

GCSE ONLINE TUTORING

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GCSE MATHEMATICS FOUNDATION TIER

UNIT 6: STATISTICS

6 chapters | 72 curated questions | 1-4 marks

Student name: _____

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Contents and publication statement

This curated Foundation edition prioritises distinct tasks, accurate tier boundaries, clear working space and visible reasoning. Marks indicate an independent teaching allocation, not an official Eduqas mark scheme.

Chapter	Specification topic
1	FS1 - Sampling and populations
2	FS2 - Questionnaires and fairness
3	FS3 - Tables, charts and time series
4	FS4 - Averages, spread and distributions
5	FS5 - Using statistics to describe populations
6	FS6 - Scatter graphs, correlation and prediction

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FOUNDATION TIER

UNIT 6 | CHAPTER 1

FS1 - Sampling and populations

12 curated questions | complete solutions

Chapter focus

Infer properties of populations from samples while recognising the limitations of sampling.

Assessment progression

Questions 1-4 secure essential Foundation skills; Questions 5-8 connect representations; Questions 9-12 develop Grade 4-5 reasoning and interpretation.

Working expectation

Show every stage for questions worth 4 marks. For all other questions, write enough working for another student to follow your method.

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Chapter 1: FS1 - Sampling and populations

Q01 | 4 MARKS

You must show your working.

An unbiased sample of 50 people contains 22 who prefer option A. Estimate how many of a population of 600 prefer A and state why the answer is only an estimate.

Q02 | 3 MARKS

A school wants pupils' views on homework. Survey 2 asks only pupils attending an after-school homework club. Identify the sampling problem and suggest an improvement.

Chapter 1: FS1 - Sampling and populations

Q03 | 3 MARKS

Two random samples from the same population contain 35 and 150 people. Which sample is generally more reliable, and give one limitation that may remain?

Q04 | 4 MARKS

You must show your working.

An unbiased sample of 80 people contains 34 who prefer option A. Estimate how many of a population of 900 prefer A and state why the answer is only an estimate.

Chapter 1: FS1 - Sampling and populations

Q05 | 3 MARKS

A school wants pupils' views on homework. Survey 5 asks only pupils attending an after-school homework club. Identify the sampling problem and suggest an improvement.

Q06 | 3 MARKS

Two random samples from the same population contain 50 and 180 people. Which sample is generally more reliable, and give one limitation that may remain?

Chapter 1: FS1 - Sampling and populations

Q07 | 4 MARKS

You must show your working.

An unbiased sample of 110 people contains 46 who prefer option A. Estimate how many of a population of 1200 prefer A and state why the answer is only an estimate.

Q08 | 3 MARKS

A school wants pupils' views on homework. Survey 8 asks only pupils attending an after-school homework club. Identify the sampling problem and suggest an improvement.

Chapter 1: FS1 - Sampling and populations

Q09 | 3 MARKS

Two random samples from the same population contain 65 and 210 people. Which sample is generally more reliable, and give one limitation that may remain?

Q10 | 4 MARKS

You must show your working.

An unbiased sample of 140 people contains 58 who prefer option A. Estimate how many of a population of 1500 prefer A and state why the answer is only an estimate.

Chapter 1: FS1 - Sampling and populations

Q11 | 3 MARKS

A school wants pupils' views on homework. Survey 11 asks only pupils attending an after-school homework club. Identify the sampling problem and suggest an improvement.

Q12 | 3 MARKS

Two random samples from the same population contain 80 and 240 people. Which sample is generally more reliable, and give one limitation that may remain?

Worked solutions

Q01 | 4 MARKS

Sample proportion= $22/50$. Estimate= $600 \times 22/50=264.00$, which is about 264 people. Sampling variation means the true population value may differ.

ANSWER: About 264; a sample may not represent the population exactly

Q02 | 3 MARKS

Homework-club pupils may have different views from other pupils. A random or stratified sample from the full school population is more representative.

ANSWER: The sample is biased; select pupils randomly from the whole school

Worked solutions

Q03 | 3 MARKS

A larger random sample usually reduces sampling variation, but size alone does not guarantee perfect representation.

ANSWER: The sample of 150; it can still be unrepresentative by chance or through non-response

Q04 | 4 MARKS

Sample proportion = $34/80$. Estimate = $900 \times 34/80 = 382.50$, which is about 383 people. Sampling variation means the true population value may differ.

ANSWER: About 383; a sample may not represent the population exactly

Worked solutions

Q05 | 3 MARKS

Homework-club pupils may have different views from other pupils. A random or stratified sample from the full school population is more representative.

ANSWER: The sample is biased; select pupils randomly from the whole school

Q06 | 3 MARKS

A larger random sample usually reduces sampling variation, but size alone does not guarantee perfect representation.

ANSWER: The sample of 180; it can still be unrepresentative by chance or through non-response

Worked solutions

Q07 | 4 MARKS

Sample proportion= $46/110$. Estimate= $1200 \times 46/110=501.82$, which is about 502 people. Sampling variation means the true population value may differ.

ANSWER: About 502; a sample may not represent the population exactly

Q08 | 3 MARKS

Homework-club pupils may have different views from other pupils. A random or stratified sample from the full school population is more representative.

ANSWER: The sample is biased; select pupils randomly from the whole school

Worked solutions

Q09 | 3 MARKS

A larger random sample usually reduces sampling variation, but size alone does not guarantee perfect representation.

ANSWER: The sample of 210; it can still be unrepresentative by chance or through non-response

Q10 | 4 MARKS

Sample proportion = $58/140$. Estimate = $1500 \times 58/140 = 621.43$, which is about 621 people. Sampling variation means the true population value may differ.

ANSWER: About 621; a sample may not represent the population exactly

Worked solutions

Q11 | 3 MARKS

Homework-club pupils may have different views from other pupils. A random or stratified sample from the full school population is more representative.

ANSWER: The sample is biased; select pupils randomly from the whole school

Q12 | 3 MARKS

A larger random sample usually reduces sampling variation, but size alone does not guarantee perfect representation.

ANSWER: The sample of 240; it can still be unrepresentative by chance or through non-response

Chapter completion record

Question	Score / marks	Repair target	Retest date
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FOUNDATION TIER

UNIT 6 | CHAPTER 2

FS2 - Questionnaires and fairness

12 curated questions | complete solutions

Chapter focus

Design and criticise questionnaire questions, response options and sampling choices.

Assessment progression

Questions 1-4 secure essential Foundation skills; Questions 5-8 connect representations; Questions 9-12 develop Grade 4-5 reasoning and interpretation.

Working expectation

Show every stage for questions worth 4 marks. For all other questions, write enough working for another student to follow your method.

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Chapter 2: FS2 - Questionnaires and fairness

Q01 | 4 MARKS

You must show your working.

Questionnaire item 1 asks: "Don't you agree that our excellent new library should stay open later?" Explain two problems and rewrite it fairly.

Q02 | 3 MARKS

A questionnaire asks weekly study time using: 0-3 hours, 3-5 hours, 5-7 hours. Identify the boundary problem and give non-overlapping intervals.

Chapter 2: FS2 - Questionnaires and fairness

Q03 | 4 MARKS

You must show your working.

A survey numbered 3 asks “How often do you exercise?” with options Never, Sometimes and Often. Give two improvements that would make responses easier to interpret.

Q04 | 4 MARKS

You must show your working.

Questionnaire item 4 asks: “Don’t you agree that our excellent new library should stay open later?” Explain two problems and rewrite it fairly.

Chapter 2: FS2 - Questionnaires and fairness

Q05 | 3 MARKS

A questionnaire asks weekly study time using: 0-6 hours, 6-8 hours, 8-10 hours. Identify the boundary problem and give non-overlapping intervals.

Q06 | 4 MARKS

You must show your working.

A survey numbered 6 asks "How often do you exercise?" with options Never, Sometimes and Often. Give two improvements that would make responses easier to interpret.

Chapter 2: FS2 - Questionnaires and fairness

Q07 | 4 MARKS

You must show your working.

Questionnaire item 7 asks: "Don't you agree that our excellent new library should stay open later?" Explain two problems and rewrite it fairly.

Q08 | 3 MARKS

A questionnaire asks weekly study time using: 0-9 hours, 9-11 hours, 11-13 hours. Identify the boundary problem and give non-overlapping intervals.

Chapter 2: FS2 - Questionnaires and fairness

Q09 | 4 MARKS

You must show your working.

A survey numbered 9 asks “How often do you exercise?” with options Never, Sometimes and Often. Give two improvements that would make responses easier to interpret.

Q10 | 4 MARKS

You must show your working.

Questionnaire item 10 asks: “Don’t you agree that our excellent new library should stay open later?” Explain two problems and rewrite it fairly.

Chapter 2: FS2 - Questionnaires and fairness

Q11 | 3 MARKS

A questionnaire asks weekly study time using: 0-12 hours, 12-14 hours, 14-16 hours. Identify the boundary problem and give non-overlapping intervals.

Q12 | 4 MARKS

You must show your working.

A survey numbered 12 asks "How often do you exercise?" with options Never, Sometimes and Often. Give two improvements that would make responses easier to interpret.

Worked solutions

Q01 | 4 MARKS

Remove language that encourages one answer and provide balanced, exhaustive response options.

ANSWER: It is leading and uses emotive wording; e.g. "Should the library stay open later? Yes / No / Not sure"

Q02 | 3 MARKS

A value at a shared endpoint could fit two boxes. Use one included and one excluded boundary, then add $t \geq 7$ so the categories are exhaustive.

ANSWER: The endpoints overlap; e.g. $0 \leq t < 3$, $3 \leq t < 5$, $5 \leq t < 7$, $t \geq 7$

Worked solutions

Q03 | 4 MARKS

Words such as “sometimes” mean different things to different people. A period such as “in the last 7 days” and numerical intervals produce clearer data.

ANSWER: Specify a time period and use numerical, exhaustive, non-overlapping response intervals

Q04 | 4 MARKS

Remove language that encourages one answer and provide balanced, exhaustive response options.

ANSWER: It is leading and uses emotive wording; e.g. “Should the library stay open later? Yes / No / Not sure”

Worked solutions

Q05 | 3 MARKS

A value at a shared endpoint could fit two boxes. Use one included and one excluded boundary, then add $t \geq 10$ so the categories are exhaustive.

ANSWER: The endpoints overlap; e.g. $0 \leq t < 6$, $6 \leq t < 8$, $8 \leq t < 10$, $t \geq 10$

Q06 | 4 MARKS

Words such as “sometimes” mean different things to different people. A period such as “in the last 7 days” and numerical intervals produce clearer data.

ANSWER: Specify a time period and use numerical, exhaustive, non-overlapping response intervals

Worked solutions

Q07 | 4 MARKS

Remove language that encourages one answer and provide balanced, exhaustive response options.

ANSWER: It is leading and uses emotive wording; e.g. "Should the library stay open later? Yes / No / Not sure"

Q08 | 3 MARKS

A value at a shared endpoint could fit two boxes. Use one included and one excluded boundary, then add $t \geq 13$ so the categories are exhaustive.

ANSWER: The endpoints overlap; e.g. $0 \leq t < 9$, $9 \leq t < 11$, $11 \leq t < 13$, $t \geq 13$

Worked solutions

Q09 | 4 MARKS

Words such as “sometimes” mean different things to different people. A period such as “in the last 7 days” and numerical intervals produce clearer data.

ANSWER: Specify a time period and use numerical, exhaustive, non-overlapping response intervals

Q10 | 4 MARKS

Remove language that encourages one answer and provide balanced, exhaustive response options.

ANSWER: It is leading and uses emotive wording; e.g. “Should the library stay open later? Yes / No / Not sure”

Worked solutions

Q11 | 3 MARKS

A value at a shared endpoint could fit two boxes. Use one included and one excluded boundary, then add $t \geq 16$ so the categories are exhaustive.

ANSWER: The endpoints overlap; e.g. $0 \leq t < 12$, $12 \leq t < 14$, $14 \leq t < 16$, $t \geq 16$

Q12 | 4 MARKS

Words such as “sometimes” mean different things to different people. A period such as “in the last 7 days” and numerical intervals produce clearer data.

ANSWER: Specify a time period and use numerical, exhaustive, non-overlapping response intervals

Chapter completion record

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FOUNDATION TIER

UNIT 6 | CHAPTER 3

FS3 - Tables, charts and time series

12 curated questions | complete solutions

Chapter focus

Interpret and construct frequency tables, bar charts, pie charts, pictograms, vertical line charts and time-series graphs.

Assessment progression

Questions 1-4 secure essential Foundation skills; Questions 5-8 connect representations; Questions 9-12 develop Grade 4-5 reasoning and interpretation.

Working expectation

Show every stage for questions worth 4 marks. For all other questions, write enough working for another student to follow your method.

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Chapter 3: FS3 - Tables, charts and time series

Q01 | 3 MARKS

A survey records four categories with frequencies 4, 6, 8 and 6. Find the pie-chart angle for the third category.

Q02 | 2 MARKS

On a pictogram, one complete symbol represents 4 people. A category has 5 complete symbols and one half-symbol. Find its frequency.

Chapter 3: FS3 - Tables, charts and time series

Q03 | 3 MARKS

A time series has consecutive values [15, 18, 14, 21, 23]. State the overall change from first to last and identify the interval with the largest increase.

Q04 | 2 MARKS

Scores 1, 2, 3, 4 and 5 have frequencies [5, 7, 8, 6, 4]. State an appropriate chart and the total number of observations.

Chapter 3: FS3 - Tables, charts and time series

Q05 | 3 MARKS

A survey records four categories with frequencies 8, 10, 12 and 10. Find the pie-chart angle for the third category.

Q06 | 2 MARKS

On a pictogram, one complete symbol represents 4 people. A category has 9 complete symbols and one half-symbol. Find its frequency.

Chapter 3: FS3 - Tables, charts and time series

Q07 | 3 MARKS

A time series has consecutive values [19, 22, 18, 25, 27]. State the overall change from first to last and identify the interval with the largest increase.

Q08 | 2 MARKS

Scores 1, 2, 3, 4 and 5 have frequencies [9, 11, 12, 10, 8]. State an appropriate chart and the total number of observations.

Chapter 3: FS3 - Tables, charts and time series

Q09 | 3 MARKS

A survey records four categories with frequencies 12, 14, 16 and 14. Find the pie-chart angle for the third category.

Q10 | 2 MARKS

On a pictogram, one complete symbol represents 4 people. A category has 13 complete symbols and one half-symbol. Find its frequency.

Chapter 3: FS3 - Tables, charts and time series

Q11 | 3 MARKS

A time series has consecutive values [23, 26, 22, 29, 31]. State the overall change from first to last and identify the interval with the largest increase.

Q12 | 2 MARKS

Scores 1, 2, 3, 4 and 5 have frequencies [13, 15, 16, 14, 12]. State an appropriate chart and the total number of observations.

Worked solutions

Q01 | 3 MARKS

Angle=frequency/total x 360=8/24 x 360=120 degrees.

ANSWER: 120 degrees

Q02 | 2 MARKS

Frequency=(5+1/2) x 4=22.

ANSWER: 22

Worked solutions

Q03 | 3 MARKS

Overall change= $23-15=8$. Consecutive changes are 3, -4, 7 and 2; the largest rise is from 3 to 4.

ANSWER: Increase of 8; interval 3 to 4

Q04 | 2 MARKS

The scores are ungrouped discrete numerical data, so a vertical line chart is suitable. Add the frequencies for the total.

ANSWER: Vertical line chart; 30

Worked solutions

Q05 | 3 MARKS

Angle=frequency/total $\times$ 360= $12/40 \times 360=108$ degrees.

ANSWER: 108 degrees

Q06 | 2 MARKS

Frequency= $(9+1/2) \times 4=38$.

ANSWER: 38

Worked solutions

Q07 | 3 MARKS

Overall change= $27-19=8$. Consecutive changes are 3, -4, 7 and 2; the largest rise is from 3 to 4.

ANSWER: Increase of 8; interval 3 to 4

Q08 | 2 MARKS

The scores are ungrouped discrete numerical data, so a vertical line chart is suitable. Add the frequencies for the total.

ANSWER: Vertical line chart; 50

Worked solutions

Q09 | 3 MARKS

Angle=frequency/total x 360= $16/56 \times 360=720/7$ degrees.

ANSWER: $720/7$ degrees

Q10 | 2 MARKS

Frequency= $(13+1/2) \times 4=54$.

ANSWER: 54

Worked solutions

Q11 | 3 MARKS

Overall change= $31-23=8$. Consecutive changes are 3, -4, 7 and 2; the largest rise is from 3 to 4.

ANSWER: Increase of 8; interval 3 to 4

Q12 | 2 MARKS

The scores are ungrouped discrete numerical data, so a vertical line chart is suitable. Add the frequencies for the total.

ANSWER: Vertical line chart; 70

Chapter completion record

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FOUNDATION TIER

UNIT 6 | CHAPTER 4

FS4 - Averages, spread and distributions

12 curated questions | complete solutions

Chapter focus

Interpret, analyse and compare discrete, continuous and grouped data using suitable diagrams, averages and range.

Assessment progression

Questions 1-4 secure essential Foundation skills; Questions 5-8 connect representations; Questions 9-12 develop Grade 4-5 reasoning and interpretation.

Working expectation

Show every stage for questions worth 4 marks. For all other questions, write enough working for another student to follow your method.

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Chapter 4: FS4 - Averages, spread and distributions

Q01 | 4 MARKS

You must show your working.

For the data [1, 3, 4, 6, 6], calculate the mean, median, mode and range.

Q02 | 4 MARKS

You must show your working.

Group A has mean 22 and range 14. Group B has mean 24 and range 8. Compare their typical values and consistency.

Chapter 4: FS4 - Averages, spread and distributions

Q03 | 4 MARKS

You must show your working.

Grouped intervals $0 \leq x < 10$, $10 \leq x < 20$ and $20 \leq x < 30$ have frequencies [5, 7, 6]. Estimate the mean.

Q04 | 4 MARKS

You must show your working.

The ordered data are [8, 9, 10, 11, 34]. Identify the outlier and explain whether the mean or median better represents a typical value.

Chapter 4: FS4 - Averages, spread and distributions

Q05 | 4 MARKS

You must show your working.

For the data [5, 7, 8, 10, 10], calculate the mean, median, mode and range.

Q06 | 4 MARKS

You must show your working.

Group A has mean 26 and range 18. Group B has mean 28 and range 12. Compare their typical values and consistency.

Chapter 4: FS4 - Averages, spread and distributions

Q07 | 4 MARKS

You must show your working.

Grouped intervals $0 \leq x < 10$, $10 \leq x < 20$ and $20 \leq x < 30$ have frequencies [9, 11, 10]. Estimate the mean.

Q08 | 4 MARKS

You must show your working.

The ordered data are [12, 13, 14, 15, 38]. Identify the outlier and explain whether the mean or median better represents a typical value.

Chapter 4: FS4 - Averages, spread and distributions

Q09 | 4 MARKS

You must show your working.

For the data [9, 11, 12, 14, 14], calculate the mean, median, mode and range.

Q10 | 4 MARKS

You must show your working.

Group A has mean 30 and range 22. Group B has mean 32 and range 16. Compare their typical values and consistency.

Chapter 4: FS4 - Averages, spread and distributions

Q11 | 4 MARKS

You must show your working.

Grouped intervals $0 \leq x < 10$, $10 \leq x < 20$ and $20 \leq x < 30$ have frequencies [13, 15, 14]. Estimate the mean.

Q12 | 4 MARKS

You must show your working.

The ordered data are [16, 17, 18, 19, 42]. Identify the outlier and explain whether the mean or median better represents a typical value.

Worked solutions

Q01 | 4 MARKS

Sum=20, so mean= $20/5=4$. The middle value is 4, the repeated value is 6, and range= $(6)-1=5$.

ANSWER: Mean 4; median 4; mode 6; range 5

Q02 | 4 MARKS

Compare centres using the means and spread using the ranges. A smaller range indicates less variation.

ANSWER: Group B has the higher mean and smaller range, so it is typically higher and more consistent

Worked solutions

Q03 | 4 MARKS

Use midpoints 5, 15 and 25. Estimated mean= $(5 \times 5 + 7 \times 15 + 6 \times 25) / 18 = 15.56$.

ANSWER: 15.56

Q04 | 4 MARKS

The value 34 is far from the cluster. It pulls the mean to 14.4, while the median remains 10, within the main cluster.

ANSWER: Outlier 34; median 10 is more representative

Worked solutions

Q05 | 4 MARKS

Sum=40, so mean= $40/5=8$. The middle value is 8, the repeated value is 10, and range= $(10)-5=5$.

ANSWER: Mean 8; median 8; mode 10; range 5

Q06 | 4 MARKS

Compare centres using the means and spread using the ranges. A smaller range indicates less variation.

ANSWER: Group B has the higher mean and smaller range, so it is typically higher and more consistent

Worked solutions

Q07 | 4 MARKS

Use midpoints 5, 15 and 25. Estimated mean= $(9 \times 5 + 11 \times 15 + 10 \times 25) / 30 = 15.33$.

ANSWER: 15.33

Q08 | 4 MARKS

The value 38 is far from the cluster. It pulls the mean to 18.4, while the median remains 14, within the main cluster.

ANSWER: Outlier 38; median 14 is more representative

Worked solutions

Q09 | 4 MARKS

Sum=60, so mean= $60/5=12$. The middle value is 12, the repeated value is 14, and range= $(14)-9=5$.

ANSWER: Mean 12; median 12; mode 14; range 5

Q10 | 4 MARKS

Compare centres using the means and spread using the ranges. A smaller range indicates less variation.

ANSWER: Group B has the higher mean and smaller range, so it is typically higher and more consistent

Worked solutions

Q11 | 4 MARKS

Use midpoints 5, 15 and 25. Estimated mean = $(13 \times 5 + 15 \times 15 + 14 \times 25) / 42 = 15.24$.

ANSWER: 15.24

Q12 | 4 MARKS

The value 42 is far from the cluster. It pulls the mean to 22.4, while the median remains 18, within the main cluster.

ANSWER: Outlier 42; median 18 is more representative

Chapter completion record

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FOUNDATION TIER

UNIT 6 | CHAPTER 5

FS5 - Using statistics to describe populations

12 curated questions | complete solutions

Chapter focus

Use sample statistics appropriately to estimate and describe features of a population.

Assessment progression

Questions 1-4 secure essential Foundation skills; Questions 5-8 connect representations; Questions 9-12 develop Grade 4-5 reasoning and interpretation.

Working expectation

Show every stage for questions worth 4 marks. For all other questions, write enough working for another student to follow your method.

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Chapter 5: FS5 - Using statistics to describe populations

Q01 | 3 MARKS

A random sample of 60 packets has mean mass 21 g. State a suitable estimate for the population mean and explain one uncertainty.

Q02 | 4 MARKS

You must show your working.

In a random sample of 100 components, 6 are defective. Estimate the number defective in a production run of 2200. Give one reason the actual number may differ.

Chapter 5: FS5 - Using statistics to describe populations

Q03 | 3 MARKS

A report numbered 3 states: "The mean income in a sample is high, so most people have a high income." Explain why this conclusion may be misleading and name another statistic to inspect.

Q04 | 3 MARKS

A random sample of 90 packets has mean mass 24 g. State a suitable estimate for the population mean and explain one uncertainty.

Chapter 5: FS5 - Using statistics to describe populations

Q05 | 4 MARKS

You must show your working.

In a random sample of 130 components, 9 are defective. Estimate the number defective in a production run of 2500. Give one reason the actual number may differ.

Q06 | 3 MARKS

A report numbered 6 states: "The mean income in a sample is high, so most people have a high income." Explain why this conclusion may be misleading and name another statistic to inspect.

Chapter 5: FS5 - Using statistics to describe populations

Q07 | 3 MARKS

A random sample of 120 packets has mean mass 27 g. State a suitable estimate for the population mean and explain one uncertainty.

Q08 | 4 MARKS

You must show your working.

In a random sample of 160 components, 12 are defective. Estimate the number defective in a production run of 2800. Give one reason the actual number may differ.

Chapter 5: FS5 - Using statistics to describe populations

Q09 | 3 MARKS

A report numbered 9 states: "The mean income in a sample is high, so most people have a high income." Explain why this conclusion may be misleading and name another statistic to inspect.

Q10 | 3 MARKS

A random sample of 150 packets has mean mass 30 g. State a suitable estimate for the population mean and explain one uncertainty.

Chapter 5: FS5 - Using statistics to describe populations

Q11 | 4 MARKS

You must show your working.

In a random sample of 190 components, 15 are defective. Estimate the number defective in a production run of 3100. Give one reason the actual number may differ.

Q12 | 3 MARKS

A report numbered 12 states: "The mean income in a sample is high, so most people have a high income." Explain why this conclusion may be misleading and name another statistic to inspect.

Worked solutions

Q01 | 3 MARKS

For a representative random sample, the sample mean is the best available estimate of the population mean, but sampling variation remains.

ANSWER: 21 g; another random sample could give a different mean

Q02 | 4 MARKS

Estimated defective proportion = $6/100$. Multiply by 2200: $2200 \times 6/100 = 132.00$, so estimate about 132 components.

ANSWER: About 132; random sampling variation or changing production conditions

Worked solutions

Q03 | 3 MARKS

The mean is sensitive to extreme values and does not reveal how values are distributed. Median, range and the graph add context.

ANSWER: A few very high values may raise the mean; inspect the median and the spread

Q04 | 3 MARKS

For a representative random sample, the sample mean is the best available estimate of the population mean, but sampling variation remains.

ANSWER: 24 g; another random sample could give a different mean

Worked solutions

Q05 | 4 MARKS

Estimated defective proportion = $9/130$. Multiply by 2500: $2500 \times 9/130 = 173.08$, so estimate about 173 components.

ANSWER: About 173; random sampling variation or changing production conditions

Q06 | 3 MARKS

The mean is sensitive to extreme values and does not reveal how values are distributed. Median, range and the graph add context.

ANSWER: A few very high values may raise the mean; inspect the median and the spread

Worked solutions

Q07 | 3 MARKS

For a representative random sample, the sample mean is the best available estimate of the population mean, but sampling variation remains.

ANSWER: 27 g; another random sample could give a different mean

Q08 | 4 MARKS

Estimated defective proportion= $12/160$. Multiply by 2800: $2800 \times 12/160 = 210.00$, so estimate about 210 components.

ANSWER: About 210; random sampling variation or changing production conditions

Worked solutions

Q09 | 3 MARKS

The mean is sensitive to extreme values and does not reveal how values are distributed. Median, range and the graph add context.

ANSWER: A few very high values may raise the mean; inspect the median and the spread

Q10 | 3 MARKS

For a representative random sample, the sample mean is the best available estimate of the population mean, but sampling variation remains.

ANSWER: 30 g; another random sample could give a different mean

Worked solutions

Q11 | 4 MARKS

Estimated defective proportion = $15/190$. Multiply by 3100: $3100 \times 15/190 = 244.74$, so estimate about 245 components.

ANSWER: About 245; random sampling variation or changing production conditions

Q12 | 3 MARKS

The mean is sensitive to extreme values and does not reveal how values are distributed. Median, range and the graph add context.

ANSWER: A few very high values may raise the mean; inspect the median and the spread

Chapter completion record

Question	Score / marks	Repair target	Retest date
1			
2			
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FOUNDATION TIER

UNIT 6 | CHAPTER 6

FS6 - Scatter graphs, correlation and prediction

12 curated questions | complete solutions

Chapter focus

Interpret scatter graphs, correlation and lines of best fit, including interpolation, extrapolation and causation.

Assessment progression

Questions 1-4 secure essential Foundation skills; Questions 5-8 connect representations; Questions 9-12 develop Grade 4-5 reasoning and interpretation.

Working expectation

Show every stage for questions worth 4 marks. For all other questions, write enough working for another student to follow your method.

Source-use notice

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Chapter 6: FS6 - Scatter graphs, correlation and prediction

Q01 | 3 MARKS

Scatter graph 1 shows points rising closely from left to right. Describe the correlation and explain what it does not prove.

Q02 | 3 MARKS

A line of best fit is $y=4x+7$. Estimate y when $x=8$ and state whether this is interpolation if observed x -values range from 2 to 12.

Chapter 6: FS6 - Scatter graphs, correlation and prediction

Q03 | 3 MARKS

Data on a scatter graph cover x-values from 1 to 13. A line of best fit is used to predict at $x=21$. Name this process and explain why the prediction is less reliable.

Q04 | 3 MARKS

A scatter graph numbered 4 shows almost no upward or downward pattern. State the correlation and explain why drawing a prediction line would be of little value.

Chapter 6: FS6 - Scatter graphs, correlation and prediction

Q05 | 3 MARKS

Scatter graph 5 shows points rising closely from left to right. Describe the correlation and explain what it does not prove.

Q06 | 3 MARKS

A line of best fit is $y=2x+11$. Estimate y when $x=12$ and state whether this is interpolation if observed x -values range from 2 to 16.

Chapter 6: FS6 - Scatter graphs, correlation and prediction

Q07 | 3 MARKS

Data on a scatter graph cover x-values from 1 to 17. A line of best fit is used to predict at $x=25$. Name this process and explain why the prediction is less reliable.

Q08 | 3 MARKS

A scatter graph numbered 8 shows almost no upward or downward pattern. State the correlation and explain why drawing a prediction line would be of little value.

Chapter 6: FS6 - Scatter graphs, correlation and prediction

Q09 | 3 MARKS

Scatter graph 9 shows points rising closely from left to right. Describe the correlation and explain what it does not prove.

Q10 | 3 MARKS

A line of best fit is $y=3x+15$. Estimate y when $x=16$ and state whether this is interpolation if observed x -values range from 2 to 20.

Chapter 6: FS6 - Scatter graphs, correlation and prediction

Q11 | 3 MARKS

Data on a scatter graph cover x-values from 1 to 21. A line of best fit is used to predict at $x=29$. Name this process and explain why the prediction is less reliable.

Q12 | 3 MARKS

A scatter graph numbered 12 shows almost no upward or downward pattern. State the correlation and explain why drawing a prediction line would be of little value.

Worked solutions

Q01 | 3 MARKS

An upward pattern indicates positive correlation. Correlation alone cannot establish causation because other factors may affect both variables.

ANSWER: Strong positive correlation; it does not prove that one variable causes the other

Q02 | 3 MARKS

Substitute $x=8$: $y=4x+7=39$. Since 8 lies inside the observed range, this is interpolation.

ANSWER: 39; interpolation

Worked solutions

Q03 | 3 MARKS

The prediction is outside the measured x-range, so it extends an assumed trend without supporting observations.

ANSWER: Extrapolation; the pattern may not continue beyond the observed data

Q04 | 3 MARKS

With no clear relationship, a line would not represent a dependable trend and predictions would have large uncertainty.

ANSWER: No correlation; one variable gives little useful information for predicting the other

Worked solutions

Q05 | 3 MARKS

An upward pattern indicates positive correlation. Correlation alone cannot establish causation because other factors may affect both variables.

ANSWER: Strong positive correlation; it does not prove that one variable causes the other

Q06 | 3 MARKS

Substitute $x=12$: $y=2 \times 12 + 11 = 35$. Since 12 lies inside the observed range, this is interpolation.

ANSWER: 35; interpolation

Worked solutions

Q07 | 3 MARKS

The prediction is outside the measured x-range, so it extends an assumed trend without supporting observations.

ANSWER: Extrapolation; the pattern may not continue beyond the observed data

Q08 | 3 MARKS

With no clear relationship, a line would not represent a dependable trend and predictions would have large uncertainty.

ANSWER: No correlation; one variable gives little useful information for predicting the other

Worked solutions

Q09 | 3 MARKS

An upward pattern indicates positive correlation. Correlation alone cannot establish causation because other factors may affect both variables.

ANSWER: Strong positive correlation; it does not prove that one variable causes the other

Q10 | 3 MARKS

Substitute $x=16$: $y=3 \times 16 + 15 = 63$. Since 16 lies inside the observed range, this is interpolation.

ANSWER: 63; interpolation

Worked solutions

Q11 | 3 MARKS

The prediction is outside the measured x-range, so it extends an assumed trend without supporting observations.

ANSWER: Extrapolation; the pattern may not continue beyond the observed data

Q12 | 3 MARKS

With no clear relationship, a line would not represent a dependable trend and predictions would have large uncertainty.

ANSWER: No correlation; one variable gives little useful information for predicting the other

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