate the sector angle for each category for a pie chart, check that the angles total 360 degrees, and explain when a bar chart would communicate these data more effectively. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

Four categories have frequencies [14, 22, 25, 15]. Calculate the sector angle for each category for a pie chart, check that the angles total 360 degrees, and explain when a bar chart would communicate these data more effectively. Your solution must justify the main method or assumption and include a final check.

Chapter 7: Bar, line and pie representations

Q07 | 4 MARKS

Four categories have frequencies [17, 20, 25, 18]. Calculate the sector angle for each category for a pie chart, check that the angles total 360 degrees, and explain when a bar chart would communicate these data more effectively. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

Four categories have frequencies [13, 18, 25, 21]. Calculate the sector angle for each category for a pie chart, check that the angles total 360 degrees, and explain when a bar chart would communicate these data more effectively. Your solution must justify the main method or assumption and include a final check.

Chapter 7: Bar, line and pie representations

Q09 | 4 MARKS

Four categories have frequencies [16, 24, 25, 24]. Calculate the sector angle for each category for a pie chart, check that the angles total 360 degrees, and explain when a bar chart would communicate these data more effectively. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

Four categories have frequencies [12, 22, 25, 17]. Calculate the sector angle for each category for a pie chart, check that the angles total 360 degrees, and explain when a bar chart would communicate these data more effectively. Your solution must justify the main method or assumption and include a final check.

Chapter 7: Bar, line and pie representations

Q11 | 5 MARKS

You must show your working.
Four categories have frequencies [13, 24, 28, 18]. Calculate the sector angle for each category for a pie chart, check that the angles total 360 degrees, and explain when a bar chart would communicate these data more effectively. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
Four categories have frequencies [14, 18, 31, 19]. Calculate the sector angle for each category for a pie chart, check that the angles total 360 degrees, and explain when a bar chart would communicate these data more effectively. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Angles are frequency/total x 360. With total 82, the exact angles are ['2340/41', '4320/41', '4500/41', '3600/41'] degrees, and they sum to 360 degrees. A bar chart is often clearer when precise category comparisons matter, while a pie chart emphasises part-to-whole composition. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Angles are frequency/total x 360. With total 86, the exact angles are ['2880/43', '3960/43', '4500/43', '4140/43'] degrees, and they sum to 360 degrees. A bar chart is often clearer when precise category comparisons matter, while a pie chart emphasises part-to-whole composition. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Angles are frequency/total x 360. With total 73, the exact angles are ['4320/73', '7200/73', '9000/73', '5760/73'] degrees, and they sum to 360 degrees. A bar chart is often clearer when precise category comparisons matter, while a pie chart emphasises part-to-whole composition. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Angles are frequency/total x 360. With total 77, the exact angles are ['5400/77', '6480/77', '9000/77', '6840/77'] degrees, and they sum to 360 degrees. A bar chart is often clearer when precise category comparisons matter, while a pie chart emphasises part-to-whole composition. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Angles are frequency/total x 360. With total 89, the exact angles are ['6480/89', '8640/89', '9000/89', '7920/89'] degrees, and they sum to 360 degrees. A bar chart is often clearer when precise category comparisons matter, while a pie chart emphasises part-to-whole composition. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Angles are frequency/total x 360. With total 76, the exact angles are ['1260/19', '1980/19', '2250/19', '1350/19'] degrees, and they sum to 360 degrees. A bar chart is often clearer when precise category comparisons matter, while a pie chart emphasises part-to-whole composition. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Angles are frequency/total x 360. With total 80, the exact angles are ['153/2', '90', '225/2', '81'] degrees, and they sum to 360 degrees. A bar chart is often clearer when precise category comparisons matter, while a pie chart emphasises part-to-whole composition. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Angles are frequency/total x 360. With total 77, the exact angles are ['4680/77', '6480/77', '9000/77', '1080/11'] degrees, and they sum to 360 degrees. A bar chart is often clearer when precise category comparisons matter, while a pie chart emphasises part-to-whole composition. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Angles are frequency/total x 360. With total 89, the exact angles are ['5760/89', '8640/89', '9000/89', '8640/89'] degrees, and they sum to 360 degrees. A bar chart is often clearer when precise category comparisons matter, while a pie chart emphasises part-to-whole composition. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Angles are frequency/total x 360. With total 76, the exact angles are ['1080/19', '1980/19', '2250/19', '1530/19'] degrees, and they sum to 360 degrees. A bar chart is often clearer when precise category comparisons matter, while a pie chart emphasises part-to-whole composition. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Angles are frequency/total x 360. With total 83, the exact angles are ['4680/83', '8640/83', '10080/83', '6480/83'] degrees, and they sum to 360 degrees. A bar chart is often clearer when precise category comparisons matter, while a pie chart emphasises part-to-whole composition. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Angles are frequency/total x 360. With total 82, the exact angles are ['2520/41', '3240/41', '5580/41', '3420/41'] degrees, and they sum to 360 degrees. A bar chart is often clearer when precise category comparisons matter, while a pie chart emphasises part-to-whole composition. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 8

Averages and range

12 curated questions | complete solutions

Chapter focus

Mean, median, mode, range and suitability in context

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

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Chapter 8: Averages and range

Q01 | 4 MARKS

For the data [4, 8, 12, 12, 15, 16, 23], calculate the mean, median and range. If the largest value is replaced by a value 20 greater, determine which statistics change and recommend a measure of centre for data containing an extreme value. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

For the data [7, 7, 13, 9, 12, 19, 24], calculate the mean, median and range. If the largest value is replaced by a value 23 greater, determine which statistics change and recommend a measure of centre for data containing an extreme value. Your solution must justify the main method or assumption and include a final check.

Chapter 8: Averages and range

Q03 | 4 MARKS

For the data [5, 6, 14, 12, 18, 15, 25], calculate the mean, median and range. If the largest value is replaced by a value 26 greater, determine which statistics change and recommend a measure of centre for data containing an extreme value. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

For the data [8, 12, 7, 9, 15, 18, 18], calculate the mean, median and range. If the largest value is replaced by a value 29 greater, determine which statistics change and recommend a measure of centre for data containing an extreme value. Your solution must justify the main method or assumption and include a final check.

Chapter 8: Averages and range

Q05 | 4 MARKS

For the data [6, 11, 8, 12, 12, 21, 19], calculate the mean, median and range. If the largest value is replaced by a value 32 greater, determine which statistics change and recommend a measure of centre for data containing an extreme value. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

For the data [4, 10, 9, 9, 18, 17, 20], calculate the mean, median and range. If the largest value is replaced by a value 20 greater, determine which statistics change and recommend a measure of centre for data containing an extreme value. Your solution must justify the main method or assumption and include a final check.

Chapter 8: Averages and range

Q07 | 4 MARKS

For the data [7, 9, 10, 12, 15, 20, 21], calculate the mean, median and range. If the largest value is replaced by a value 23 greater, determine which statistics change and recommend a measure of centre for data containing an extreme value. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

For the data [5, 8, 11, 9, 12, 16, 22], calculate the mean, median and range. If the largest value is replaced by a value 26 greater, determine which statistics change and recommend a measure of centre for data containing an extreme value. Your solution must justify the main method or assumption and include a final check.

Chapter 8: Averages and range

Q09 | 4 MARKS

For the data [8, 7, 12, 12, 18, 19, 23], calculate the mean, median and range. If the largest value is replaced by a value 29 greater, determine which statistics change and recommend a measure of centre for data containing an extreme value. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

For the data [6, 6, 13, 9, 15, 15, 24], calculate the mean, median and range. If the largest value is replaced by a value 32 greater, determine which statistics change and recommend a measure of centre for data containing an extreme value. Your solution must justify the main method or assumption and include a final check.

Chapter 8: Averages and range

Q11 | 5 MARKS

You must show your working.
For the data [7, 8, 8, 10, 17, 16, 19], calculate the mean, median and range. If the largest value is replaced by a value 33 greater, determine which statistics change and recommend a measure of centre for data containing an extreme value. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
For the data [8, 10, 11, 11, 19, 17, 22], calculate the mean, median and range. If the largest value is replaced by a value 34 greater, determine which statistics change and recommend a measure of centre for data containing an extreme value. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Original mean=90/7, median=12, range=19. After replacement, mean=110/7, median=12, range=39. The median is usually more resistant to an extreme value, although choice should reflect the investigative purpose. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Original mean=13, median=12, range=17. After replacement, mean=114/7, median=12, range=40. The median is usually more resistant to an extreme value, although choice should reflect the investigative purpose. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Original mean=95/7, median=14, range=20. After replacement, mean=121/7, median=14, range=46. The median is usually more resistant to an extreme value, although choice should reflect the investigative purpose. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Original mean=87/7, median=12, range=11. After replacement, mean=116/7, median=12, range=40. The median is usually more resistant to an extreme value, although choice should reflect the investigative purpose. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Original mean=89/7, median=12, range=15. After replacement, mean=121/7, median=12, range=45. The median is usually more resistant to an extreme value, although choice should reflect the investigative purpose. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Original mean=87/7, median=10, range=16. After replacement, mean=107/7, median=10, range=36. The median is usually more resistant to an extreme value, although choice should reflect the investigative purpose. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Original mean=94/7, median=12, range=14. After replacement, mean=117/7, median=12, range=37. The median is usually more resistant to an extreme value, although choice should reflect the investigative purpose. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Original mean=83/7, median=11, range=17. After replacement, mean=109/7, median=11, range=43. The median is usually more resistant to an extreme value, although choice should reflect the investigative purpose. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Original mean=99/7, median=12, range=16. After replacement, mean=128/7, median=12, range=45. The median is usually more resistant to an extreme value, although choice should reflect the investigative purpose. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Original mean=88/7, median=13, range=18. After replacement, mean=120/7, median=13, range=50. The median is usually more resistant to an extreme value, although choice should reflect the investigative purpose. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Original mean=85/7, median=10, range=12. After replacement, mean=118/7, median=10, range=45. The median is usually more resistant to an extreme value, although choice should reflect the investigative purpose. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Original mean=14, median=11, range=14. After replacement, mean=132/7, median=11, range=48. The median is usually more resistant to an extreme value, although choice should reflect the investigative purpose. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 9

Weighted means and combined groups

12 curated questions | complete solutions

Chapter focus

Frequency-weighted calculation and reverse mean problems

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

Chapter 9: Weighted means and combined groups

Q01 | 4 MARKS

Group A has 25 values with mean 62; group B has 31 values with mean 61. Find the combined mean. Then find the mean group B would need for the combined mean to be exactly 63, keeping both group sizes fixed. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

Group A has 28 values with mean 57; group B has 25 values with mean 61. Find the combined mean. Then find the mean group B would need for the combined mean to be exactly 60, keeping both group sizes fixed. Your solution must justify the main method or assumption and include a final check.

Chapter 9: Weighted means and combined groups

Q03 | 4 MARKS

Group A has 21 values with mean 60; group B has 31 values with mean 61. Find the combined mean. Then find the mean group B would need for the combined mean to be exactly 63, keeping both group sizes fixed. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

Group A has 24 values with mean 55; group B has 25 values with mean 61. Find the combined mean. Then find the mean group B would need for the combined mean to be exactly 60, keeping both group sizes fixed. Your solution must justify the main method or assumption and include a final check.

Chapter 9: Weighted means and combined groups

Q05 | 4 MARKS

Group A has 27 values with mean 58; group B has 31 values with mean 61. Find the combined mean. Then find the mean group B would need for the combined mean to be exactly 63, keeping both group sizes fixed. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

Group A has 20 values with mean 61; group B has 25 values with mean 61. Find the combined mean. Then find the mean group B would need for the combined mean to be exactly 60, keeping both group sizes fixed. Your solution must justify the main method or assumption and include a final check.

Chapter 9: Weighted means and combined groups

Q07 | 4 MARKS

Group A has 23 values with mean 56; group B has 31 values with mean 61. Find the combined mean. Then find the mean group B would need for the combined mean to be exactly 63, keeping both group sizes fixed. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

Group A has 26 values with mean 59; group B has 25 values with mean 61. Find the combined mean. Then find the mean group B would need for the combined mean to be exactly 60, keeping both group sizes fixed. Your solution must justify the main method or assumption and include a final check.

Chapter 9: Weighted means and combined groups

Q09 | 4 MARKS

Group A has 29 values with mean 62; group B has 31 values with mean 61. Find the combined mean. Then find the mean group B would need for the combined mean to be exactly 63, keeping both group sizes fixed. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

Group A has 22 values with mean 57; group B has 25 values with mean 61. Find the combined mean. Then find the mean group B would need for the combined mean to be exactly 60, keeping both group sizes fixed. Your solution must justify the main method or assumption and include a final check.

Chapter 9: Weighted means and combined groups

Q11 | 5 MARKS

You must show your working.
Group A has 23 values with mean 58; group B has 27 values with mean 64. Find the combined mean. Then find the mean group B would need for the combined mean to be exactly 61, keeping both group sizes fixed. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
Group A has 24 values with mean 59; group B has 29 values with mean 67. Find the combined mean. Then find the mean group B would need for the combined mean to be exactly 62, keeping both group sizes fixed. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Total for A=25x62; total for B=31x61. Combined mean=(1550+1891)/56=61.446. For target 63, required B mean=[63(56)-1550]/31=63.806. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Total for A=28x57; total for B=25x61. Combined mean=(1596+1525)/53=58.887. For target 60, required B mean=[60(53)-1596]/25=63.360. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Total for A=21x60; total for B=31x61. Combined mean=(1260+1891)/52=60.596. For target 63, required B mean=[63(52)-1260]/31=65.032. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Total for A=24x55; total for B=25x61. Combined mean=(1320+1525)/49=58.061. For target 60, required B mean=[60(49)-1320]/25=64.800. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Total for A=27x58; total for B=31x61. Combined mean=(1566+1891)/58=59.603. For target 63, required B mean=[63(58)-1566]/31=67.355. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Total for A=20x61; total for B=25x61. Combined mean=(1220+1525)/45=61.000. For target 60, required B mean=[60(45)-1220]/25=59.200. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Total for A=23x56; total for B=31x61. Combined mean=(1288+1891)/54=58.870. For target 63, required B mean=[63(54)-1288]/31=68.194. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Total for A=26x59; total for B=25x61. Combined mean=(1534+1525)/51=59.980. For target 60, required B mean=[60(51)-1534]/25=61.040. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Total for A=29x62; total for B=31x61. Combined mean=(1798+1891)/60=61.483. For target 63, required B mean=[63(60)-1798]/31=63.935. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Total for A=22x57; total for B=25x61. Combined mean=(1254+1525)/47=59.128. For target 60, required B mean=[60(47)-1254]/25=62.640. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Total for A=23x58; total for B=27x64. Combined mean=(1334+1728)/50=61.240. For target 61, required B mean=[61(50)-1334]/27=63.556. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Total for A=24x59; total for B=29x67. Combined mean=(1416+1943)/53=63.377. For target 62, required B mean=[62(53)-1416]/29=64.483. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 10

Estimated mean from grouped data

12 curated questions | complete solutions

Chapter focus

Class midpoints, products and the limits of estimation

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

Chapter 10: Estimated mean from grouped data

Q01 | 4 MARKS

Grouped data have class midpoints [5, 15, 30, 50] and frequencies [4, 8, 15, 13]. Calculate the estimated mean using a midpoint-product table. Explain precisely why the answer is an estimate and give one possible set of class intervals. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

Grouped data have class midpoints [5, 15, 30, 50] and frequencies [7, 8, 17, 8]. Calculate the estimated mean using a midpoint-product table. Explain precisely why the answer is an estimate and give one possible set of class intervals. Your solution must justify the main method or assumption and include a final check.

Chapter 10: Estimated mean from grouped data

Q03 | 4 MARKS

Grouped data have class midpoints [5, 15, 30, 50] and frequencies [5, 8, 12, 11]. Calculate the estimated mean using a midpoint-product table. Explain precisely why the answer is an estimate and give one possible set of class intervals. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

Grouped data have class midpoints [5, 15, 30, 50] and frequencies [8, 8, 14, 6]. Calculate the estimated mean using a midpoint-product table. Explain precisely why the answer is an estimate and give one possible set of class intervals. Your solution must justify the main method or assumption and include a final check.

Chapter 10: Estimated mean from grouped data

Q05 | 4 MARKS

Grouped data have class midpoints [5, 15, 30, 50] and frequencies [6, 8, 16, 9]. Calculate the estimated mean using a midpoint-product table. Explain precisely why the answer is an estimate and give one possible set of class intervals. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

Grouped data have class midpoints [5, 15, 30, 50] and frequencies [4, 8, 18, 12]. Calculate the estimated mean using a midpoint-product table. Explain precisely why the answer is an estimate and give one possible set of class intervals. Your solution must justify the main method or assumption and include a final check.

Chapter 10: Estimated mean from grouped data

Q07 | 4 MARKS

Grouped data have class midpoints [5, 15, 30, 50] and frequencies [7, 8, 13, 7]. Calculate the estimated mean using a midpoint-product table. Explain precisely why the answer is an estimate and give one possible set of class intervals. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

Grouped data have class midpoints [5, 15, 30, 50] and frequencies [5, 8, 15, 10]. Calculate the estimated mean using a midpoint-product table. Explain precisely why the answer is an estimate and give one possible set of class intervals. Your solution must justify the main method or assumption and include a final check.

Chapter 10: Estimated mean from grouped data

Q09 | 4 MARKS

Grouped data have class midpoints [5, 15, 30, 50] and frequencies [8, 8, 17, 13]. Calculate the estimated mean using a midpoint-product table. Explain precisely why the answer is an estimate and give one possible set of class intervals. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

Grouped data have class midpoints [5, 15, 30, 50] and frequencies [6, 8, 12, 8]. Calculate the estimated mean using a midpoint-product table. Explain precisely why the answer is an estimate and give one possible set of class intervals. Your solution must justify the main method or assumption and include a final check.

Chapter 10: Estimated mean from grouped data

Q11 | 5 MARKS

You must show your working.
Grouped data have class midpoints [5, 15, 30, 50] and frequencies [7, 10, 15, 9]. Calculate the estimated mean using a midpoint-product table. Explain precisely why the answer is an estimate and give one possible set of class intervals. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
Grouped data have class midpoints [5, 15, 30, 50] and frequencies [8, 12, 18, 10]. Calculate the estimated mean using a midpoint-product table. Explain precisely why the answer is an estimate and give one possible set of class intervals. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Midpoint products are [20, 120, 450, 650], with sum 1240 and total frequency 40. Estimated mean=1240/40=31.000. It assumes every value in a class equals its midpoint. One compatible set of intervals for midpoints 5, 15, 30 and 50 is 0<=x<10, 10<=x<20, 20<=x<40 and 40<=x<60; each stated midpoint is the centre of its class.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Midpoint products are [35, 120, 510, 400], with sum 1065 and total frequency 40. Estimated mean=1065/40=26.625. It assumes every value in a class equals its midpoint. One compatible set of intervals for midpoints 5, 15, 30 and 50 is 0<=x<10, 10<=x<20, 20<=x<40 and 40<=x<60; each stated midpoint is the centre of its class.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Midpoint products are [25, 120, 360, 550], with sum 1055 and total frequency 36. Estimated mean=1055/36=29.306. It assumes every value in a class equals its midpoint. One compatible set of intervals for midpoints 5, 15, 30 and 50 is 0<=x<10, 10<=x<20, 20<=x<40 and 40<=x<60; each stated midpoint is the centre of its class.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Midpoint products are [40, 120, 420, 300], with sum 880 and total frequency 36. Estimated mean=880/36=24.444. It assumes every value in a class equals its midpoint. One compatible set of intervals for midpoints 5, 15, 30 and 50 is 0<=x<10, 10<=x<20, 20<=x<40 and 40<=x<60; each stated midpoint is the centre of its class.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Midpoint products are [30, 120, 480, 450], with sum 1080 and total frequency 39. Estimated mean=1080/39=27.692. It assumes every value in a class equals its midpoint. One compatible set of intervals for midpoints 5, 15, 30 and 50 is 0<=x<10, 10<=x<20, 20<=x<40 and 40<=x<60; each stated midpoint is the centre of its class.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Midpoint products are [20, 120, 540, 600], with sum 1280 and total frequency 42. Estimated mean=1280/42=30.476. It assumes every value in a class equals its midpoint. One compatible set of intervals for midpoints 5, 15, 30 and 50 is 0<=x<10, 10<=x<20, 20<=x<40 and 40<=x<60; each stated midpoint is the centre of its class.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Midpoint products are [35, 120, 390, 350], with sum 895 and total frequency 35. Estimated mean=895/35=25.571. It assumes every value in a class equals its midpoint. One compatible set of intervals for midpoints 5, 15, 30 and 50 is 0<=x<10, 10<=x<20, 20<=x<40 and 40<=x<60; each stated midpoint is the centre of its class.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Midpoint products are [25, 120, 450, 500], with sum 1095 and total frequency 38. Estimated mean=1095/38=28.816. It assumes every value in a class equals its midpoint. One compatible set of intervals for midpoints 5, 15, 30 and 50 is 0<=x<10, 10<=x<20, 20<=x<40 and 40<=x<60; each stated midpoint is the centre of its class.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Midpoint products are [40, 120, 510, 650], with sum 1320 and total frequency 46. Estimated mean=1320/46=28.696. It assumes every value in a class equals its midpoint. One compatible set of intervals for midpoints 5, 15, 30 and 50 is 0<=x<10, 10<=x<20, 20<=x<40 and 40<=x<60; each stated midpoint is the centre of its class.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Midpoint products are [30, 120, 360, 400], with sum 910 and total frequency 34. Estimated mean=910/34=26.765. It assumes every value in a class equals its midpoint. One compatible set of intervals for midpoints 5, 15, 30 and 50 is 0<=x<10, 10<=x<20, 20<=x<40 and 40<=x<60; each stated midpoint is the centre of its class.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Midpoint products are [35, 150, 450, 450], with sum 1085 and total frequency 41. Estimated mean=1085/41=26.463. It assumes every value in a class equals its midpoint. One compatible set of intervals for midpoints 5, 15, 30 and 50 is 0<=x<10, 10<=x<20, 20<=x<40 and 40<=x<60; each stated midpoint is the centre of its class.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Midpoint products are [40, 180, 540, 500], with sum 1260 and total frequency 48. Estimated mean=1260/48=26.250. It assumes every value in a class equals its midpoint. One compatible set of intervals for midpoints 5, 15, 30 and 50 is 0<=x<10, 10<=x<20, 20<=x<40 and 40<=x<60; each stated midpoint is the centre of its class.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 11

Stem-and-leaf diagrams

12 curated questions | complete solutions

Chapter focus

Ordered construction, keys, medians and comparative interpretation

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

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Chapter 11: Stem-and-leaf diagrams

Q01 | 4 MARKS

Two ordered samples are [12, 17, 15, 19, 25, 28, 25] and [18, 23, 21, 25, 31, 34, 31]. Write each as a stem-and-leaf diagram using a common key, calculate both medians and ranges, and compare the distributions using centre and spread. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

Two ordered samples are [15, 14, 15, 22, 26, 22, 31] and [20, 19, 20, 27, 31, 27, 36]. Write each as a stem-and-leaf diagram using a common key, calculate both medians and ranges, and compare the distributions using centre and spread. Your solution must justify the main method or assumption and include a final check.

Chapter 11: Stem-and-leaf diagrams

Q03 | 4 MARKS

Two ordered samples are [13, 17, 15, 18, 27, 25, 27] and [17, 21, 19, 22, 31, 29, 31]. Write each as a stem-and-leaf diagram using a common key, calculate both medians and ranges, and compare the distributions using centre and spread. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

Two ordered samples are [16, 14, 15, 21, 20, 28, 33] and [19, 17, 18, 24, 23, 31, 36]. Write each as a stem-and-leaf diagram using a common key, calculate both medians and ranges, and compare the distributions using centre and spread. Your solution must justify the main method or assumption and include a final check.

Chapter 11: Stem-and-leaf diagrams

Q05 | 4 MARKS

Two ordered samples are [14, 17, 15, 24, 21, 22, 29] and [20, 23, 21, 30, 27, 28, 35]. Write each as a stem-and-leaf diagram using a common key, calculate both medians and ranges, and compare the distributions using centre and spread. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

Two ordered samples are [12, 14, 15, 20, 22, 25, 25] and [17, 19, 20, 25, 27, 30, 30]. Write each as a stem-and-leaf diagram using a common key, calculate both medians and ranges, and compare the distributions using centre and spread. Your solution must justify the main method or assumption and include a final check.

Chapter 11: Stem-and-leaf diagrams

Q07 | 4 MARKS

Two ordered samples are [15, 17, 15, 23, 23, 28, 31] and [19, 21, 19, 27, 27, 32, 35]. Write each as a stem-and-leaf diagram using a common key, calculate both medians and ranges, and compare the distributions using centre and spread. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

Two ordered samples are [13, 14, 15, 19, 24, 22, 27] and [16, 17, 18, 22, 27, 25, 30]. Write each as a stem-and-leaf diagram using a common key, calculate both medians and ranges, and compare the distributions using centre and spread. Your solution must justify the main method or assumption and include a final check.

Chapter 11: Stem-and-leaf diagrams

Q09 | 4 MARKS

Two ordered samples are [16, 17, 15, 22, 25, 25, 33] and [22, 23, 21, 28, 31, 31, 39]. Write each as a stem-and-leaf diagram using a common key, calculate both medians and ranges, and compare the distributions using centre and spread. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

Two ordered samples are [14, 14, 15, 18, 26, 28, 29] and [19, 19, 20, 23, 31, 33, 34]. Write each as a stem-and-leaf diagram using a common key, calculate both medians and ranges, and compare the distributions using centre and spread. Your solution must justify the main method or assumption and include a final check.

Chapter 11: Stem-and-leaf diagrams

Q11 | 5 MARKS

You must show your working.
Two ordered samples are [15, 15, 17, 19, 21, 29, 31] and [21, 21, 23, 25, 27, 35, 37]. Write each as a stem-and-leaf diagram using a common key, calculate both medians and ranges, and compare the distributions using centre and spread. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
Two ordered samples are [16, 16, 19, 20, 24, 30, 33] and [19, 19, 22, 23, 27, 33, 36]. Write each as a stem-and-leaf diagram using a common key, calculate both medians and ranges, and compare the distributions using centre and spread. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Use tens as stems and units as leaves; preserve repeated leaves and provide a key such as 1|4=14. Sample 1 median=19, range=16. Sample 2 median=25, range=16. Sample 2 has higher centre and range 16 compared with 16. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Use tens as stems and units as leaves; preserve repeated leaves and provide a key such as 1|4=14. Sample 1 median=22, range=17. Sample 2 median=27, range=17. Sample 2 has higher centre and range 17 compared with 17. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Use tens as stems and units as leaves; preserve repeated leaves and provide a key such as 1|4=14. Sample 1 median=18, range=14. Sample 2 median=22, range=14. Sample 2 has higher centre and range 14 compared with 14. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Use tens as stems and units as leaves; preserve repeated leaves and provide a key such as 1|4=14. Sample 1 median=20, range=19. Sample 2 median=23, range=19. Sample 2 has higher centre and range 19 compared with 19. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Use tens as stems and units as leaves; preserve repeated leaves and provide a key such as 1|4=14. Sample 1 median=21, range=15. Sample 2 median=27, range=15. Sample 2 has higher centre and range 15 compared with 15. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Use tens as stems and units as leaves; preserve repeated leaves and provide a key such as 1|4=14. Sample 1 median=20, range=13. Sample 2 median=25, range=13. Sample 2 has higher centre and range 13 compared with 13. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Use tens as stems and units as leaves; preserve repeated leaves and provide a key such as 1|4=14. Sample 1 median=23, range=16. Sample 2 median=27, range=16. Sample 2 has higher centre and range 16 compared with 16. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Use tens as stems and units as leaves; preserve repeated leaves and provide a key such as 1|4=14. Sample 1 median=19, range=14. Sample 2 median=22, range=14. Sample 2 has higher centre and range 14 compared with 14. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Use tens as stems and units as leaves; preserve repeated leaves and provide a key such as 1|4=14. Sample 1 median=22, range=18. Sample 2 median=28, range=18. Sample 2 has higher centre and range 18 compared with 18. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Use tens as stems and units as leaves; preserve repeated leaves and provide a key such as 1|4=14. Sample 1 median=18, range=15. Sample 2 median=23, range=15. Sample 2 has higher centre and range 15 compared with 15. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Use tens as stems and units as leaves; preserve repeated leaves and provide a key such as 1|4=14. Sample 1 median=19, range=16. Sample 2 median=25, range=16. Sample 2 has higher centre and range 16 compared with 16. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Use tens as stems and units as leaves; preserve repeated leaves and provide a key such as 1|4=14. Sample 1 median=20, range=17. Sample 2 median=23, range=17. Sample 2 has higher centre and range 17 compared with 17. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 12

Scatter graphs and lines of best fit

12 curated questions | complete solutions

Chapter focus

Correlation, prediction, residual ideas and causation limits

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

Chapter 12: Scatter graphs and lines of best fit

Q01 | 4 MARKS

A scatter plot uses points with x-values [1, 2, 3, 4, 5, 6] and y-values [3, 5, 7, 9, 11, 13]. Describe the correlation, propose a reasonable line of best fit, estimate y when x=7, and explain why the relationship alone cannot establish causation. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

A scatter plot uses points with x-values [1, 2, 3, 4, 5, 6] and y-values [3, 5, 7, 9, 11, 13]. Describe the correlation, propose a reasonable line of best fit, estimate y when x=7, and explain why the relationship alone cannot establish causation. Your solution must justify the main method or assumption and include a final check. After completing the calculation, give one independent check that supports your result.

Chapter 12: Scatter graphs and lines of best fit

Q03 | 4 MARKS

A scatter plot uses points with x-values [1, 2, 3, 4, 5, 6] and y-values [3, 5, 7, 9, 11, 13]. Describe the correlation, propose a reasonable line of best fit, estimate y when x=7, and explain why the relationship alone cannot establish causation. Your solution must justify the main method or assumption and include a final check. Identify the key condition you used and explain why it applies here.

Q04 | 4 MARKS

A scatter plot uses points with x-values [1, 2, 3, 4, 5, 6] and y-values [3, 5, 7, 9, 11, 13]. Describe the correlation, propose a reasonable line of best fit, estimate y when x=7, and explain why the relationship alone cannot establish causation. Your solution must justify the main method or assumption and include a final check. Write one sentence interpreting your answer in the context of the question.

Chapter 12: Scatter graphs and lines of best fit

Q05 | 4 MARKS

A scatter plot uses points with x-values [1, 2, 3, 4, 5, 6] and y-values [3, 5, 7, 9, 11, 13]. Describe the correlation, propose a reasonable line of best fit, estimate y when x=7, and explain why the relationship alone cannot establish causation. Your solution must justify the main method or assumption and include a final check. Describe one common error in this calculation and how your working avoids it.

Q06 | 5 MARKS

You must show your working.
A scatter plot uses points with x-values [1, 2, 3, 4, 5, 6] and y-values [2, 5, 8, 8, 11, 14]. Describe the correlation, propose a reasonable line of best fit, estimate y when x=7, and explain why the relationship alone cannot establish causation. Your solution must justify the main method or assumption and include a final check.

Chapter 12: Scatter graphs and lines of best fit

Q07 | 6 MARKS

You must show your working.
A scatter plot uses points with x-values [1, 2, 3, 4, 5, 6] and y-values [1, 5, 9, 7, 11, 15]. Describe the correlation, propose a reasonable line of best fit, estimate y when x=7, and explain why the relationship alone cannot establish causation. Your solution must justify the main method or assumption and include a final check.

Q08 | 5 MARKS

You must show your working.
A scatter plot uses points with x-values [1, 2, 3, 4, 5, 6] and y-values [2, 5, 8, 8, 11, 14]. Describe the correlation, propose a reasonable line of best fit, estimate y when x=7, and explain why the relationship alone cannot establish causation. Your solution must justify the main method or assumption and include a final check. After completing the calculation, give one independent check that supports your result.

Chapter 12: Scatter graphs and lines of best fit

Q09 | 6 MARKS

You must show your working.
A scatter plot uses points with x-values [1, 2, 3, 4, 5, 6] and y-values [1, 5, 9, 7, 11, 15]. Describe the correlation, propose a reasonable line of best fit, estimate y when x=7, and explain why the relationship alone cannot establish causation. Your solution must justify the main method or assumption and include a final check. After completing the calculation, give one independent check that supports your result.

Q10 | 5 MARKS

You must show your working.
A scatter plot uses points with x-values [1, 2, 3, 4, 5, 6] and y-values [2, 5, 8, 8, 11, 14]. Describe the correlation, propose a reasonable line of best fit, estimate y when x=7, and explain why the relationship alone cannot establish causation. Your solution must justify the main method or assumption and include a final check. Identify the key condition you used and explain why it applies here.

Chapter 12: Scatter graphs and lines of best fit

Q11 | 6 MARKS

You must show your working.
A scatter plot uses points with x-values [1, 2, 3, 4, 5, 6] and y-values [1, 5, 9, 7, 11, 15]. Describe the correlation, propose a reasonable line of best fit, estimate y when x=7, and explain why the relationship alone cannot establish causation. Your solution must justify the main method or assumption and include a final check. Identify the key condition you used and explain why it applies here.

Q12 | 5 MARKS

You must show your working.
A scatter plot uses points with x-values [1, 2, 3, 4, 5, 6] and y-values [2, 5, 8, 8, 11, 14]. Describe the correlation, propose a reasonable line of best fit, estimate y when x=7, and explain why the relationship alone cannot establish causation. Your solution must justify the main method or assumption and include a final check. Write one sentence interpreting your answer in the context of the question.

Worked solutions

Q01 | 4 MARKS

The points show positive correlation. A defensible approximate model is y=2x+1, giving y approximately 15 at x=7. Different reasonable lines may give nearby answers. Correlation does not control lurking variables or establish a causal mechanism; extrapolation beyond observed x-values also increases uncertainty. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

The points show positive correlation. A defensible approximate model is y=2x+1, giving y approximately 15 at x=7. Different reasonable lines may give nearby answers. Correlation does not control lurking variables or establish a causal mechanism; extrapolation beyond observed x-values also increases uncertainty. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. A valid independent check uses substitution, an inverse operation, estimation, or the defining property as appropriate.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

The points show positive correlation. A defensible approximate model is y=2x+1, giving y approximately 15 at x=7. Different reasonable lines may give nearby answers. Correlation does not control lurking variables or establish a causal mechanism; extrapolation beyond observed x-values also increases uncertainty. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. The explanation must name the relevant condition and link it explicitly to the method used.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

The points show positive correlation. A defensible approximate model is y=2x+1, giving y approximately 15 at x=7. Different reasonable lines may give nearby answers. Correlation does not control lurking variables or establish a causal mechanism; extrapolation beyond observed x-values also increases uncertainty. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. The interpretation should include the correct units or geometric/statistical meaning where applicable.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

The points show positive correlation. A defensible approximate model is y=2x+1, giving y approximately 15 at x=7. Different reasonable lines may give nearby answers. Correlation does not control lurking variables or establish a causal mechanism; extrapolation beyond observed x-values also increases uncertainty. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. A valid response identifies a plausible error and points to the step that prevents it.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 5 MARKS

The points show positive correlation. A defensible approximate model is y=2x+1, giving y approximately 15 at x=7. Different reasonable lines may give nearby answers. Correlation does not control lurking variables or establish a causal mechanism; extrapolation beyond observed x-values also increases uncertainty. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 6 MARKS

The points show positive correlation. A defensible approximate model is y=2x+1, giving y approximately 15 at x=7. Different reasonable lines may give nearby answers. Correlation does not control lurking variables or establish a causal mechanism; extrapolation beyond observed x-values also increases uncertainty. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 5 MARKS

The points show positive correlation. A defensible approximate model is y=2x+1, giving y approximately 15 at x=7. Different reasonable lines may give nearby answers. Correlation does not control lurking variables or establish a causal mechanism; extrapolation beyond observed x-values also increases uncertainty. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. A valid independent check uses substitution, an inverse operation, estimation, or the defining property as appropriate.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 6 MARKS

The points show positive correlation. A defensible approximate model is $y=2x+1$, giving y approximately 15 at $x=7$. Different reasonable lines may give nearby answers. Correlation does not control lurking variables or establish a causal mechanism; extrapolation beyond observed x-values also increases uncertainty. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. A valid independent check uses substitution, an inverse operation, estimation, or the defining property as appropriate.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 5 MARKS

The points show positive correlation. A defensible approximate model is $y=2x+1$, giving y approximately 15 at $x=7$. Different reasonable lines may give nearby answers. Correlation does not control lurking variables or establish a causal mechanism; extrapolation beyond observed x-values also increases uncertainty. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. The explanation must name the relevant condition and link it explicitly to the method used.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 6 MARKS

The points show positive correlation. A defensible approximate model is $y=2x+1$, giving y approximately 15 at $x=7$. Different reasonable lines may give nearby answers. Correlation does not control lurking variables or establish a causal mechanism; extrapolation beyond observed x-values also increases uncertainty. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. The explanation must name the relevant condition and link it explicitly to the method used.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 5 MARKS

The points show positive correlation. A defensible approximate model is $y=2x+1$, giving y approximately 15 at $x=7$. Different reasonable lines may give nearby answers. Correlation does not control lurking variables or establish a causal mechanism; extrapolation beyond observed x-values also increases uncertainty. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. The interpretation should include the correct units or geometric/statistical meaning where applicable.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 13

Time series and moving averages

12 curated questions | complete solutions

Chapter focus

Trend, seasonal variation, smoothing and forecasting

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

Chapter 13: Time series and moving averages

Q01 | 4 MARKS

A time series has consecutive values [115, 125, 119, 133, 127, 141, 135]. Calculate the five three-point moving averages, place each against the correct central period, and describe the underlying trend after smoothing. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

A time series has consecutive values [118, 128, 122, 136, 130, 144, 138]. Calculate the five three-point moving averages, place each against the correct central period, and describe the underlying trend after smoothing. Your solution must justify the main method or assumption and include a final check.

Chapter 13: Time series and moving averages

Q03 | 4 MARKS

A time series has consecutive values [121, 131, 125, 139, 133, 147, 141]. Calculate the five three-point moving averages, place each against the correct central period, and describe the underlying trend after smoothing. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

A time series has consecutive values [124, 134, 128, 142, 136, 150, 144]. Calculate the five three-point moving averages, place each against the correct central period, and describe the underlying trend after smoothing. Your solution must justify the main method or assumption and include a final check.

Chapter 13: Time series and moving averages

Q05 | 4 MARKS

A time series has consecutive values [127, 137, 131, 145, 139, 153, 147]. Calculate the five three-point moving averages, place each against the correct central period, and describe the underlying trend after smoothing. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

A time series has consecutive values [130, 140, 134, 148, 142, 156, 150]. Calculate the five three-point moving averages, place each against the correct central period, and describe the underlying trend after smoothing. Your solution must justify the main method or assumption and include a final check.

Chapter 13: Time series and moving averages

Q07 | 4 MARKS

A time series has consecutive values [133, 143, 137, 151, 145, 159, 153]. Calculate the five three-point moving averages, place each against the correct central period, and describe the underlying trend after smoothing. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

A time series has consecutive values [136, 146, 140, 154, 148, 162, 156]. Calculate the five three-point moving averages, place each against the correct central period, and describe the underlying trend after smoothing. Your solution must justify the main method or assumption and include a final check.

Chapter 13: Time series and moving averages

Q09 | 4 MARKS

A time series has consecutive values [139, 149, 143, 157, 151, 165, 159]. Calculate the five three-point moving averages, place each against the correct central period, and describe the underlying trend after smoothing. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

A time series has consecutive values [142, 152, 146, 160, 154, 168, 162]. Calculate the five three-point moving averages, place each against the correct central period, and describe the underlying trend after smoothing. Your solution must justify the main method or assumption and include a final check.

Chapter 13: Time series and moving averages

Q11 | 5 MARKS

You must show your working.
A time series has consecutive values [143, 153, 147, 161, 155, 169, 163]. Calculate the five three-point moving averages, place each against the correct central period, and describe the underlying trend after smoothing. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
A time series has consecutive values [144, 154, 148, 162, 156, 170, 164]. Calculate the five three-point moving averages, place each against the correct central period, and describe the underlying trend after smoothing. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Three-point totals divided by 3 give ['359/3', '377/3', '379/3', '401/3', '403/3']. They are plotted at periods 2 through 6, the centres of their windows. Despite short-term alternation, the moving averages show an overall upward trend. A forecast should also consider whether the alternating pattern is seasonal. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Three-point totals divided by 3 give ['368/3', '386/3', '388/3', '410/3', '412/3']. They are plotted at periods 2 through 6, the centres of their windows. Despite short-term alternation, the moving averages show an overall upward trend. A forecast should also consider whether the alternating pattern is seasonal. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Three-point totals divided by 3 give ['377/3', '395/3', '397/3', '419/3', '421/3']. They are plotted at periods 2 through 6, the centres of their windows. Despite short-term alternation, the moving averages show an overall upward trend. A forecast should also consider whether the alternating pattern is seasonal. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Three-point totals divided by 3 give ['386/3', '404/3', '406/3', '428/3', '430/3']. They are plotted at periods 2 through 6, the centres of their windows. Despite short-term alternation, the moving averages show an overall upward trend. A forecast should also consider whether the alternating pattern is seasonal. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Three-point totals divided by 3 give ['395/3', '413/3', '415/3', '437/3', '439/3']. They are plotted at periods 2 through 6, the centres of their windows. Despite short-term alternation, the moving averages show an overall upward trend. A forecast should also consider whether the alternating pattern is seasonal. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Three-point totals divided by 3 give ['404/3', '422/3', '424/3', '446/3', '448/3']. They are plotted at periods 2 through 6, the centres of their windows. Despite short-term alternation, the moving averages show an overall upward trend. A forecast should also consider whether the alternating pattern is seasonal. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Three-point totals divided by 3 give ['413/3', '431/3', '433/3', '455/3', '457/3']. They are plotted at periods 2 through 6, the centres of their windows. Despite short-term alternation, the moving averages show an overall upward trend. A forecast should also consider whether the alternating pattern is seasonal. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Three-point totals divided by 3 give ['422/3', '440/3', '442/3', '464/3', '466/3']. They are plotted at periods 2 through 6, the centres of their windows. Despite short-term alternation, the moving averages show an overall upward trend. A forecast should also consider whether the alternating pattern is seasonal. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Three-point totals divided by 3 give ['431/3', '449/3', '451/3', '473/3', '475/3']. They are plotted at periods 2 through 6, the centres of their windows. Despite short-term alternation, the moving averages show an overall upward trend. A forecast should also consider whether the alternating pattern is seasonal. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Three-point totals divided by 3 give ['440/3', '458/3', '460/3', '482/3', '484/3']. They are plotted at periods 2 through 6, the centres of their windows. Despite short-term alternation, the moving averages show an overall upward trend. A forecast should also consider whether the alternating pattern is seasonal. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Three-point totals divided by 3 give ['443/3', '461/3', '463/3', '485/3', '487/3']. They are plotted at periods 2 through 6, the centres of their windows. Despite short-term alternation, the moving averages show an overall upward trend. A forecast should also consider whether the alternating pattern is seasonal. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Three-point totals divided by 3 give ['446/3', '464/3', '466/3', '488/3', '490/3']. They are plotted at periods 2 through 6, the centres of their windows. Despite short-term alternation, the moving averages show an overall upward trend. A forecast should also consider whether the alternating pattern is seasonal. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 14

Histograms and frequency density

12 curated questions | complete solutions

Chapter focus

Unequal class widths, areas, missing frequencies and comparison

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

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Chapter 14: Histograms and frequency density

Q01 | 4 MARKS

A histogram uses class widths [5, 10, 15, 20] and frequencies [13, 24, 24, 21]. Calculate all frequency densities. A missing bar has width 15 and the same area as the third class; find its frequency and state what bar area represents. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

A histogram uses class widths [5, 10, 15, 20] and frequencies [10, 22, 24, 24]. Calculate all frequency densities. A missing bar has width 15 and the same area as the third class; find its frequency and state what bar area represents. Your solution must justify the main method or assumption and include a final check.

Chapter 14: Histograms and frequency density

Q03 | 4 MARKS

A histogram uses class widths [5, 10, 15, 20] and frequencies [13, 20, 24, 17]. Calculate all frequency densities. A missing bar has width 15 and the same area as the third class; find its frequency and state what bar area represents. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

A histogram uses class widths [5, 10, 15, 20] and frequencies [10, 18, 24, 20]. Calculate all frequency densities. A missing bar has width 15 and the same area as the third class; find its frequency and state what bar area represents. Your solution must justify the main method or assumption and include a final check.

Chapter 14: Histograms and frequency density

Q05 | 4 MARKS

A histogram uses class widths [5, 10, 15, 20] and frequencies [13, 24, 24, 23]. Calculate all frequency densities. A missing bar has width 15 and the same area as the third class; find its frequency and state what bar area represents. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

A histogram uses class widths [5, 10, 15, 20] and frequencies [10, 22, 24, 16]. Calculate all frequency densities. A missing bar has width 15 and the same area as the third class; find its frequency and state what bar area represents. Your solution must justify the main method or assumption and include a final check.

Chapter 14: Histograms and frequency density

Q07 | 4 MARKS

A histogram uses class widths [5, 10, 15, 20] and frequencies [13, 20, 24, 19]. Calculate all frequency densities. A missing bar has width 15 and the same area as the third class; find its frequency and state what bar area represents. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

A histogram uses class widths [5, 10, 15, 20] and frequencies [10, 18, 24, 22]. Calculate all frequency densities. A missing bar has width 15 and the same area as the third class; find its frequency and state what bar area represents. Your solution must justify the main method or assumption and include a final check.

Chapter 14: Histograms and frequency density

Q09 | 4 MARKS

A histogram uses class widths [5, 10, 15, 20] and frequencies [13, 24, 24, 25]. Calculate all frequency densities. A missing bar has width 15 and the same area as the third class; find its frequency and state what bar area represents. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

A histogram uses class widths [5, 10, 15, 20] and frequencies [10, 22, 24, 18]. Calculate all frequency densities. A missing bar has width 15 and the same area as the third class; find its frequency and state what bar area represents. Your solution must justify the main method or assumption and include a final check.

Chapter 14: Histograms and frequency density

Q11 | 5 MARKS

You must show your working.
A histogram uses class widths [5, 10, 15, 20] and frequencies [11, 24, 27, 19]. Calculate all frequency densities. A missing bar has width 15 and the same area as the third class; find its frequency and state what bar area represents. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
A histogram uses class widths [5, 10, 15, 20] and frequencies [12, 18, 30, 20]. Calculate all frequency densities. A missing bar has width 15 and the same area as the third class; find its frequency and state what bar area represents. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Frequency density=f/width, giving ['13/5', '12/5', '8/5', '21/20']. Histogram area=class width x density=frequency. Equal area therefore means equal frequency, so the missing class frequency is 24, regardless of its height. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Frequency density=f/width, giving ['2', '11/5', '8/5', '6/5']. Histogram area=class width x density=frequency. Equal area therefore means equal frequency, so the missing class frequency is 24, regardless of its height. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Frequency density=f/width, giving ['13/5', '2', '8/5', '17/20']. Histogram area=class width x density=frequency. Equal area therefore means equal frequency, so the missing class frequency is 24, regardless of its height. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Frequency density=f/width, giving ['2', '9/5', '8/5', '1']. Histogram area=class width x density=frequency. Equal area therefore means equal frequency, so the missing class frequency is 24, regardless of its height. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Frequency density=f/width, giving ['13/5', '12/5', '8/5', '23/20']. Histogram area=class width x density=frequency. Equal area therefore means equal frequency, so the missing class frequency is 24, regardless of its height. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Frequency density=f/width, giving ['2', '11/5', '8/5', '4/5']. Histogram area=class width x density=frequency. Equal area therefore means equal frequency, so the missing class frequency is 24, regardless of its height. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Frequency density=f/width, giving ['13/5', '2', '8/5', '19/20']. Histogram area=class width x density=frequency. Equal area therefore means equal frequency, so the missing class frequency is 24, regardless of its height. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Frequency density=f/width, giving ['2', '9/5', '8/5', '11/10']. Histogram area=class width x density=frequency. Equal area therefore means equal frequency, so the missing class frequency is 24, regardless of its height. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Frequency density=f/width, giving ['13/5', '12/5', '8/5', '5/4']. Histogram area=class width x density=frequency. Equal area therefore means equal frequency, so the missing class frequency is 24, regardless of its height. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Frequency density=f/width, giving ['2', '11/5', '8/5', '9/10']. Histogram area=class width x density=frequency. Equal area therefore means equal frequency, so the missing class frequency is 24, regardless of its height. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Frequency density=f/width, giving ['11/5', '12/5', '9/5', '19/20']. Histogram area=class width x density=frequency. Equal area therefore means equal frequency, so the missing class frequency is 27, regardless of its height. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Frequency density=f/width, giving ['12/5', '9/5', '2', '1']. Histogram area=class width x density=frequency. Equal area therefore means equal frequency, so the missing class frequency is 30, regardless of its height. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 15

Cumulative-frequency curves

12 curated questions | complete solutions

Chapter focus

Running totals, quartiles, percentiles and interpolation

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

Chapter 15: Cumulative-frequency curves

Q01 | 4 MARKS

Grouped frequencies are [8, 16, 25, 18, 6] across five increasing intervals. Form cumulative frequencies, identify the cumulative-frequency positions of Q1, median and Q3, and explain how they would be read from a curve. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

Grouped frequencies are [11, 15, 26, 12, 6] across five increasing intervals. Form cumulative frequencies, identify the cumulative-frequency positions of Q1, median and Q3, and explain how they would be read from a curve. Your solution must justify the main method or assumption and include a final check.

Chapter 15: Cumulative-frequency curves

Q03 | 4 MARKS

Grouped frequencies are [9, 14, 27, 15, 6] across five increasing intervals. Form cumulative frequencies, identify the cumulative-frequency positions of Q1, median and Q3, and explain how they would be read from a curve. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

Grouped frequencies are [12, 20, 20, 18, 6] across five increasing intervals. Form cumulative frequencies, identify the cumulative-frequency positions of Q1, median and Q3, and explain how they would be read from a curve. Your solution must justify the main method or assumption and include a final check.

Chapter 15: Cumulative-frequency curves

Q05 | 4 MARKS

Grouped frequencies are [10, 19, 21, 12, 6] across five increasing intervals. Form cumulative frequencies, identify the cumulative-frequency positions of Q1, median and Q3, and explain how they would be read from a curve. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

Grouped frequencies are [8, 18, 22, 15, 6] across five increasing intervals. Form cumulative frequencies, identify the cumulative-frequency positions of Q1, median and Q3, and explain how they would be read from a curve. Your solution must justify the main method or assumption and include a final check.

Chapter 15: Cumulative-frequency curves

Q07 | 4 MARKS

Grouped frequencies are [11, 17, 23, 18, 6] across five increasing intervals. Form cumulative frequencies, identify the cumulative-frequency positions of Q1, median and Q3, and explain how they would be read from a curve. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

Grouped frequencies are [9, 16, 24, 12, 6] across five increasing intervals. Form cumulative frequencies, identify the cumulative-frequency positions of Q1, median and Q3, and explain how they would be read from a curve. Your solution must justify the main method or assumption and include a final check.

Chapter 15: Cumulative-frequency curves

Q09 | 4 MARKS

Grouped frequencies are [12, 15, 25, 15, 6] across five increasing intervals. Form cumulative frequencies, identify the cumulative-frequency positions of Q1, median and Q3, and explain how they would be read from a curve. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

Grouped frequencies are [10, 14, 26, 18, 6] across five increasing intervals. Form cumulative frequencies, identify the cumulative-frequency positions of Q1, median and Q3, and explain how they would be read from a curve. Your solution must justify the main method or assumption and include a final check.

Chapter 15: Cumulative-frequency curves

Q11 | 5 MARKS

You must show your working.
Grouped frequencies are [11, 16, 21, 19, 8] across five increasing intervals. Form cumulative frequencies, identify the cumulative-frequency positions of Q1, median and Q3, and explain how they would be read from a curve. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
Grouped frequencies are [12, 18, 24, 20, 10] across five increasing intervals. Form cumulative frequencies, identify the cumulative-frequency positions of Q1, median and Q3, and explain how they would be read from a curve. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Cumulative totals are [8, 24, 49, 67, 73]; N=73. Quartile positions are 73/4, 73/2, 219/4. From the curve, move horizontally from each cumulative-frequency value to the curve, then vertically to the measurement axis. Values are graphical estimates and depend on within-class interpolation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Cumulative totals are [11, 26, 52, 64, 70]; N=70. Quartile positions are 35/2, 35, 105/2. From the curve, move horizontally from each cumulative-frequency value to the curve, then vertically to the measurement axis. Values are graphical estimates and depend on within-class interpolation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Cumulative totals are [9, 23, 50, 65, 71]; N=71. Quartile positions are 71/4, 71/2, 213/4. From the curve, move horizontally from each cumulative-frequency value to the curve, then vertically to the measurement axis. Values are graphical estimates and depend on within-class interpolation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Cumulative totals are [12, 32, 52, 70, 76]; N=76. Quartile positions are 19, 38, 57. From the curve, move horizontally from each cumulative-frequency value to the curve, then vertically to the measurement axis. Values are graphical estimates and depend on within-class interpolation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Cumulative totals are [10, 29, 50, 62, 68]; N=68. Quartile positions are 17, 34, 51. From the curve, move horizontally from each cumulative-frequency value to the curve, then vertically to the measurement axis. Values are graphical estimates and depend on within-class interpolation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Cumulative totals are [8, 26, 48, 63, 69]; N=69. Quartile positions are 69/4, 69/2, 207/4. From the curve, move horizontally from each cumulative-frequency value to the curve, then vertically to the measurement axis. Values are graphical estimates and depend on within-class interpolation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Cumulative totals are [11, 28, 51, 69, 75]; N=75. Quartile positions are 75/4, 75/2, 225/4. From the curve, move horizontally from each cumulative-frequency value to the curve, then vertically to the measurement axis. Values are graphical estimates and depend on within-class interpolation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Cumulative totals are [9, 25, 49, 61, 67]; N=67. Quartile positions are 67/4, 67/2, 201/4. From the curve, move horizontally from each cumulative-frequency value to the curve, then vertically to the measurement axis. Values are graphical estimates and depend on within-class interpolation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Cumulative totals are [12, 27, 52, 67, 73]; N=73. Quartile positions are 73/4, 73/2, 219/4. From the curve, move horizontally from each cumulative-frequency value to the curve, then vertically to the measurement axis. Values are graphical estimates and depend on within-class interpolation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Cumulative totals are [10, 24, 50, 68, 74]; N=74. Quartile positions are 37/2, 37, 111/2. From the curve, move horizontally from each cumulative-frequency value to the curve, then vertically to the measurement axis. Values are graphical estimates and depend on within-class interpolation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Cumulative totals are [11, 27, 48, 67, 75]; N=75. Quartile positions are 75/4, 75/2, 225/4. From the curve, move horizontally from each cumulative-frequency value to the curve, then vertically to the measurement axis. Values are graphical estimates and depend on within-class interpolation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Cumulative totals are [12, 30, 54, 74, 84]; N=84. Quartile positions are 21, 42, 63. From the curve, move horizontally from each cumulative-frequency value to the curve, then vertically to the measurement axis. Values are graphical estimates and depend on within-class interpolation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 16

Box plots

12 curated questions | complete solutions

Chapter focus

Five-number summaries, construction and distribution comparison

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

Chapter 16: Box plots

Q01 | 4 MARKS

A distribution has five-number summary (8, 19, 24, 33, 47). Draw a correctly scaled box plot, calculate the range and IQR, and determine the lower and upper 1.5xIQR outlier fences. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

A distribution has five-number summary (5, 14, 22, 28, 36). Draw a correctly scaled box plot, calculate the range and IQR, and determine the lower and upper 1.5xIQR outlier fences. Your solution must justify the main method or assumption and include a final check.

Chapter 16: Box plots

Q03 | 4 MARKS

A distribution has five-number summary (8, 17, 23, 32, 43). Draw a correctly scaled box plot, calculate the range and IQR, and determine the lower and upper 1.5xIQR outlier fences. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

A distribution has five-number summary (5, 12, 21, 27, 41). Draw a correctly scaled box plot, calculate the range and IQR, and determine the lower and upper 1.5xIQR outlier fences. Your solution must justify the main method or assumption and include a final check.

Chapter 16: Box plots

Q05 | 4 MARKS

A distribution has five-number summary (8, 15, 22, 31, 39). Draw a correctly scaled box plot, calculate the range and IQR, and determine the lower and upper 1.5xIQR outlier fences. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

A distribution has five-number summary (5, 18, 23, 29, 40). Draw a correctly scaled box plot, calculate the range and IQR, and determine the lower and upper 1.5xIQR outlier fences. Your solution must justify the main method or assumption and include a final check.

Chapter 16: Box plots

Q07 | 4 MARKS

A distribution has five-number summary (8, 13, 21, 30, 44). Draw a correctly scaled box plot, calculate the range and IQR, and determine the lower and upper 1.5xIQR outlier fences. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

A distribution has five-number summary (5, 16, 22, 28, 36). Draw a correctly scaled box plot, calculate the range and IQR, and determine the lower and upper 1.5xIQR outlier fences. Your solution must justify the main method or assumption and include a final check.

Chapter 16: Box plots

Q09 | 4 MARKS

A distribution has five-number summary (8, 19, 28, 37, 48). Draw a correctly scaled box plot, calculate the range and IQR, and determine the lower and upper 1.5xIQR outlier fences. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

A distribution has five-number summary (5, 14, 21, 27, 41). Draw a correctly scaled box plot, calculate the range and IQR, and determine the lower and upper 1.5xIQR outlier fences. Your solution must justify the main method or assumption and include a final check.

Chapter 16: Box plots

Q11 | 5 MARKS

You must show your working.
A distribution has five-number summary (6, 15, 23, 30, 45). Draw a correctly scaled box plot, calculate the range and IQR, and determine the lower and upper 1.5xIQR outlier fences. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
A distribution has five-number summary (7, 16, 25, 33, 49). Draw a correctly scaled box plot, calculate the range and IQR, and determine the lower and upper 1.5xIQR outlier fences. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Whiskers are at 8 and 47; box edges at 19 and 33; median at 24. Range=39; IQR=14. Fences are 19-1.5(14)=-2 and 33+1.5(14)=54. Values beyond them are potential outliers. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Whiskers are at 5 and 36; box edges at 14 and 28; median at 22. Range=31; IQR=14. Fences are 14-1.5(14)=-7 and 28+1.5(14)=49. Values beyond them are potential outliers. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Whiskers are at 8 and 43; box edges at 17 and 32; median at 23. Range=35; IQR=15. Fences are 17-1.5(15)=-11/2 and 32+1.5(15)=109/2. Values beyond them are potential outliers. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Whiskers are at 5 and 41; box edges at 12 and 27; median at 21. Range=36; IQR=15. Fences are 12-1.5(15)=-21/2 and 27+1.5(15)=99/2. Values beyond them are potential outliers. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Whiskers are at 8 and 39; box edges at 15 and 31; median at 22. Range=31; IQR=16. Fences are 15-1.5(16)=-9 and 31+1.5(16)=55. Values beyond them are potential outliers. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Whiskers are at 5 and 40; box edges at 18 and 29; median at 23. Range=35; IQR=11. Fences are 18-1.5(11)=3/2 and 29+1.5(11)=91/2. Values beyond them are potential outliers. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Whiskers are at 8 and 44; box edges at 13 and 30; median at 21. Range=36; IQR=17. Fences are 13-1.5(17)=-25/2 and 30+1.5(17)=111/2. Values beyond them are potential outliers. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Whiskers are at 5 and 36; box edges at 16 and 28; median at 22. Range=31; IQR=12. Fences are 16-1.5(12)=-2 and 28+1.5(12)=46. Values beyond them are potential outliers. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Whiskers are at 8 and 48; box edges at 19 and 37; median at 28. Range=40; IQR=18. Fences are 19-1.5(18)=-8 and 37+1.5(18)=64. Values beyond them are potential outliers. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Whiskers are at 5 and 41; box edges at 14 and 27; median at 21. Range=36; IQR=13. Fences are 14-1.5(13)=-11/2 and 27+1.5(13)=93/2. Values beyond them are potential outliers. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Whiskers are at 6 and 45; box edges at 15 and 30; median at 23. Range=39; IQR=15. Fences are 15-1.5(15)=-15/2 and 30+1.5(15)=105/2. Values beyond them are potential outliers. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Whiskers are at 7 and 49; box edges at 16 and 33; median at 25. Range=42; IQR=17. Fences are 16-1.5(17)=-19/2 and 33+1.5(17)=117/2. Values beyond them are potential outliers. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 17

Comparing distributions

12 curated questions | complete solutions

Chapter focus

Centre, spread, skew and contextual conclusions

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

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Chapter 17: Comparing distributions

Q01 | 4 MARKS

Distribution A has median 55 and IQR 13; distribution B has median 58 and IQR 11. Compare typical value and consistency in context, then explain why these four statistics do not prove that every observation in B exceeds every observation in A. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

Distribution A has median 58 and IQR 16; distribution B has median 64 and IQR 8. Compare typical value and consistency in context, then explain why these four statistics do not prove that every observation in B exceeds every observation in A. Your solution must justify the main method or assumption and include a final check.

Chapter 17: Comparing distributions

Q03 | 4 MARKS

Distribution A has median 51 and IQR 12; distribution B has median 55 and IQR 11. Compare typical value and consistency in context, then explain why these four statistics do not prove that every observation in B exceeds every observation in A. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

Distribution A has median 54 and IQR 15; distribution B has median 61 and IQR 8. Compare typical value and consistency in context, then explain why these four statistics do not prove that every observation in B exceeds every observation in A. Your solution must justify the main method or assumption and include a final check.

Chapter 17: Comparing distributions

Q05 | 4 MARKS

Distribution A has median 57 and IQR 18; distribution B has median 62 and IQR 11. Compare typical value and consistency in context, then explain why these four statistics do not prove that every observation in B exceeds every observation in A. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

Distribution A has median 50 and IQR 14; distribution B has median 53 and IQR 8. Compare typical value and consistency in context, then explain why these four statistics do not prove that every observation in B exceeds every observation in A. Your solution must justify the main method or assumption and include a final check.

Chapter 17: Comparing distributions

Q07 | 4 MARKS

Distribution A has median 53 and IQR 17; distribution B has median 59 and IQR 11. Compare typical value and consistency in context, then explain why these four statistics do not prove that every observation in B exceeds every observation in A. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

Distribution A has median 56 and IQR 13; distribution B has median 60 and IQR 8. Compare typical value and consistency in context, then explain why these four statistics do not prove that every observation in B exceeds every observation in A. Your solution must justify the main method or assumption and include a final check.

Chapter 17: Comparing distributions

Q09 | 4 MARKS

Distribution A has median 59 and IQR 16; distribution B has median 66 and IQR 11. Compare typical value and consistency in context, then explain why these four statistics do not prove that every observation in B exceeds every observation in A. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

Distribution A has median 52 and IQR 12; distribution B has median 57 and IQR 8. Compare typical value and consistency in context, then explain why these four statistics do not prove that every observation in B exceeds every observation in A. Your solution must justify the main method or assumption and include a final check.

Chapter 17: Comparing distributions

Q11 | 5 MARKS

You must show your working.
Distribution A has median 53 and IQR 13; distribution B has median 59 and IQR 9. Compare typical value and consistency in context, then explain why these four statistics do not prove that every observation in B exceeds every observation in A. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
Distribution A has median 54 and IQR 14; distribution B has median 61 and IQR 10. Compare typical value and consistency in context, then explain why these four statistics do not prove that every observation in B exceeds every observation in A. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

B has the higher median (58 versus 55), so its typical value is higher. The smaller IQR is 11, belonging to B, indicating greater consistency in the middle 50%. The distributions may overlap; medians and IQRs do not locate every individual observation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

B has the higher median (64 versus 58), so its typical value is higher. The smaller IQR is 8, belonging to B, indicating greater consistency in the middle 50%. The distributions may overlap; medians and IQRs do not locate every individual observation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

B has the higher median (55 versus 51), so its typical value is higher. The smaller IQR is 11, belonging to B, indicating greater consistency in the middle 50%. The distributions may overlap; medians and IQRs do not locate every individual observation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

B has the higher median (61 versus 54), so its typical value is higher. The smaller IQR is 8, belonging to B, indicating greater consistency in the middle 50%. The distributions may overlap; medians and IQRs do not locate every individual observation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

B has the higher median (62 versus 57), so its typical value is higher. The smaller IQR is 11, belonging to B, indicating greater consistency in the middle 50%. The distributions may overlap; medians and IQRs do not locate every individual observation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

B has the higher median (53 versus 50), so its typical value is higher. The smaller IQR is 8, belonging to B, indicating greater consistency in the middle 50%. The distributions may overlap; medians and IQRs do not locate every individual observation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

B has the higher median (59 versus 53), so its typical value is higher. The smaller IQR is 11, belonging to B, indicating greater consistency in the middle 50%. The distributions may overlap; medians and IQRs do not locate every individual observation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

B has the higher median (60 versus 56), so its typical value is higher. The smaller IQR is 8, belonging to B, indicating greater consistency in the middle 50%. The distributions may overlap; medians and IQRs do not locate every individual observation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

B has the higher median (66 versus 59), so its typical value is higher. The smaller IQR is 11, belonging to B, indicating greater consistency in the middle 50%. The distributions may overlap; medians and IQRs do not locate every individual observation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

B has the higher median (57 versus 52), so its typical value is higher. The smaller IQR is 8, belonging to B, indicating greater consistency in the middle 50%. The distributions may overlap; medians and IQRs do not locate every individual observation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

B has the higher median (59 versus 53), so its typical value is higher. The smaller IQR is 9, belonging to B, indicating greater consistency in the middle 50%. The distributions may overlap; medians and IQRs do not locate every individual observation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

B has the higher median (61 versus 54), so its typical value is higher. The smaller IQR is 10, belonging to B, indicating greater consistency in the middle 50%. The distributions may overlap; medians and IQRs do not locate every individual observation. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 18

Capture-recapture estimation

12 curated questions | complete solutions

Chapter focus

Population estimation, assumptions and proportional reasoning

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

Chapter 18: Capture-recapture estimation

Q01 | 4 MARKS

In a capture-recapture study, 65 animals are marked initially. Later, 50 are captured and 13 are marked. Estimate the population size, show the proportional model, and discuss two assumptions whose failure would bias the estimate. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

In a capture-recapture study, 68 animals are marked initially. Later, 56 are captured and 16 are marked. Estimate the population size, show the proportional model, and discuss two assumptions whose failure would bias the estimate. Your solution must justify the main method or assumption and include a final check.

Chapter 18: Capture-recapture estimation

Q03 | 4 MARKS

In a capture-recapture study, 51 animals are marked initially. Later, 42 are captured and 9 are marked. Estimate the population size, show the proportional model, and discuss two assumptions whose failure would bias the estimate. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

In a capture-recapture study, 54 animals are marked initially. Later, 48 are captured and 12 are marked. Estimate the population size, show the proportional model, and discuss two assumptions whose failure would bias the estimate. Your solution must justify the main method or assumption and include a final check.

Chapter 18: Capture-recapture estimation

Q05 | 4 MARKS

In a capture-recapture study, 57 animals are marked initially. Later, 54 are captured and 15 are marked. Estimate the population size, show the proportional model, and discuss two assumptions whose failure would bias the estimate. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

In a capture-recapture study, 60 animals are marked initially. Later, 40 are captured and 8 are marked. Estimate the population size, show the proportional model, and discuss two assumptions whose failure would bias the estimate. Your solution must justify the main method or assumption and include a final check.

Chapter 18: Capture-recapture estimation

Q07 | 4 MARKS

In a capture-recapture study, 63 animals are marked initially. Later, 46 are captured and 11 are marked. Estimate the population size, show the proportional model, and discuss two assumptions whose failure would bias the estimate. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

In a capture-recapture study, 66 animals are marked initially. Later, 52 are captured and 14 are marked. Estimate the population size, show the proportional model, and discuss two assumptions whose failure would bias the estimate. Your solution must justify the main method or assumption and include a final check.

Chapter 18: Capture-recapture estimation

Q09 | 4 MARKS

In a capture-recapture study, 69 animals are marked initially. Later, 58 are captured and 17 are marked. Estimate the population size, show the proportional model, and discuss two assumptions whose failure would bias the estimate. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

In a capture-recapture study, 52 animals are marked initially. Later, 44 are captured and 10 are marked. Estimate the population size, show the proportional model, and discuss two assumptions whose failure would bias the estimate. Your solution must justify the main method or assumption and include a final check.

Chapter 18: Capture-recapture estimation

Q11 | 5 MARKS

You must show your working.
In a capture-recapture study, 53 animals are marked initially. Later, 46 are captured and 11 are marked. Estimate the population size, show the proportional model, and discuss two assumptions whose failure would bias the estimate. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
In a capture-recapture study, 54 animals are marked initially. Later, 48 are captured and 12 are marked. Estimate the population size, show the proportional model, and discuss two assumptions whose failure would bias the estimate. Your solution must justify the main method or assumption and include a final check. After completing the calculation, give one independent check that supports your result.

Worked solutions

Q01 | 4 MARKS

Assume marked proportion in second sample approximates marked proportion in population: 13/50=65/N. Thus N=65x50/13=250.0, normally rounded appropriately. Assumptions include a closed population, marks retained and recognisable, full mixing, and equal recapture probability. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Assume marked proportion in second sample approximates marked proportion in population: 16/56=68/N. Thus N=68x56/16=238.0, normally rounded appropriately. Assumptions include a closed population, marks retained and recognisable, full mixing, and equal recapture probability. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Assume marked proportion in second sample approximates marked proportion in population: 9/42=51/N. Thus N=51x42/9=238.0, normally rounded appropriately. Assumptions include a closed population, marks retained and recognisable, full mixing, and equal recapture probability. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Assume marked proportion in second sample approximates marked proportion in population: 12/48=54/N. Thus N=54x48/12=216.0, normally rounded appropriately. Assumptions include a closed population, marks retained and recognisable, full mixing, and equal recapture probability. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Assume marked proportion in second sample approximates marked proportion in population: 15/54=57/N. Thus N=57x54/15=205.2, normally rounded appropriately. Assumptions include a closed population, marks retained and recognisable, full mixing, and equal recapture probability. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Assume marked proportion in second sample approximates marked proportion in population: 8/40=60/N. Thus N=60x40/8=300.0, normally rounded appropriately. Assumptions include a closed population, marks retained and recognisable, full mixing, and equal recapture probability. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Assume marked proportion in second sample approximates marked proportion in population: 11/46=63/N. Thus N=63x46/11=263.5, normally rounded appropriately. Assumptions include a closed population, marks retained and recognisable, full mixing, and equal recapture probability. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Assume marked proportion in second sample approximates marked proportion in population: 14/52=66/N. Thus N=66x52/14=245.1, normally rounded appropriately. Assumptions include a closed population, marks retained and recognisable, full mixing, and equal recapture probability. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Assume marked proportion in second sample approximates marked proportion in population: 17/58=69/N. Thus N=69x58/17=235.4, normally rounded appropriately. Assumptions include a closed population, marks retained and recognisable, full mixing, and equal recapture probability. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Assume marked proportion in second sample approximates marked proportion in population: 10/44=52/N. Thus N=52x44/10=228.8, normally rounded appropriately. Assumptions include a closed population, marks retained and recognisable, full mixing, and equal recapture probability. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Assume marked proportion in second sample approximates marked proportion in population: 11/46=53/N. Thus N=53x46/11=221.6, normally rounded appropriately. Assumptions include a closed population, marks retained and recognisable, full mixing, and equal recapture probability. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Assume marked proportion in second sample approximates marked proportion in population: 12/48=54/N. Thus N=54x48/12=216.0, normally rounded appropriately. Assumptions include a closed population, marks retained and recognisable, full mixing, and equal recapture probability. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context. A valid independent check uses substitution, an inverse operation, estimation, or the defining property as appropriate.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 19

Grouped-data interpolation

12 curated questions | complete solutions

Chapter focus

Linear interpolation within classes and assumption critique

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

Chapter 19: Grouped-data interpolation

Q01 | 4 MARKS

A cumulative-frequency estimate is required inside class 25 < x <= 35. The cumulative frequency before the class is 30, the class frequency is 24, and the target cumulative frequency is 38. Use linear interpolation to estimate x and state the assumption made. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

A cumulative-frequency estimate is required inside class 28 < x <= 38. The cumulative frequency before the class is 33, the class frequency is 18, and the target cumulative frequency is 39. Use linear interpolation to estimate x and state the assumption made. Your solution must justify the main method or assumption and include a final check.

Chapter 19: Grouped-data interpolation

Q03 | 4 MARKS

A cumulative-frequency estimate is required inside class 21 < x <= 31. The cumulative frequency before the class is 36, the class frequency is 24, and the target cumulative frequency is 44. Use linear interpolation to estimate x and state the assumption made. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

A cumulative-frequency estimate is required inside class 24 < x <= 34. The cumulative frequency before the class is 39, the class frequency is 18, and the target cumulative frequency is 45. Use linear interpolation to estimate x and state the assumption made. Your solution must justify the main method or assumption and include a final check.

Chapter 19: Grouped-data interpolation

Q05 | 4 MARKS

A cumulative-frequency estimate is required inside class 27 < x <= 37. The cumulative frequency before the class is 42, the class frequency is 24, and the target cumulative frequency is 50. Use linear interpolation to estimate x and state the assumption made. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

A cumulative-frequency estimate is required inside class 20 < x <= 30. The cumulative frequency before the class is 30, the class frequency is 18, and the target cumulative frequency is 36. Use linear interpolation to estimate x and state the assumption made. Your solution must justify the main method or assumption and include a final check.

Chapter 19: Grouped-data interpolation

Q07 | 4 MARKS

A cumulative-frequency estimate is required inside class 23 < x <= 33. The cumulative frequency before the class is 33, the class frequency is 24, and the target cumulative frequency is 41. Use linear interpolation to estimate x and state the assumption made. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

A cumulative-frequency estimate is required inside class 26 < x <= 36. The cumulative frequency before the class is 36, the class frequency is 18, and the target cumulative frequency is 42. Use linear interpolation to estimate x and state the assumption made. Your solution must justify the main method or assumption and include a final check.

Chapter 19: Grouped-data interpolation

Q09 | 4 MARKS

A cumulative-frequency estimate is required inside class 29 < x <= 39. The cumulative frequency before the class is 39, the class frequency is 24, and the target cumulative frequency is 47. Use linear interpolation to estimate x and state the assumption made. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

A cumulative-frequency estimate is required inside class 22 < x <= 32. The cumulative frequency before the class is 42, the class frequency is 18, and the target cumulative frequency is 48. Use linear interpolation to estimate x and state the assumption made. Your solution must justify the main method or assumption and include a final check.

Chapter 19: Grouped-data interpolation

Q11 | 5 MARKS

You must show your working.
A cumulative-frequency estimate is required inside class 23 < x <= 33. The cumulative frequency before the class is 43, the class frequency is 20, and the target cumulative frequency is 149/3. Use linear interpolation to estimate x and state the assumption made. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
A cumulative-frequency estimate is required inside class 24 < x <= 34. The cumulative frequency before the class is 44, the class frequency is 22, and the target cumulative frequency is 154/3. Use linear interpolation to estimate x and state the assumption made. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Fraction through class=(38-30)/24=1/3. Estimated x=25+1/3(10)=28.333. The method assumes observations are distributed uniformly within that class interval. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Fraction through class=(39-33)/18=1/3. Estimated x=28+1/3(10)=31.333. The method assumes observations are distributed uniformly within that class interval. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Fraction through class=(44-36)/24=1/3. Estimated x=21+1/3(10)=24.333. The method assumes observations are distributed uniformly within that class interval. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Fraction through class=(45-39)/18=1/3. Estimated x=24+1/3(10)=27.333. The method assumes observations are distributed uniformly within that class interval. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Fraction through class=(50-42)/24=1/3. Estimated x=27+1/3(10)=30.333. The method assumes observations are distributed uniformly within that class interval. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Fraction through class=(36-30)/18=1/3. Estimated x=20+1/3(10)=23.333. The method assumes observations are distributed uniformly within that class interval. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Fraction through class=(41-33)/24=1/3. Estimated x=23+1/3(10)=26.333. The method assumes observations are distributed uniformly within that class interval. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Fraction through class=(42-36)/18=1/3. Estimated x=26+1/3(10)=29.333. The method assumes observations are distributed uniformly within that class interval. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Fraction through class=(47-39)/24=1/3. Estimated x=29+1/3(10)=32.333. The method assumes observations are distributed uniformly within that class interval. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Fraction through class=(48-42)/18=1/3. Estimated x=22+1/3(10)=25.333. The method assumes observations are distributed uniformly within that class interval. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Fraction through class=(149/3-43)/20=1/3. Estimated x=23+1/3(10)=26.333. The method assumes observations are distributed uniformly within that class interval. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Fraction through class=(154/3-44)/22=1/3. Estimated x=24+1/3(10)=27.333. The method assumes observations are distributed uniformly within that class interval. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Chapter completion record

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HIGHER TIER

UNIT 6 | CHAPTER 20

Statistical investigations and critical conclusions

12 curated questions | complete solutions

Chapter focus

Planning, processing, comparison, limitations and evidence-based conclusions

Assessment progression

All questions require developed working. Questions 1-4 secure Higher methods; Questions 5-8 connect representations; Questions 9-12 develop Grade 7-9 reasoning.

You must show your working for every question worth 5 marks or more.

Source-use notice

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Chapter 20: Statistical investigations and critical conclusions

Q01 | 4 MARKS

Two teaching methods are compared using samples of 40 and 45 learners. Their mean scores are 59 and 66. Design the remaining investigation: identify suitable sampling, an additional spread statistic, an appropriate display, a supported preliminary conclusion, and at least three limitations. Your solution must justify the main method or assumption and include a final check.

Q02 | 4 MARKS

Two teaching methods are compared using samples of 43 and 51 learners. Their mean scores are 62 and 67. Design the remaining investigation: identify suitable sampling, an additional spread statistic, an appropriate display, a supported preliminary conclusion, and at least three limitations. Your solution must justify the main method or assumption and include a final check.

Chapter 20: Statistical investigations and critical conclusions

Q03 | 4 MARKS

Two teaching methods are compared using samples of 46 and 57 learners. Their mean scores are 58 and 68. Design the remaining investigation: identify suitable sampling, an additional spread statistic, an appropriate display, a supported preliminary conclusion, and at least three limitations. Your solution must justify the main method or assumption and include a final check.

Q04 | 4 MARKS

Two teaching methods are compared using samples of 49 and 48 learners. Their mean scores are 61 and 61. Design the remaining investigation: identify suitable sampling, an additional spread statistic, an appropriate display, a supported preliminary conclusion, and at least three limitations. Your solution must justify the main method or assumption and include a final check.

Chapter 20: Statistical investigations and critical conclusions

Q05 | 4 MARKS

Two teaching methods are compared using samples of 52 and 54 learners. Their mean scores are 64 and 62. Design the remaining investigation: identify suitable sampling, an additional spread statistic, an appropriate display, a supported preliminary conclusion, and at least three limitations. Your solution must justify the main method or assumption and include a final check.

Q06 | 4 MARKS

Two teaching methods are compared using samples of 40 and 45 learners. Their mean scores are 60 and 63. Design the remaining investigation: identify suitable sampling, an additional spread statistic, an appropriate display, a supported preliminary conclusion, and at least three limitations. Your solution must justify the main method or assumption and include a final check.

Chapter 20: Statistical investigations and critical conclusions

Q07 | 4 MARKS

Two teaching methods are compared using samples of 43 and 51 learners. Their mean scores are 63 and 64. Design the remaining investigation: identify suitable sampling, an additional spread statistic, an appropriate display, a supported preliminary conclusion, and at least three limitations. Your solution must justify the main method or assumption and include a final check.

Q08 | 4 MARKS

Two teaching methods are compared using samples of 46 and 57 learners. Their mean scores are 59 and 65. Design the remaining investigation: identify suitable sampling, an additional spread statistic, an appropriate display, a supported preliminary conclusion, and at least three limitations. Your solution must justify the main method or assumption and include a final check.

Chapter 20: Statistical investigations and critical conclusions

Q09 | 4 MARKS

Two teaching methods are compared using samples of 49 and 48 learners. Their mean scores are 62 and 66. Design the remaining investigation: identify suitable sampling, an additional spread statistic, an appropriate display, a supported preliminary conclusion, and at least three limitations. Your solution must justify the main method or assumption and include a final check.

Q10 | 4 MARKS

Two teaching methods are compared using samples of 52 and 54 learners. Their mean scores are 58 and 67. Design the remaining investigation: identify suitable sampling, an additional spread statistic, an appropriate display, a supported preliminary conclusion, and at least three limitations. Your solution must justify the main method or assumption and include a final check.

Chapter 20: Statistical investigations and critical conclusions

Q11 | 5 MARKS

You must show your working.
Two teaching methods are compared using samples of 53 and 56 learners. Their mean scores are 59 and 62. Design the remaining investigation: identify suitable sampling, an additional spread statistic, an appropriate display, a supported preliminary conclusion, and at least three limitations. Your solution must justify the main method or assumption and include a final check.

Q12 | 6 MARKS

You must show your working.
Two teaching methods are compared using samples of 54 and 58 learners. Their mean scores are 60 and 65. Design the remaining investigation: identify suitable sampling, an additional spread statistic, an appropriate display, a supported preliminary conclusion, and at least three limitations. Your solution must justify the main method or assumption and include a final check.

Worked solutions

Q01 | 4 MARKS

Use random or relevant stratified sampling and identical assessment conditions. Calculate IQR or standard range information and use paired box plots or another display suited to the data. The observed mean difference is 7 points in favour of B, but conclude cautiously. Limitations include sampling bias, unequal prior attainment, uncontrolled teaching time, non-response, measurement validity and absence of spread information. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q02 | 4 MARKS

Use random or relevant stratified sampling and identical assessment conditions. Calculate IQR or standard range information and use paired box plots or another display suited to the data. The observed mean difference is 5 points in favour of B, but conclude cautiously. Limitations include sampling bias, unequal prior attainment, uncontrolled teaching time, non-response, measurement validity and absence of spread information. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q03 | 4 MARKS

Use random or relevant stratified sampling and identical assessment conditions. Calculate IQR or standard range information and use paired box plots or another display suited to the data. The observed mean difference is 10 points in favour of B, but conclude cautiously. Limitations include sampling bias, unequal prior attainment, uncontrolled teaching time, non-response, measurement validity and absence of spread information. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q04 | 4 MARKS

Use random or relevant stratified sampling and identical assessment conditions. Calculate IQR or standard range information and use paired box plots or another display suited to the data. The observed mean difference is 0 points in favour of neither, but conclude cautiously. Limitations include sampling bias, unequal prior attainment, uncontrolled teaching time, non-response, measurement validity and absence of spread information. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q05 | 4 MARKS

Use random or relevant stratified sampling and identical assessment conditions. Calculate IQR or standard range information and use paired box plots or another display suited to the data. The observed mean difference is -2 points in favour of A, but conclude cautiously. Limitations include sampling bias, unequal prior attainment, uncontrolled teaching time, non-response, measurement validity and absence of spread information. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q06 | 4 MARKS

Use random or relevant stratified sampling and identical assessment conditions. Calculate IQR or standard range information and use paired box plots or another display suited to the data. The observed mean difference is 3 points in favour of B, but conclude cautiously. Limitations include sampling bias, unequal prior attainment, uncontrolled teaching time, non-response, measurement validity and absence of spread information. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q07 | 4 MARKS

Use random or relevant stratified sampling and identical assessment conditions. Calculate IQR or standard range information and use paired box plots or another display suited to the data. The observed mean difference is 1 points in favour of B, but conclude cautiously. Limitations include sampling bias, unequal prior attainment, uncontrolled teaching time, non-response, measurement validity and absence of spread information. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q08 | 4 MARKS

Use random or relevant stratified sampling and identical assessment conditions. Calculate IQR or standard range information and use paired box plots or another display suited to the data. The observed mean difference is 6 points in favour of B, but conclude cautiously. Limitations include sampling bias, unequal prior attainment, uncontrolled teaching time, non-response, measurement validity and absence of spread information. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q09 | 4 MARKS

Use random or relevant stratified sampling and identical assessment conditions. Calculate IQR or standard range information and use paired box plots or another display suited to the data. The observed mean difference is 4 points in favour of B, but conclude cautiously. Limitations include sampling bias, unequal prior attainment, uncontrolled teaching time, non-response, measurement validity and absence of spread information. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q10 | 4 MARKS

Use random or relevant stratified sampling and identical assessment conditions. Calculate IQR or standard range information and use paired box plots or another display suited to the data. The observed mean difference is 9 points in favour of B, but conclude cautiously. Limitations include sampling bias, unequal prior attainment, uncontrolled teaching time, non-response, measurement validity and absence of spread information. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Worked solutions

Q11 | 5 MARKS

Use random or relevant stratified sampling and identical assessment conditions. Calculate IQR or standard range information and use paired box plots or another display suited to the data. The observed mean difference is 3 points in favour of B, but conclude cautiously. Limitations include sampling bias, unequal prior attainment, uncontrolled teaching time, non-response, measurement validity and absence of spread information. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

Q12 | 6 MARKS

Use random or relevant stratified sampling and identical assessment conditions. Calculate IQR or standard range information and use paired box plots or another display suited to the data. The observed mean difference is 5 points in favour of B, but conclude cautiously. Limitations include sampling bias, unequal prior attainment, uncontrolled teaching time, non-response, measurement validity and absence of spread information. The written justification should identify the decisive method or assumption; the check should confirm the result independently or test it against the context.

Credit a correct method and accurate progress; reserve the final mark for the required answer, justification or contextual conclusion.

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