2.15 Bar Charts: Test Pack

EDEXCEL 1MA1 · Calculator allowed · about 70 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)

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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)

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3 A charity shop's bar chart shows the number of items donated in one week: Books 34, Toys 19, Clothes 47, DVDs 8. Write down the number of toys donated.

(Total for Question 3 is 1 mark)

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4 A bar chart shows these frequencies: Red 39, Blue 18, Green 10, Yellow 15, Black 28. Which category is the most popular, and how many more visitors chose it than chose Blue?

(Total for Question 4 is 3 marks)

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5 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 5 is 2 marks)

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6 A park ranger's bar chart shows how 220 visitors spent their time over a bank holiday weekend: Walking 85, Cycling 40, Other 15, and the rest were Picnicking. Work out the number of visitors who were picnicking.

(Total for Question 6 is 2 marks)

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7 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 7 is 3 marks)

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8 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. **(2)**

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

(Total for Question 8 is 4 marks)

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9 A charity park run's bar chart shows the number of runners in four age categories on Saturday: Under 18: 22, 18-40: 68, 41-60: 45, Over 60: 15. Show that the total number of runners was 150, and that the mean number of runners per age category was 37.5.

(Total for Question 9 is 4 marks)

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10 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. **(2)**

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

.....

(Total for Question 10 is 6 marks)

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11 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. **(3)**

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

(Total for Question 11 is 8 marks)

12 A survey of 80 students at a college shows their favourite type of music: Pop 32, Rock 20, Hip-hop 16, Classical 12.

(a) Work out the ratio of students who chose Rock to students who chose Classical, giving your answer in its simplest form. **(2)**

(b) The college has 960 students in total. Assuming the survey is representative of the whole college, estimate how many of all 960 students would choose Hip-hop as their favourite type of music. **(4)**

(Total for Question 12 is 6 marks)

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13 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. **(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 13 is 9 marks)

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Mark scheme · 2.15 Bar Charts: Test Pack

Question 1

25 cao **B1**

Answer: 25 (12 + 8 + 5 = 25).

Question 2

Dogs cao **B1**

Answer: Dogs

Question 3

19 cao **B1**

Answer: 19

Question 4

Red **B1**

subtraction of the two frequencies **M1**

difference cao **A1**

Answer: Red, 21 more

Question 5

find highest and lowest values and subtract (22 - 15) or equivalent method **M1**

7 cao **A1**

Answer: 7 (22 is highest, 15 is lowest, 22 - 15 = 7).

Question 6

220 - (85 + 40 + 15) or equivalent method **M1**

80 cao **A1**

Answer: 80 (220 - 140 = 80).

Question 7

find total and form percentage, 60 / (45+60+35) x 100 oe **M1**

60 / 140 x 100 = 42.857...% cao **A1**

answer given to 1 dp 42.9% awrt **A1**

Answer: 42.9% (Total = 45 + 60 + 35 = 140. 60/140 x 100 = 42.857... -> 42.9% to 1 dp).

Question 8

(a) find total and divide by 6, (120+95+130+110+140+105)/6 **M1**

(a) 116.666... or 116.7 awrt **A1**

(a) Answer: 116.7 (Total = 700; mean = 700 / 6 = 116.666... -> 116.7 to 1 dp).

(b) identify a month above mean and compute difference e.g. May 140 - 116.666... **M1**

(b) May by 23.3 (oe, awrt) **A1**

(b) Answer: May by 23.3 (Mean 116.666..., May 140 is 23.333... higher -> 23.3 to 1 dp).

Question 9

add the four frequencies, 22 + 68 + 45 + 15 **M1**

= 150 shown correctly (cso) **A1**

divide the total by the number of categories, 150 / 4 **M1**

= 37.5 shown correctly (cso), confirming both given values **A1**

Answer: Total = 150; mean = 37.5 runners per category (150 / 4 = 37.5).

Question 10

(a) identify the category with highest frequency **M1**

(a) 10-14 hours cao **A1**

(a) Answer: 10-14 hours (30 students).

(b) find median position: (80 + 1)/2 = 40.5 or equivalent **M1**

(b) calculate cumulative frequencies: 12, 30, 60, 80 **M1**

(b) identify which class contains the median position (40.5 lies in cumulative 30 to 60) **M1**

(b) 10-14 hours cao with reason **A1**

(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 11

(a) form fraction 30/120 and simplify **M1**

(a) 1/4 cao **A1**

(a) 25% cao **A1**

(a) Answer: 1/4 and 25% (30/120 = 1/4 = 25%).

(b) form ratio 48 : 20 **M1**

(b) divide both sides by common factor 4 or 2 as part of simplification **M1**

(b) 12 : 5 or 12:5 cao **A1**

(b) show working or state simplified form explicitly **M1**

(b) final simplified ratio 12:5 cao **A1**

(b) Answer: 12 : 5 (Football 48 : Tennis 20 = 48:20 = divide by 4 -> 12:5).

Question 12

(a) form the ratio 20 : 12 **M1**

(a) 5 : 3 cao **A1**

(a) Answer: 5 : 3 (20 : 12 simplifies to 5 : 3).

(b) form proportion 16/80 oe **M1**

(b) multiply by 960, 960 x 16/80 oe **M1**

(b) 192 cao **A1**

(b) state the assumption that the survey sample is representative of (has the same proportions as) the whole college **C1**

(b) Answer: 192 students (960 x 16/80 = 192).

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Question 13

(a) form fractions 70/200, 85/200, 30/200, 15/200 **M1**

(a) convert to percentages correctly **M1**

(a) answers: 70/200 = 7/20 = 35%, 85/200 = 17/40 = 42.5%, 30/200 = 3/20 = 15%, 15/200 = 3/40 = 7.5% cao **A1**

(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) use assumed values 0,1,2,3 and multiply by frequencies: 0*70 + 1*85 + 2*30 + 3*15 **M1**

(b) sum the products correctly: 0 + 85 + 60 + 45 = 190 **M1**

(b) divide by total households 200 to find mean **M1**

(b) 0.95 cao (190/200 = 0.95 -> 0.95 to 2 dp) **A1**

(b) Answer: 0.95 bikes per household (estimate).

(c) state that treating 3 or more as 3 ignores households with more than 3 bikes **M1**

(c) conclude it underestimates the true mean if any households have more than 3 bikes **A1**

(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.

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