2.15 Bar Charts: 30-minute Pack

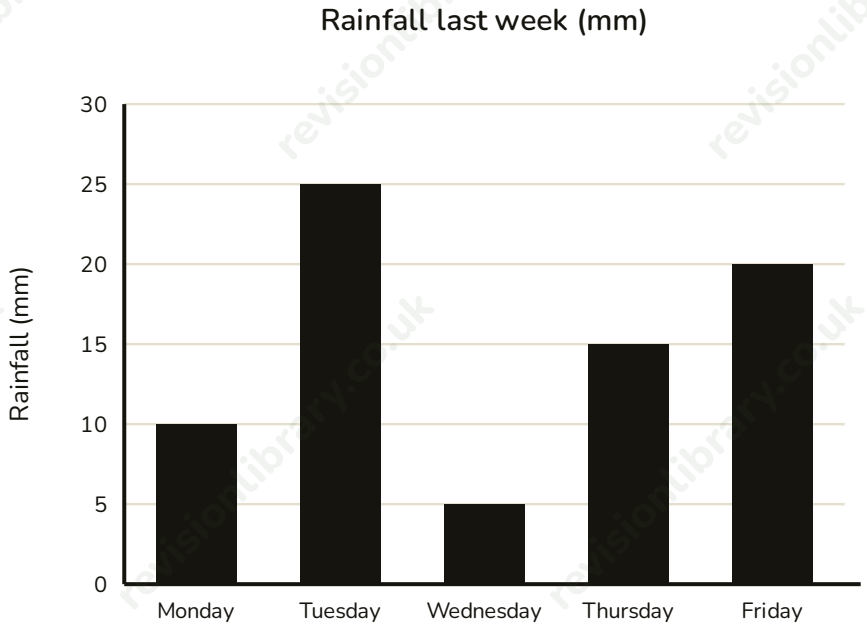
EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The bar chart below shows the rainfall (in mm) recorded at a weather station on each day last week.



(a) Use the bar chart to write down the rainfall recorded on Wednesday. **(1)**

.....

(b) Work out the range of the rainfall over the five days. **(2)**

.....

(Total for Question 1 is 3 marks)

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2 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) 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 2 is 4 marks)

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3 Ayesha, a member of a hockey team, used the bar chart of goals scored in each of the team's 6 matches this season (2, 5, 1, 4, 3, 5) to find the mean. Her working was: 'Total = 2 + 5 + 1 + 4 + 3 + 5 = 20. Mean = 20 / 5 = 4.'

(a) Show that Ayesha's total of 20 is correct, and explain why her mean of 4 is wrong. **(2)**

(b) Work out the correct mean number of goals per match, giving your answer correct to 1 decimal place. **(2)**

(Total for Question 3 is 4 marks)

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4 A running club recorded the time, t minutes, taken by 60 members to complete a 5 km run, grouped as follows: $20 \leq t < 25$: 8 members, $25 \leq t < 30$: 22 members, $30 \leq t < 35$: 19 members, $35 \leq t < 40$: 11 members.

(a) Write down the modal class. **(2)**

(b) Use the midpoint of each class to estimate the mean time taken, giving your answer correct to 1 decimal place. **(5)**

(c) Comment on whether using the midpoints is likely to give an accurate estimate of the mean, given that a runner's finishing time is unlikely to be spread evenly across each 5-minute interval. **(2)**

(Total for Question 4 is 9 marks)

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Mark scheme · 2.15 Bar Charts: 30-minute Pack

Question 1

(a) 5 mm cao **B1**

(a) Answer: 5 mm

(b) identify the highest (25) and lowest (5) values, 25 - 5 **M1**

(b) 20 mm cao **A1**

(b) Answer: 20 mm (25 - 5 = 20).

Question 2

(a) form fraction 30/150 and simplify **M1**

(a) 1/5 cao **A1**

(a) Answer: 1/5 (30/150 = 1/5).

(b) add frequencies Mon-Fri: 28+24+30+18+25 **M1**

(b) 125 cao **A1**

(b) Answer: 125 (28 + 24 + 30 + 18 + 25 = 125).

Question 3

(a) confirm 2 + 5 + 1 + 4 + 3 + 5 = 20 **M1**

(a) state Ayesha divided by 5 instead of 6 (there are 6 matches), which is why her mean is wrong **A1**

(a) Answer: Total = 20 is correct, but Ayesha divided by 5 instead of 6 (there are 6 matches), so her mean is wrong.

(b) 20 / 6 **M1**

(b) 3.3 awrt **A1**

(b) Answer: 3.3 (20 / 6 = 3.333... = 3.3 to 1 dp).

Question 4

(a) identify the class with the highest frequency (22) **M1**

(a) $25 \leq t < 30$ cao **A1**

(a) Answer: $25 \leq t < 30$ (22 members, the highest frequency).

(b) use midpoints 22.5, 27.5, 32.5, 37.5 **M1**

(b) multiply each midpoint by its frequency, e.g. 8 x 22.5, 22 x 27.5, 19 x 32.5, 11 x 37.5 **M1**

(b) sum the products, 180 + 605 + 617.5 + 412.5 = 1815 **M1**

(b) divide by the total frequency, 1815 / 60 **M1**

(b) 30.3 awrt **A1**

(b) Answer: 30.3 minutes (1815 / 60 = 30.25, which rounds to 30.3 to 1 dp).

(c) state that using midpoints assumes the times are evenly spread within each class, which may not be true **M1**

(c) conclude it is only an estimate and could be an over- or underestimate of the true mean depending on how the times are actually distributed within each class **A1**

(c) Answer: It is only an estimate, not the exact mean: the midpoint method assumes times are evenly spread within each class, which may not be true, so the estimate could be higher or lower than the true mean.

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