Grouped Data, Percentiles & Modal Interval (Grade 10)

MEMORANDUM

Name: ..... Class: .....

Date: .....

MARK ____ / 21

Answer all questions. Show all your working — marks are awarded for method as well as the final answer. **Teacher copy: accept any correct equivalent method.**

1 Write down the midpoint of the interval $20 \leq x < 30$. (1)

$\frac{20 + 30}{2} = \mathbf{25}$ ✓ (1)

2 Using the table ($f = 4, 9, 14, 8, 5$ for intervals of width 10 from 0), estimate the mean. (4)

$\frac{1\,010}{40} = \mathbf{25{,}25}$ ✓✓✓ (4)

3 Write down the modal interval for that data. (1)

$\mathbf{20 \leq x < 30}$ (highest frequency, 14) ✓ (1)

4 In which interval does the median lie for that data? (2)

The 20th value → $\mathbf{20 \leq x < 30}$ ✓✓ (2)

5 Determine the position of the 25th percentile when $n = 40$. (2)

$\frac{25}{100} \times 40 =$ **the 10th value** ✓✓ (2)

6 $Q_1 = 24$ and $Q_3 = 42$. Calculate the interquartile range. (1)

$42 - 24 = \mathbf{18}$ ✓ (1)

7 $Q_1 = 24$ and $Q_3 = 42$. Calculate the semi-interquartile range. (2)

$\frac{18}{2} = \mathbf{9}$ ✓✓ (2)

8 Why can the mean of grouped data only be estimated? (2)

Because the **individual values are unknown** — we assume each one sits at its interval's midpoint. ✓✓ (2)

9 State TWO differences between a histogram and a bar graph. (2)

> A histogram shows continuous grouped data and a bar graph shows categorical data ✓; the bars of a histogram touch while those of a bar graph have gaps ✓ (2)

10 The bars of a histogram have frequencies 6, 10, 14, 9 and 5. How many values are in the data set, and which is the modal interval? (2)

> $6 + 10 + 14 + 9 + 5 = 44$ values ✓; the modal interval is the one with frequency 14 ✓ (2)

11 Explain why the bars of a histogram must touch. (2)

> The intervals are continuous ✓ — one interval ends exactly where the next begins, so there is no value that could fall in a gap ✓ (2)

TOTAL: 21 marks

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