2.17 Cumulative Frequency: 30-minute Pack

EDEXCEL 1ST0 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The table shows the heights, in centimetres, of young trees. There are 64 trees altogether. The cumulative frequency graph is drawn by plotting the upper class boundary against the cumulative frequency and joining the points with straight lines.

Class (cm)	Frequency
$10 < x \leq 20$	6
$20 < x \leq 30$	12
$30 < x \leq 40$	16
$40 < x \leq 50$	15
$50 < x \leq 60$	15

(a) Work out the cumulative frequency for each class.

(b) Use linear interpolation between the plotted points to estimate the median. Give your answer to 1 decimal place.

(c) Estimate how many values are less than 25.

(Total for Question 1 is 7 marks)

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2 Two box plots show the times, in minutes, taken by each group to finish a puzzle. The five-figure summaries are in the table.

Statistic	the north branch	the south branch
Minimum	14	26
Lower quartile	23	32
Median	33	41
Upper quartile	39	50
Maximum	56	64

(a) Work out the interquartile range for the north branch and for the south branch.

(b) Write down one comparison of the averages and one comparison of the spread, in context.

(Total for Question 2 is 4 marks)

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3 The table shows the speeds, in km/h, of cars on a road. There are 76 cars altogether. The cumulative frequency graph is drawn by plotting the upper class boundary against the cumulative frequency and joining the points with straight lines.

Class (km/h)	Frequency
$0 < x \leq 20$	20
$20 < x \leq 40$	12
$40 < x \leq 60$	6
$60 < x \leq 80$	20
$80 < x \leq 100$	8
$100 < x \leq 120$	10

(a) Work out the cumulative frequency for each class.

(b) Use linear interpolation between the plotted points to estimate the median. Give your answer to 1 decimal place.

(c) Estimate how many values are less than 30.

(Total for Question 3 is 7 marks)

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4 The table shows the time, in minutes, that students took to do an online quiz. There are 68 students altogether. The cumulative frequency graph is drawn by plotting the upper class boundary against the cumulative frequency and joining the points with straight lines.

Class (minutes)	Frequency
$0 < x \leq 10$	20
$10 < x \leq 20$	8
$20 < x \leq 30$	8
$30 < x \leq 40$	20
$40 < x \leq 50$	12

(a) Use linear interpolation between the plotted points to estimate the median. Give your answer to 1 decimal place.
(b) Use linear interpolation to estimate the lower quartile and the upper quartile, and so the interquartile range. Give your answer to 1 decimal place.
(c) Estimate how many values are greater than 35.

(Total for Question 4 is 8 marks)

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5 Two box plots show the heights, in centimetres, of each group. The five-figure summaries are in the table.

Statistic	boys	girls
Minimum	7	20
Lower quartile	21	25
Median	31	37
Upper quartile	42	50
Maximum	55	59

(a) Work out the interquartile range for boys and for girls.

(b) Write down one comparison of the averages and one comparison of the spread, in context.

(Total for Question 5 is 4 marks)

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Mark scheme · 2.17 Cumulative Frequency: 30-minute Pack

Question 1

running totals of the frequencies	**M1**
6, 18, 34, 49, 64 cao	**A1**
uses 32 on the cumulative frequency axis	**M1**
linear interpolation within the class	**M1**
38.8 cao (accept values within 1 of this)	**A1**
reads or interpolates the cumulative frequency at 25	**M1**
12 cao	**A1**

Answer: (a) 6, 18, 34, 49, 64; (b) 38.8; (c) 12

Question 2

upper quartile minus lower quartile	**M1**
16 and 18 cao	**A1**
the south branch has the higher median (41 compared with 33)	**B1**
the north branch has the smaller interquartile range, so the data is less spread out	**B1**

Answer: (a) the north branch 16, the south branch 18; (b) the south branch has the higher median; the north branch has the smaller IQR so is more consistent

Question 3

running totals of the frequencies	**M1**
20, 32, 38, 58, 66, 76 cao	**A1**
uses 38 on the cumulative frequency axis	**M1**
linear interpolation within the class	**M1**
60 cao (accept values within 1 of this)	**A1**
reads or interpolates the cumulative frequency at 30	**M1**
26 cao	**A1**

Answer: (a) 20, 32, 38, 58, 66, 76; (b) 60; (c) 26

Question 4

uses 34 on the cumulative frequency axis	**M1**
linear interpolation within the class	**M1**
27.5 cao (accept values within 1 of this)	**A1**
positions 17 and 51 used	**M1**
linear interpolation for each quartile	**M1**
29 cao	**A1**
interpolates at 35 and subtracts from 68	**M1**
22 cao	**A1**

Answer: (a) 27.5; (b) 29; (c) 22

Question 5

upper quartile minus lower quartile	**M1**
21 and 25 cao	**A1**
girls has the higher median (37 compared with 31)	**B1**
boys has the smaller interquartile range, so the data is less spread out	**B1**

Answer: (a) boys 21, girls 25; (b) girls has the higher median; boys has the smaller IQR so is more consistent

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