HIGHER ONLY

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Name ..... Class .....

S3: Histograms and cumulative frequency

Solve problems using histograms and cumulative frequency

20 marks · 25 minutes · Calculator allowed

1) A histogram has these classes and frequency densities: $0 < x \leqslant 10$: 1.2; $10 < x \leqslant 15$: 4; $15 < x \leqslant 20$: 5.6; $20 < x \leqslant 30$: 2; $30 < x \leqslant 50$: 0.5. Find the total frequency and estimate how many values lie between 12 and 25.

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[Question 1: 4 marks]

2) Using the data in question 1, estimate the median.

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[Question 2: 3 marks]

3) Group A: median 25, LQ 18, UQ 31. Group B: median 28, IQR 8. Compare the two groups.

[Question 3: 2 marks]

4) A cumulative frequency graph for 80 people reaches 68 at 40 minutes. What percentage of people took more than 40 minutes?

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[Question 4: 2 marks]

5) A histogram bar for $25 < x \leqslant 35$ has frequency density 1.8. Find its frequency.

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[Question 5: 2 marks]

6) Using the data in question 1, estimate the mean.

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[Question 6: 4 marks]

7) Two histogram bars, $10 < x \leqslant 15$ and $20 < x \leqslant 30$, have the same frequency. Explain why they have different heights and find the ratio of their heights.

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[Question 7: 3 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	90; 50	Frequencies 12, 20, 28, 20, 10 (P1); 90 (A1); $\frac{3}{5} \times 20 + 28 + \frac{1}{2} \times 20$ (P1); 50 (A1).
2	17.3	45th value (P1); in 15–20 class after 32 (P1); $15 + \frac{13}{28} \times 5$ (A1).
3	Comparison	B higher median (C1); A has larger IQR, 13 versus 8, so more spread (C1).
4	15%	12 people (P1); A1.
5	18	10×1.8 (P1); A1.
6	18.9	Midpoints 5, 12.5, 17.5, 25, 40 (P1); $\sum fx = 1700$ (P1, P1); $\div 90$ (A1).
7	2 : 1	Width 5 versus 10 (P1); area represents frequency (C1); heights 4 and 2 (A1).