

May 03 Paper 4 IGCSE - Estimated Mean and Cumulative Frequency - 2

8 Answer the whole of this question on a sheet of graph paper.

In a survey, 200 shoppers were asked how much they had just spent in a supermarket. The results are shown in the table.

| Amount(\$x) | $0 < x \leq 20$ | $20 < x \leq 40$ | $40 < x \leq 60$ | $60 < x \leq 80$ | $80 < x \leq 100$ | $100 < x \leq 140$ |
|--------------------|-----------------|------------------|------------------|------------------|-------------------|--------------------|
| Number of shoppers | 10 | 32 | 48 | 54 | 36 | 20 |

- (a) (i) Write down the modal class. [1]
 (ii) Calculate an estimate of the mean amount, giving your answer correct to 2 decimal places. [4]
- (b) (i) Make a cumulative frequency table for these 200 shoppers. [2]
 (ii) Using a scale of 2 cm to represent \$20 on the horizontal axis and 2 cm to represent 20 shoppers on the vertical axis, draw a cumulative frequency diagram for this data. [4]
- (c) Use your cumulative frequency diagram to find
 (i) the median amount, [1]
 (ii) the upper quartile, [1]
 (iii) the interquartile range, [1]
 (iv) how many shoppers spent at least \$75. [2]

5 Answer the whole of this question on a sheet of graph paper.

- (a) 100 seeds were treated with fertilizer and the heights (H cm) of the plants which grew are given in the **cumulative** frequency table below.

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| Height (H cm) | $H \leq 5$ | $H \leq 10$ | $H \leq 15$ | $H \leq 20$ | $H \leq 30$ |
|----------------------|------------|-------------|-------------|-------------|-------------|
| Cumulative frequency | 0 | 5 | 25 | 85 | 100 |

- (i) Using a scale of 2 cm to represent 5 cm on the horizontal H -axis and 2 cm to represent 20 plants on the vertical axis, draw a cumulative frequency diagram for these plants. [5]
 (ii) Find the median, the lower quartile and the interquartile range. [3]
 (iii) Write down the number of plants in the $15 < H \leq 20$ group. [1]
- (b) Another 100 seeds were **not** treated with fertilizer and the heights (h cm) of the plants which grew from these seeds are given in the grouped frequency table below.

| Height (h cm) | $0 < h \leq 5$ | $5 < h \leq 10$ | $10 < h \leq 15$ | $15 < h \leq 20$ | $20 < h \leq 30$ |
|------------------|----------------|-----------------|------------------|------------------|------------------|
| Frequency | 10 | 20 | 45 | 23 | 2 |

You do not need to draw another graph.

- (i) Calculate an estimate of the mean value of h . [4]
 (ii) Write down the class which contains the lower quartile. [1]
 (iii) Write down the class which contains the 90th percentile. [1]
- (c) The two groups of 100 plants are combined. One of these 200 plants is chosen at random.
 (i) Find the probability that its height is less than or equal to 10 cm. [2]
 (ii) Given that the plant height is less than or equal to 10 cm, what is the probability that it was treated with fertilizer? [2]