**GCSE Mathematics (1MA1)**

**Themed papers – Set and Venn diagrams**

**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 an or answer examiner might expect to see** | **Mark** | **Notes** |
|  | *A*  *B* | B1 | This mark is given for labelling sets *A* and *B* |
| *A*  *B*  6  12 | A1 | This mark is given for 6, 12 placed in the intersection of *A* and *B* |
| *A*  *B*  1 5 7 11 13  3 9  2 4  8 10  6  12 | M1 | This mark is given for one of  3, 9 only in set *A*  or  2, 4, 8, 10 in set *B* only  or  1, 5, 6, 11, 13 in (*A* ∪ *B*)′ only |
| C1 | This mark is given for a completely correct Venn diagram |

**Question 2 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working an or answer examiner might expect to see** | **Mark** | **Notes** |
| (a) | 6  9  6  9  1 5 8  2  3 4 7 | M1 | This mark is given for placing numbers 6 and 9 in the intersection of *A* and *B* |
|  | M1 | This mark is given for placing numbers 1, 5 and 8 in set A only  **or**  the number 2 in set B only  **or**  the numbers 3, 4 7 outside *A* ∪ *B* |
| C1 | This mark is given for a fully correct Venn diagram |
| (b) | There are 2 numbers in *A* ∩ *B*  There are 9 numbers in the universal set | M1 | This mark is given for one of these two statements seen |
|  | A1 | This mark is given for a correct answer only |

**Question 3 (Total 6 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working an or answer examiner might expect to see** | **Mark** | **Notes** |
| (a) |  | C4 | Four marks are given for a fully correct Venn diagram  (3 marks for at least 6 numbers in the correct position)  (2 marks for at least 4 numbers in the correct position)  (1 mark for at least 2 numbers in the correct position) |
| (b) | *A* ∩ *B* = {8} | M1 | This mark is given for finding the number of members of *A* ∩ *B* |
|  | A1 | This mark is given for the correct answer only |

**Question 4 (Total 6 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
| (a) | *A* *B*  3 9 5  15  21 27 25  1, 7, 11, 13, 17, 19, 23, 29 | B1 | This mark is given for labels on the Venn diagram |
| M1 | This mark is given for 15 shown in the intersection |
| M1 | This mark is given for  5 and 25 in only set *B*  or  3, 9, 21 and 27 in only set *A*  or  1, 7, 11, 13, 17, 19, 23, 29 in |
| C1 | This mark is given for all numbers correctly placed in the Venn Diagram |
| (b) | where *a* ≥ 7 or , where *b* ≤ 15 | P1 | This mark is given for a correct numerator or denominator |
|  | A1 | This mark is given for the correct answer only |

**Question 5 (Total 3 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
| (a) | *A* = {15, 20, 25}  *B* = {15, 17, 19, 21, 23, 25} | M1 | This mark is given for listing the elements of the sets *A* and *B* |
| *A* ∪ *B* = {15, 17, 19, 20, 21, 23, 25} | A1 | This mark is given for the correct answer only (with no repeats) |
| (b) | *A* ∩ *B* = {15, 25}  Odd multiples of five between 14 and 26 | C1 | This mark is given for a correct description |

**Question 6 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) |  | B1 | This mark is given for 13 and 20 in the correct positions in the Venn diagram |
| 43 − 20 (= 23)  60 − 43 − 13 (= 4) | M1 | This mark is given for a method to find the number of students who study only Spanish, , or the number of students who study neither French nor Spanish, |
|  | A1 | This mark is given for a fully correct Venn diagram |
| (b) |  | B1 | This mark is given for |

**Question 7 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 3 is placed in *Q* | B1 | This mark is given for the figure 3 correctly placed in the diagram |
| 6 is placed where *P* and *Q* overlap | B1 | This mark is given for the figure 6 correctly placed in the diagram |
| (b) | There are 7 numbers not in set *Q*  There are 11 numbers in all | M1 | This mark is given for an indication of at least one of the two statement |
|  | A1 | This mark is given for the correct answer only |

**Question 8 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a)(i) | 1, 3, 5, 15 | B1 | This mark is given for the correct answer only |
| (a)(ii) | 3 | B1 | This mark is given for the correct answer only |
| (a)(iii) | 1, 3, 5, 9, 15, 21 | B1 | This mark is given for the correct answer only |
| (b) | for where *a* > 8  or  where *b* < 11 | M1 |  |
|  | C1 | This mark is given for the correct answer or an equivalent decimal or percentage |

**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** | **5** | **4** | **3** | **2** | **1** | **U** |
| 1 | 20 | Nov-19 | 3F | 4 | Probability | N4, P6 | 2 | 81 | 3.22 | 3.57 | 3.5 | 3.28 | 2.8 | 1.82 | 0.69 |
| 2a | 24a | Jun-19 | 3F | 3 | Probability | P6 | 2 | 62 | 1.86 | 2.76 | 2.48 | 1.99 | 1.37 | 0.68 | 0.15 |
| 2b | 24b | Jun-19 | 3F | 2 | Probability | P3, P8 | 2 | 49 | 0.98 | 1.58 | 1.35 | 1.03 | 0.67 | 0.33 | 0.12 |
| 3a | 20a | Nov-18 | 2F | 4 | Probability | P6 | 2 | 61 | 2.42 | 3.28 | 2.92 | 2.45 | 1.83 | 1.02 | 0.27 |
| 3b | 20b | Nov-18 | 2F | 2 | Probability | P3, P8 | 2 | 31 | 0.61 | 1.15 | 0.75 | 0.6 | 0.46 | 0.29 | 0.08 |
| 4a | 15a | Jun-17 | 3F | 4 | Probability | P6 | 2 | 52 | 2.08 | 3.05 | 2.65 | 2.19 | 1.61 | 0.91 | 0.29 |
| 4b | 15b | Jun-17 | 3F | 2 | Probability | P3, 8 | 1 | 26 | 0.52 | 1.02 | 0.72 | 0.5 | 0.31 | 0.14 | 0.02 |
| 5a | 18a | Jun-18 | 1F | 2 | Probability | P6 | 1 | 40 | 0.79 | 1.13 | 0.99 | 0.85 | 0.65 | 0.38 | 0.12 |
| 5b | 18b | Jun-18 | 1F | 1 | Probability | P6 | 1 | 20 | 0.2 | 0.42 | 0.29 | 0.2 | 0.13 | 0.06 | 0.02 |
| 6a | 23a | Mock Set 1 | 2F | 3 | Probability | − | − | − | − | − | − | − | − | − | − |
| 6b | 23b | Mock Set 1 | 2F | 1 | Probability | − | − | − | − | − | − | − | − | − | − |
| 7a | 17a | Mock Set 2 | 1F | 2 | Probability | − | − | − | − | − | − | − | − | − | − |
| 7b | 17b | Mock Set 2 | 1F | 2 | Probability | − | − | − | − | − | − | − | − | − | − |
| 8ai | 20ai | Mock Set 4 | 2F | 1 | Probability | − | − | − | − | − | − | − | − | − | − |
| 8aii | 20aii | Mock Set 4 | 2F | 1 | Probability | − | − | − | − | − | − | − | − | − | − |
| 8aiii | 20aiii | Mock Set 4 | 2F | 1 | Probability | − | − | − | − | − | − | − | − | − | − |
| 8b | 20b | Mock Set 4 | 2F | 2 | Probability | − | − | − | − | − | − | − | − | − | − |
|  |  |  |  | **37** |  |  |  | **422** | **12.68** | **17.96** | **15.65** | **13.09** | **9.83** | **5.63** | **1.76** |