6.1 Statistics: Test Pack

Calculator allowed · about 55 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Here are the ages, in years, of 7 cousins at a family gathering: 4, 7, 4, 9, 6, 4, 8.

(a) Write down the mode of the ages. **(1)**

.....

(b) Find the median of the ages. **(1)**

.....

(c) Find the range of the ages. **(1)**

.....

2 The salaries, in thousands of pounds, of 9 employees at a small firm in Cardiff are: 18, 19, 20, 21, 22, 23, 24, 25, 95.

(a) Which average best describes the typical salary, without being distorted by the outlier of 95? **(1)**

- ☐ A) Mean
- ☐ B) Median
- ☐ C) Mode
- ☐ D) Range

(b) Explain why your chosen average is more suitable than the mean here. **(1)**

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3 A school library pictogram shows the number of books borrowed each day, using the key: 1 symbol = 4 books. Monday: 3 symbols. Tuesday: 2.5 symbols. Wednesday: 4 symbols. Thursday: 1.5 symbols.

(a) How many books were borrowed on Monday? **(1)**

(b) How many books were borrowed on Tuesday? **(1)**

(c) Work out the total number of books borrowed from Monday to Thursday. **(2)**

.....

4 The grouped frequency table shows the number of texts sent in a day by 40 pupils.
0-9 texts: frequency 8
10-19 texts: frequency 12
20-29 texts: frequency 15
30-39 texts: frequency 5

(a) Write down the midpoint of the 20-29 class. **(1)**

.....

(b) Calculate an estimate for the mean number of texts sent. **(3)**

.....

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5 Two classes sat the same maths test out of 20 marks. Class 8A (taught by Miss Okafor) had mean score 14.2 and range 8. Class 8B (taught by Mr Singh) had mean score 15.6 and range 15.

(a) Which class had the higher average test score? **(1)**

(b) Which class was more consistent? Give a reason for your answer. **(2)**

(c) Comment on which class performed better overall, using both the mean and the range in your answer. **(2)**

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6 Here are 8 numbers: 27, 10, 55, 5, 31, 30, 1, 10.
Work out the median.

(2)

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7 A bar chart shows the number of pupils in a class who own each type of pet: dogs 3, cats 8, fish 8, rabbits 14, hamsters 20.
Which type of pet is the mode, and what fraction of all the pets is it? Give the fraction in its simplest form.

(2)

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8 The table shows the number of pets for a group of people.
number of pets = 2: frequency 11; number of pets = 3: frequency 11; number of pets = 4: frequency 4; number of pets = 5: frequency 10.
Work out the range.

(2)

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9 Freya recorded the number of hours she spent revising and her test score (out of 100) for 8 different tests:
(1 hour, 42), (2 hours, 50), (3 hours, 55), (3 hours, 60), (4 hours, 65), (5 hours, 70), (6 hours, 78), (7 hours, 85).
She plotted these on a scatter graph and drew a line of best fit.

(a) Describe the type of correlation shown by the scatter graph. **(1)**

(b) The line of best fit passes through (4 hours, 65 marks) and (5 hours, 70 marks). Use linear interpolation between these points to estimate the test score for a pupil who revises for 4.5 hours. **(2)**

(c) Explain why it would not be reliable to use this line of best fit to predict the test score of a pupil who revises for 15 hours. **(1)**

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10 A two-way table shows members of Riverside Gym by age group and membership type, where x is unknown.
Under 30: Standard = 2x, Premium = 15, Total = not given.
30 and over: Standard = 18, Premium = x, Total = not given.
The grand total of all members is 90.

(a) Form an equation in x and solve it. **(3)**

(b) Hence work out the number of Premium members aged 30 and over. **(1)**

(c) Work out the total number of Standard members. **(2)**

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11 Aaliyah wants to find out how much time Year 8 pupils spend on homework each week. She surveys the first 20 pupils who arrive at school on a Monday morning.

(a) Give one reason why this sample may not be representative of all Year 8 pupils. **(1)**

(b) Suggest a better method Aaliyah could use to choose a sample of 20 pupils from Year 8, and explain why it would be an improvement. **(2)**

(c) Aaliyah's sample of 20 pupils had a mean of 3.5 hours of homework per week. There are 180 pupils in Year 8 altogether. Use her sample to estimate the total number of hours of homework done by Year 8 per week. **(2)**

12 Two local football teams recorded the number of goals scored per match over a season. Team A played 15 matches with a mean of 1.8 goals per match. Team B played 25 matches with a mean of 2.4 goals per match.

(a) Work out the total number of goals scored by Team A over the season. **(1)**

(b) Work out the total number of goals scored by Team B over the season. **(1)**

(c) Work out the mean number of goals scored per match for both teams combined. **(3)**

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Mark scheme · 6.1 Statistics: Test Pack

Question 1

(a) 4 cao **B1**

(a) Answer: **4**

(b) 6 cao **B1**

(b) Answer: **6**

(c) 5 cao **B1**

(c) Answer: **5**

Question 2

(a) B cao **B1**

(a) Answer: **B (Median)**

(b) States that 95 is an outlier/anomaly that would inflate the mean, giving a distorted impression of a typical salary, whereas the median is not affected by extreme values oe **B1**

(b) Answer: **The mean is pulled up by the outlier of 95, so it does not represent a typical salary; the median is unaffected by extreme values.**

Question 3

(a) 12 cao **B1**

(a) Answer: **12**

(b) 10 cao **B1**

(b) Answer: **10**

(c) 12 + 10 + 16 + 6 (correct four values added, ft from parts a and b) **M1**

(c) 44 cao **A1**

(c) Answer: **44**

Question 4

(a) 24.5 cao **B1**

(a) Answer: **24.5**

(b) Uses midpoints 4.5, 14.5, 24.5, 34.5 **M1**

(b) Sum of (frequency x midpoint) = 36+174+367.5+172.5 = 750 **M1**

(b) 18.75 cao awrt 18.8 **A1**

(b) Answer: **18.75 (awrt 18.8)**

Question 5

(a) Class 8B cao **B1**

(a) Answer: **Class 8B**

(b) Class 8A cao **B1**

(b) States that Class 8A has a smaller range (8 compared to 15), meaning less variation/spread in scores oe **B1**

(b) Answer: **Class 8A, because its range (8) is smaller than Class 8B's range (15), showing less spread in scores.**

(c) States Class 8B scored higher on average (higher mean), so on the whole did better in the test **B1**

(c) States Class 8A's results were more consistent/less spread out (smaller range), making Class 8A's performance more reliable/predictable oe **B1**

(c) Answer: **Class 8B performed better on average (higher mean), but Class 8A's results were more consistent (smaller range), so neither class is entirely better; it depends which measure matters more.**

Question 6

puts the numbers in order: 1, 5, 10, 10, 27, 30, 31, 55 **M1**

18.5 cao **A1**

Answer: **18.5**

Question 7

mode = hamsters **B1**

20/53 **B1**

Answer: **hamsters, 20/53**

Question 8

5 - 2 **M1**

3 cao **A1**

Answer: **3**

Question 9

(a) Positive correlation cao **B1**

(a) Answer: **Positive correlation**

(b) Uses the halfway position between 4 and 5 hours to find half the score increase: 0.5 x (70 - 65) = 2.5 **M1**

(b) 67.5 cao **A1**

(b) Answer: **67.5**

(c) States that 15 hours is well outside the range of the data collected (max 7 hours), so extrapolating this far may not follow the same trend oe **B1**

(c) Answer: **15 hours is far beyond the range of the recorded data (which only goes up to 7 hours), so the trend may not continue in the same way; this is extrapolation.**

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Question 10

(a) 2x + 18 + 15 + x = 90 oe (correct equation) **M1**

(a) 3x + 33 = 90 (correctly simplified) **M1**

(a) x = 19 cao **A1**

(a) Answer: **x = 19**

(b) 19 cao, ft from part a **B1**

(b) Answer: **19**

(c) 2(19) + 18, ft from part a **M1**

(c) 56 cao **A1**

(c) Answer: **56**

Question 11

(a) Valid reason, e.g. only includes pupils who arrive early / travel a certain way, so may not reflect pupils who arrive later or differently oe **B1**

(a) Answer: **Pupils who arrive first may share characteristics (e.g. live nearby, travel by car) that do not represent all Year 8 pupils, so the sample is biased.**

(b) Valid method, e.g. use a random number generator to select 20 names from the full Year 8 register oe **B1**

(b) Valid reason it improves representativeness, e.g. every pupil has an equal chance of being chosen, reducing bias oe **B1**

(b) Answer: **Use a random number generator on the complete Year 8 register to select 20 pupils; this gives every pupil an equal chance of being chosen, making the sample more representative.**

(c) 3.5 x 180 (correct method) **M1**

(c) 630 hours cao **A1**

(c) Answer: **630 hours**

Question 12

(a) 27 cao **B1**

(a) Answer: **27**

(b) 60 cao **B1**

(b) Answer: **60**

(c) Total goals = 27 + 60 = 87, ft from parts a and b **M1**

(c) Total matches = 15 + 25 = 40 **M1**

(c) 2.175 cao awrt 2.18 **A1**

(c) Answer: **2.175 (awrt 2.18)**

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