GCSE Mathematics (1MA1)

Themed papers – Statistical Diagrams: Histograms

Compiled from student-friendly mark schemes

Please note that this mark scheme is not the one used by examiners for making scripts. It is intended more as a guide to good practice, indicating where marks are given for correct answers. As such, it doesn't show follow-through marks (marks that are awarded despite errors being made) or special cases.

It should also be noted that for many questions, there may be alternative methods of finding correct solutions that are not shown here – they will be covered in the formal mark scheme.

NOTES ON MARKING PRINCIPLES

Guidance on the use of codes within this mark scheme
M1 – method mark. This mark is generally given for an appropriate method in the context of the question. This mark is given for showing your working and may be awarded even if working is incorrect. P1 – process mark. This mark is generally given for setting up an appropriate process to find a solution in the context of the question. A1 – accuracy mark. This mark is generally given for a correct answer following correct working. B1 – working mark. This mark is usually given when working and the answer cannot easily be separated. C1 – communication mark. This mark is given for explaining your answer or giving a conclusion in context supported by your working. Some questions require all working to be shown; in such questions, no marks will be given for an answer with no working (even if it is a correct answer).

Question 1 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$5 \times 0.8 = 4$ $10 \times 0.4 = 4$ $10 \times 0.6 = 6$ $5 \times 1.0 = 5$ $20 \times 0.2 = 4$	M1	This mark is given for a correct method to find at least two frequencies from bars of different widths.
	4, 6, 5, 4	A1	This mark is given for the correct answer only
(b)	$\frac{4+4+6+5+4}{4} = \frac{5.75}{4}$ so take 6th value	M1	This mark is given for a method to find the 6th value
	10 (minutes)	A1	This mark is given for the correct answer only

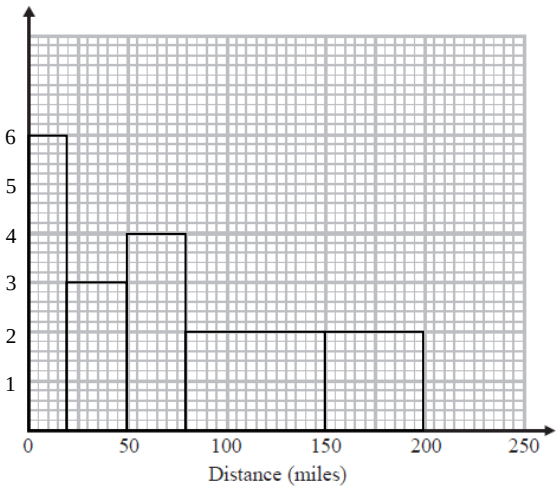
Question 2 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$1.1 \times 10 = 11$ $2.8 \times 10 = 28$ $2.3 \times 20 = 46$ $1.4 \times 20 = 28$ $1.4 \times 10 = 14$ $0.7 \times 30 = 21$	P1	This mark is given for a correct process to find any frequency (frequency density × age)
	$\frac{1}{2}(1.4 \times 20) + (0.7 \times 30) = 35$	P1	This mark is given for a complete process to find the number of members aged over 50
	$\frac{20}{100} \times 35 = 7$	A1	This mark is given for the correct answer only

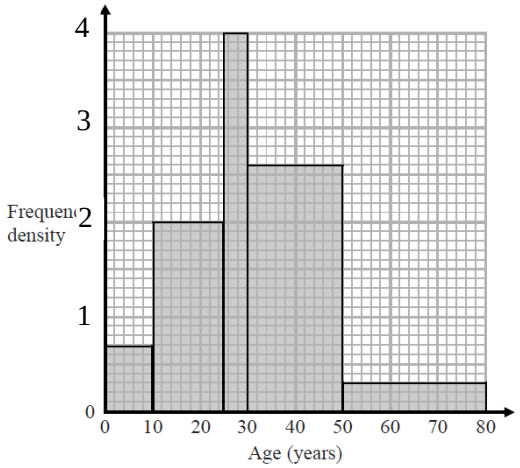
Question 3 (Total 4 marks)

<table>
<tr><th>Part</th><th>Working an or answer examiner might expect to see</th><th>Mark</th><th>Notes</th></tr>
<tr><td rowspan="4">(a)</td><td><table><tr><th>Weight</th><th>Frequency density</th><th>Frequency</th></tr><tr><td>0 – 60</td><td>2</td><td>120</td></tr><tr><td>60 – 90</td><td>5</td><td>150</td></tr><tr><td>90 – 120</td><td>9</td><td>270</td></tr><tr><td>120 – 135</td><td>6</td><td>90</td></tr><tr><td>135 – 180</td><td>2</td><td>90</td></tr><tr><td>Total</td><td></td><td>720</td></tr></table></td><td></td><td>This mark is given for a method to find the total frequency</td></tr>
<tr><td>150 + 270 = 420</td><td>M1</td><td>This mark is given for a method for finding the frequency of onions between 60 and 120 g</td></tr>
<tr><td>$\frac{420}{720} \times 360$</td><td>M1</td><td>This mark is given for a method to find the angle of the sector in the pie chart</td></tr>
<tr><td>210</td><td>A1</td><td>This mark is given for the correct answer only</td></tr>
</table>

Question 4 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)		B3	These marks are given for a fully correct histogram (B2 is given for all four blocks correct or all six frequencies) (B1 is given for at least 2 blocks of different widths or at least three correct frequencies)
(b)	$50 + \frac{285-210}{330-210} \times (80-50) = 50 + 18.75$	M1	This mark is given for a an indication of the median line in the third interval on the histogram or a proportional method to indicate the median distance
	68.75	A1	This mark is given for a correct answer in the range 65 to 70

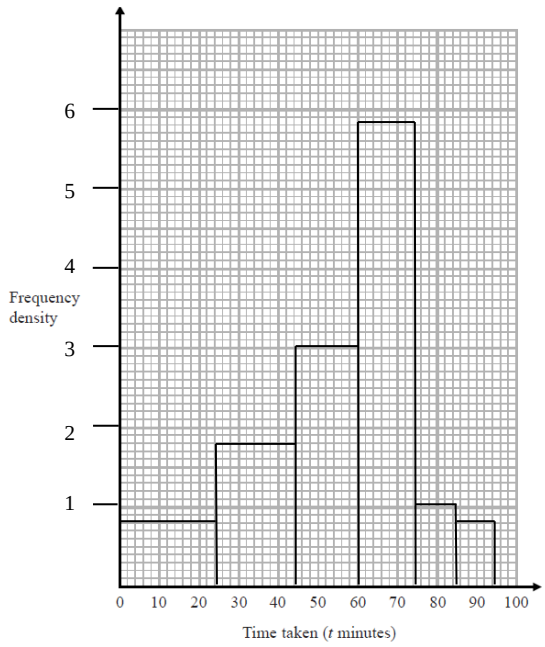
Question 5 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
		P1	This process mark is given for $20 \div 5$ or correct scale on the frequency density axis or use of area
	0–10: $10 \times 0.7 = 7$ 10–25: $15 \times 2.0 = 30$ 25–30: $5 \times 4.0 = 20$ 30–50: $20 \times 2.6 = 52$ 50–80: $30 \times 0.3 = 9$	P1	This process mark is given a correct method to find the area of the remaining bars (allow one error)
	$\frac{52+9}{7+30+20+52+9} = \frac{61}{118}$	A1	This accuracy mark is given for the correct answer only (or an equivalent fraction)

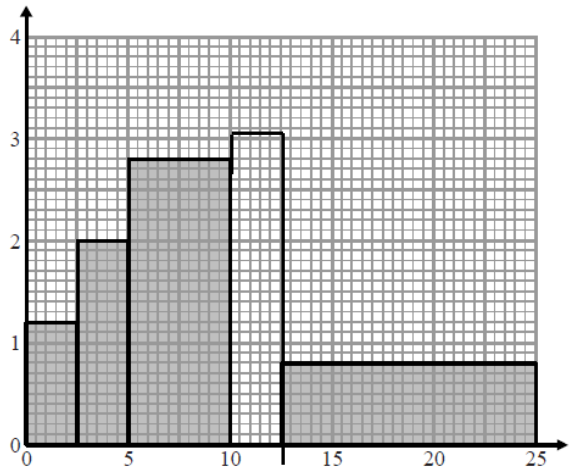
Question 6 (Total 6 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$(7\frac{1}{2}$ squares – 4 squares) represent 7 fish; so each square represents 2 fish	M1	This mark is given for working with frequency density
	10, 8, 12, 15, 15, 8	M1	This mark is given for finding at least 4 of 10, 8, 12, 15, 15, 8
	10 + 8 + 12 + 15 + 15 + 8 = 68	A1	This mark is given for the correct answer only
(b)(i)		M1	This mark is given for a complete correct method to divide the area of the histogram into two equal parts or for a complete correct method to interpolate for the 34.5th value
	412 – 417	A1	This mark is given for the correct answer only answer within the range 412 – 417
(b)(ii)	Only an estimate because it is dependent on a distribution within the interval	C1	This mark is given for a correct statement.

Question 7 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Frequency densities: 20 ÷ 25 = 0.8 25 ÷ 20 = 1.75 45 ÷ 15 = 3 87 ÷ 15 = 5.8 10 ÷ 10 = 1 8 ÷ 10 = 0.8  	C3	These marks are given for a fully correct histogram with axes scaled C2 is given for all bars in correct proportions C1 is given for two correct bars of different widths

Question 8 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$1.2 \times 2.5 = 3$, $2 \times 2.5 = 5$, $2.8 \times 5 = 14$, $0.8 \times 12.5 = 10$ $3 + 5 + 14 + 10 = 32$	M1	This mark is given for a method to find the number of trees represented by the bars shown
	$32 \times \frac{20}{80} = 8$	M1	This mark is given for method to find the number of trees between 10 and 12.5 metres
	$\frac{8}{2.5} = 3.2$ 	C1	This mark is given for a bar drawn with frequency density 3.2

Mark scheme for 1MA1 Higher themed papers: Statistical Diagrams: Histograms

Performance data:

Q	Taken from			Total Marks available	TOPIC	Spec Ref	AO	% Mean marks	Edexcel mean averages Marks of candidates who achieved grade:										
	Q	Series	Paper						ALL	9	8	7	6	5	4	3	2	1	U
1a	17a	June 2018	2H	2	Statistics	S3	2	76	1.51	1.98	1.95	1.88	1.71	1.37	0.83	0.38	-	-	0.15
1b	17b	June 2018	2H	2	Statistics	S4	2	26	0.52	1.45	1.01	0.69	0.45	0.26	0.13	0.08	-	-	0.05
2	13	June 2017	2H	3	Statistics	S3	3	44	1.32	2.65	2.28	1.86	1.37	0.80	0.31	0.06	-	-	0.02
3	21	June 2019	3H	4	Statistics	S2, S3	2	43	1.71	3.55	3.11	2.49	1.66	0.78	0.26	0.08	-	-	0.05
4a	17a	Nov 2018	3H	3	Statistics	S3	2	22	0.66	2.60	1.74	1.72	1.61	0.93	0.42	0.10	-	-	0.06
4b	17b	Nov 2018	3H	2	Statistics	S3	1	17	0.33	1.20	1.12	0.64	0.49	0.37	0.28	0.21	-	-	0.14
5	23	Mock Set 1	1H	3	Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6a	18a	Mock Set 2	3H	3	Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6bi	18bi	Mock Set 2	3H	2	Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6bii	18bii	Mock Set 2	3H	1	Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	15	Mock Set 3	2H	3	Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	18	Nov 2019	2H	3	Statistics	S3, R9	2	17	0.51	2.33	2.05	1.77	1.18	0.53	0.16	0.07	-	-	0.00
				27					**4.53**	**12.33**	**10.3**	**8.48**	**6.31**	**3.41**	**1.43**	**0.52**	**-**	**-**	**0.27**