



2.15D Bar Charts: Fluency and Exam Drill

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 50 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** A shop records the number of blue, red and green notebooks sold on Monday. The numbers are: blue 12, red 8, green 5. What is the total number of notebooks sold on Monday?

(Total for Question 1 is 1 mark)

- 2** A bar chart shows the number of pets owned by 20 pupils: Dogs 7, Cats 6, Rabbits 4, Other 3. Which category has the highest frequency?

(Total for Question 2 is 1 mark)

- 3** A small cafe counts cups of tea sold in one afternoon by hour: 12:00-13:00 18, 13:00-14:00 22, 14:00-15:00 15. Calculate the difference between the highest and lowest hourly totals.

(Total for Question 3 is 2 marks)

- 4** A school survey counted the number of pupils who cycle to school in five local streets. The frequencies are: Oak 9, Pine 4, Elm 7, Birch 6, Maple 4. What is the mode of the data?

(Total for Question 4 is 2 marks)

- 5** A bar chart shows weekly sales of three sandwich types at a cafe: Ham 45, Cheese 60, Tuna 35. Calculate the percentage of sandwiches sold that were Cheese. Give your answer correct to 1 decimal place.

(Total for Question 5 is 3 marks)

- 6** A bar chart gives the number of books borrowed from a library each month for 6 months: Jan 120, Feb 95, Mar 130, Apr 110, May 140, Jun 105. (a) Calculate the mean number of books borrowed per month. (b) State which month is above the mean and by how many books (give one example only).

(a) Calculate the mean number of books borrowed per month. (2)

(b) State which month is above the mean and by how many books (give one example). (2)

(Total for Question 6 is 4 marks)

- 7** A survey of 150 people recorded their preferred weekday to attend a club. The frequencies are shown in a bar chart: Monday 28, Tuesday 24, Wednesday 30, Thursday 18, Friday 25, Saturday 15, Sunday 10. (a) Complete: what fraction of people preferred Wednesday? Give your answer in lowest terms. (b) Work out the cumulative frequency up to and including Friday.

(a) What fraction of people preferred Wednesday? Give your answer in lowest terms. (2)

(b) Work out the cumulative frequency up to and including Friday. (2)

(Total for Question 7 is 4 marks)

- 8** A bar chart shows how many hours per week a group of 80 students spend on homework in four categories: 0-4 hours 12 students, 5-9 hours 18 students, 10-14 hours 30 students, 15-19 hours 20 students. (a) State the modal category. (b) Find the median category and give a clear reason.

(a) State the modal category. (2)

(b) Find the median category and give a clear reason. (4)

(Total for Question 8 is 6 marks)

- 9** A school asked 120 pupils their favourite sport. A bar chart gave these frequencies: Football 48, Netball 30, Rugby 12, Tennis 20, Other 10. (a) What fraction of pupils chose Netball? Give your answer in lowest terms and as a percentage. (b) Work out and simplify the ratio Football : Tennis.

(a) What fraction of pupils chose Netball? Give your answer in lowest terms and as a percentage. (3)

(b) Work out and simplify the ratio Football : Tennis. (5)

(Total for Question 9 is 8 marks)

10 A town council surveyed 200 households about how many bicycles they own. The bar chart categories were: 0 bikes 70 households, 1 bike 85 households, 2 bikes 30 households, 3 or more bikes 15 households. (a) Complete the missing relative frequency for each category as a fraction and as a percentage. (b) Use these to estimate the mean number of bikes per household by treating '3 or more' as 3. Give your answer to 2 decimal places. (c) Comment briefly whether treating '3 or more' as 3 is likely to overestimate or underestimate the true mean and why.

(a) Complete the missing relative frequency for each category as a fraction and as a percentage. (3)

(b) Use these to estimate the mean number of bikes per household by treating '3 or more' as 3. Give your answer to 2 decimal places. (4)

(c) Comment briefly whether treating '3 or more' as 3 is likely to overestimate or underestimate the true mean and why. (2)

(Total for Question 10 is 9 marks)

Mark scheme · 2.15D Bar Charts: Fluency and Exam Drill

Question 1

- **B1** 25 cao
- **Answer:** 25 ($12 + 8 + 5 = 25$).

Question 2

- **B1** Dogs cao
- **Answer:** Dogs

Question 3

- **M1** find highest and lowest values and subtract ($22 - 15$) or equivalent method
- **A1** 7 cao
- **Answer:** 7 (22 is highest, 15 is lowest, $22 - 15 = 7$).

Question 4

- **M1** identify the most frequent value(s) or state no unique mode
- **A1** 9 (Oak) cao
- **Answer:** 9 (Oak) (Oak has the highest frequency 9).

Question 5

- **M1** find total and form percentage, $60 / (45+60+35) \times 100$ oe
- **A1** $60 / 140 \times 100 = 42.857\ldots\%$ cao
- **A1** answer given to 1 dp 42.9% awrt
- **Answer:** 42.9% (Total = $45 + 60 + 35 = 140$. $60/140 \times 100 = 42.857\ldots \rightarrow 42.9\%$ to 1 dp).

Question 6

- (a) **M1** find total and divide by 6, $(120+95+130+110+140+105)/6$
- (a) **A1** 116.666... or 116.7 awrt
- (a) **Answer:** 116.7 (Total = 700; mean = $700 / 6 = 116.666\ldots \rightarrow 116.7$ to 1 dp).
- (b) **M1** identify a month above mean and compute difference e.g. May $140 - 116.666\ldots$
- (b) **A1** May by 23.3 (oe, awrt)
- (b) **Answer:** May by 23.3 (Mean 116.666..., May 140 is 23.333... higher $\rightarrow 23.3$ to 1 dp).

Question 7

- (a) **M1** form fraction $30/150$ and simplify
- (a) **A1** $1/5$ cao
- (a) **Answer:** $1/5$ ($30/150 = 1/5$).
- (b) **M1** add frequencies Mon-Fri: $28+24+30+18+25$
- (b) **A1** 125 cao
- (b) **Answer:** 125 ($28 + 24 + 30 + 18 + 25 = 125$).

Question 8

- (a) **M1** identify the category with highest frequency
- (a) **A1** 10-14 hours cao
- (a) **Answer:** 10-14 hours (30 students).
- (b) **M1** find median position: $(80 + 1)/2 = 40.5$ or equivalent
- (b) **M1** calculate cumulative frequencies: 12, 30, 60, 80
- (b) **M1** identify which class contains the median position (40.5 lies in cumulative 30 to 60)
- (b) **A1** 10-14 hours cao with reason
- (b) **Answer:** 10-14 hours, because the median position is 40.5 which lies in the cumulative range reaching 60, so the median is in the 10-14 hours class.

Question 9

- (a) **M1** form fraction $30/120$ and simplify
- (a) **A1** $1/4$ cao
- (a) **A1** 25% cao
- **(a) Answer: $1/4$ and 25% ($30/120 = 1/4 = 25\%$).**
- (b) **M1** form ratio $48 : 20$
- (b) **M1** divide both sides by common factor 4 or 2 as part of simplification
- (b) **A1** $12 : 5$ or $12:5$ cao
- (b) **M1** show working or state simplified form explicitly
- (b) **A1** final simplified ratio $12:5$ cao
- **(b) Answer: $12 : 5$ (Football $48 : \text{Tennis } 20 = 48:20 = \text{divide by } 4 \rightarrow 12:5$).**

Question 10

- (a) **M1** form fractions $70/200$, $85/200$, $30/200$, $15/200$
- (a) **M1** convert to percentages correctly
- (a) **A1** answers: $70/200 = 7/20 = 35\%$, $85/200 = 17/40 = 42.5\%$, $30/200 = 3/20 = 15\%$, $15/200 = 3/40 = 7.5\%$ cao
- **(a) Answer: $70/200 = 7/20 = 35\%$; $85/200 = 17/40 = 42.5\%$; $30/200 = 3/20 = 15\%$; $15/200 = 3/40 = 7.5\%$.**
- (b) **M1** use assumed values 0,1,2,3 and multiply by frequencies: $0*70 + 1*85 + 2*30 + 3*15$
- (b) **M1** sum the products correctly: $0 + 85 + 60 + 45 = 190$
- (b) **M1** divide by total households 200 to find mean
- (b) **A1** 0.95 cao ($190/200 = 0.95 \rightarrow 0.95$ to 2 dp)
- **(b) Answer: 0.95 bikes per household (estimate).**
- (c) **M1** state that treating 3 or more as 3 ignores households with more than 3 bikes
- (c) **A1** conclude it underestimates the true mean if any households have more than 3 bikes
- **(c) Answer: It is likely to underestimate the true mean because any households with more than 3 bikes are counted as 3, reducing the total compared with the true number.**