**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**

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| --- |
| **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 × 0.8 = 4  10 × 0.4 = 4  10 × 0.6 = 6  5 × 1.0 = 5  20 × 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) | =  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 × 10 = 11  2.8 × 10 = 28  2.3 × 20 = 46  1.4 × 20 = 28  1.4 × 10 = 14  0.7 × 30 = 21 | P1 | This mark is given for a correct process to find any frequency (frequency density × age) |
| (1.4 × 20) + (0.7 × 30) = 35 | P1 | This mark is given for a complete process to find the number of members aged over 50 |
| × 35 = 7 | A1 | This mark is given for the correct answer only |

**Question 3 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working an or answer examiner might expect to see** | **Mark** | **Notes** |
| (a) | |  |  |  | | --- | --- | --- | | **Weight** | **Frequency density** | **Frequency** | | 0 – 60 | 2 | 120 | | 60 – 90 | 5 | 150 | | 90 – 120 | 9 | 270 | | 120 – 135 | 6 | 90 | | 135 – 180 | 2 | 90 | | **Total** |  | **720** | | M1 | This mark is given for a method to find the total frequency |
| 150 + 270 = 420 | M1 | This mark is given for a method for finding the frequency of onions between 60 and 120 g |
| × 360 | M1 | This mark is given for a method to find the angle of the sector in the pie chart |
| 210 | A1 | This mark is given for the correct answer only |

**Question 4 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 6  5  4  3  2  16 | 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 +  × (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** |
|  | 1  3  4  2 | P1 | This process mark is given for 20 ÷ 5  or correct scale on the frequency density axis  or use of area |
|  | 0–10: 10 × 0.7 = 7  10–25: 15 × 2.0 = 30  25–30: 5 × 4.0 = 20  30–50: 20 × 2.6 = 52  50–80: 30 × 0.3 = 9 | P1 | This process mark is given a correct method to find the area of the remaining bars (allow one error) |
|  | = | 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 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    2  1  3  4  5  6 | 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 × 2.5 = 3, 2 × 2.5 = 5, 2.8 × 5 = 14, 0.8 × 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 ×  = 8 | M1 | This mark is given for method to find the number of trees between 10 and 12.5 metres |
| = 3.2 | C1 | This mark is given for a bar drawn with frequency density 3.2 |

**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** |