**GCSE Mathematics (1MA1)**

**Themed papers – Cards, dice, coins and spinners**

**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 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | **×** | B1 | This mark is given for a cross at |
| (b) | or | B1 | This mark is given for the correct answer only (or an equivalent fraction) |

**Question 2 (Total 4 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
| (a) | 1 – 0.2 – 0.4 – 0.1  = 0.3 | B1 | This mark is given for the correct answer only |
| (b) | 4 | B1 | This mark is given for the correct answer only |
| (c) | 0.2 × 60 | M1 | This mark is given for a method to work out an estimate |
| 12 | A1 | This mark is given for the correct answer only |

**Question 3 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 3 × 5 = 15 | P1 | This mark is given for a process to find out which multiple will have both a star and a circle drawn on |
| 100 ÷ 15 = 6.66…. | P1 | This mark is given for a process to find out how many cards up to 100 have both a star and a circle drawn on |
| 6 (whole cards) | A1 | This mark is given for the correct answer only |

**Question 4 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (i) | 2 out of 4, so × marked at | B1 | This mark is given for the correct answer only |
| (ii) | 0 out of 4, so × marked at 0 | B1 | This mark is given for the correct answer only |

**Question 5 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 3 + 9 = 12, 3 + 2 = 5, 3 + 3 = 6  4 + 9 = 13, 4 + 2 = 6, 4 + 3 = 7  5 + 9 = 14, 5 + 2 = 7, 5 + 3 = 8 | 1 | This mark is given for a sample space or listed outcomes |
|  | 1 | This mark is given for the correct answer only |

**Question 6 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a)(i) | B | B1 | This mark is given for the correct answer only |
| (a)(ii) | C | B1 | This mark is given for the correct answer only |
| (b) | No, because the probability that coin C lands on Heads is  means that the probability that coin C lands on Tails is , so not the same | C1 | This mark is given for a correct statement |
| (c) | 4000 × 0.033 | M1 | This mark is given for a complete process to find the missing frequency |
| 132 | A1 | This mark is given for the correct answer only |

**Question 7 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | Probabilities for the first throw should add up to 1 (rather than 0.9) | C1 | This mark is given for a correct statement |
| 0.35 and 0.65 have been reversed on one set of the branches for the second throw | C1 | This mark is given for a correct statement |

**Question 8 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 1 – 0.17 – 0.18 – 0.09 – 0.15 – 0.1 = 0.31 | P1 | This mark is given for a process to find the probability of throwing a 1 |
| 0.31 × 200 = 62  0.18 × 200 = 36 | P1 | This mark is given for process to find an estimate of the number of 1s and 3s expected from 200 throws |
| 62 + 36 = 98 | A1 | This mark is given for the correct answer only |

**Question 9 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | HHH HHT HTH HTT  THH THT TTH TTT | M1 | This mark is given for a at least four different combinations |
| A1 | This mark is given for a fully correct list of eight combinations with no extras and no repeats |

**Question 10 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (i) | Maxine; she throws more coins than Stuart for a larger number of trials | C1 | This mark is given for a correct reason stated |
| (ii) | = | B1 | This mark is given for the correct answer only |

**Question 11 (Total 4 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
| (a) | No; the probability is the same for each number. | C1 | This mark is given for a correct statement |
| (b) | No; the probability of getting two sixes is  × , not  + | C1 | This mark is given for a correct statement |
| (c) | 1H, 2H, 3H, 4H, 5H, 6H  1T, 2T, 3T, 4T, 5T, 6T | B2 | This mark is given for a full and correct set of outcomes  (B1 is given for at least six correct) |

**Question 12 (Total 5 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
| (a) | Sharif | B1 | Sharif with mention of greatest total throws |
| (b) | Decision | P1 | starts working with proportions |
| (supported) | A1 | Conclusion: correct for Paul, but not for the rest; or ref to just Paul’s results |
| (c) |  | P1 | Tot: H 300 T 100 |
|  | A1 | oe |

**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** |
| **1a** | 6a | Nov 2018 | 3F | 1 | Probability | P3 | 2 | **91** | 0.91 | 0.96 | 0.95 | 0.92 | 0.86 | 0.63 | 0.35 |
| **1b** | 6b | Nov 2018 | 3F | 1 | Probability | P3 | 1 | **74** | 0.74 | 0.91 | 0.85 | 0.76 | 0.61 | 0.32 | 0.12 |
| **2a** | 14a | Nov 2018 | 3F | 1 | Probability | P4 | 1 | **86** | 0.86 | 0.97 | 0.93 | 0.88 | 0.75 | 0.55 | 0.33 |
| **2b** | 14b | Nov 2018 | 3F | 1 | Probability | P4 | 1 | **83** | 0.83 | 0.92 | 0.89 | 0.84 | 0.76 | 0.57 | 0.23 |
| **2c** | 14c | Nov 2018 | 3F | 2 | Probability | P3 | 1 | **61** | 1.22 | 1.72 | 1.50 | 1.23 | 0.85 | 0.40 | 0.06 |
| **3** | 15 | Nov 2018 | 3F | 3 | Number | N4 | 3 | **61** | 1.82 | 2.61 | 2.16 | 1.86 | 1.35 | 0.63 | 0.14 |
| **4i** | 6i | June 2017 | 1F | 1 | Probability | P3 | 1 | **58** | 0.58 | 0.65 | 0.62 | 0.60 | 0.57 | 0.50 | 0.35 |
| **4ii** | 6ii | June 2017 | 1F | 1 | Probability | P3 | 1 | **97** | 0.97 | 1.00 | 1.00 | 0.99 | 0.98 | 0.93 | 0.66 |
| **5** | 17 | Nov 2017 | 1F | 2 | Probability | P7, P8 | 1 | **52** | 1.03 | 1.47 | 1.29 | 1.08 | 0.76 | 0.44 | 0.29 |
| **6ai** | 16ai | June 2019 | 2F | 1 | Number | N10, P3 | 2 | **82** | 0.82 | 0.95 | 0.92 | 0.86 | 0.76 | 0.61 | 0.37 |
| **6aii** | 16aii | June 2019 | 2F | 1 | Number | N10, P3 | 2 | **48** | 0.48 | 0.80 | 0.63 | 0.47 | 0.36 | 0.28 | 0.20 |
| **6b** | 16b | June 2019 | 2F | 1 | Probability | P4 | 2 | **47** | 0.47 | 0.81 | 0.69 | 0.50 | 0.30 | 0.13 | 0.03 |
| **6c** | 16c | June 2019 | 2F | 2 | Probability | P1 | 2 | **48** | 0.95 | 1.51 | 1.27 | 1.00 | 0.69 | 0.38 | 0.14 |
| **7** | 22 | June 2018 | 3F | 2 | Probability | P4., P7, P8 | 2 | **43** | 0.86 | 1.44 | 1.23 | 0.95 | 0.54 | 0.17 | 0.03 |
| **8** | 17 | June 2017 | 2F | 3 | Probability | P2, P4 | 3 | **38** | 1.15 | 2.18 | 1.74 | 1.17 | 0.55 | 0.14 | 0.02 |
| **9** | 11 | Nov 2019 | 1F | 2 | Number | N5 | 1 | **32** | 0.63 | 0.90 | 0.73 | 0.63 | 0.48 | 0.47 | 0.31 |
| **10i** | 17i | June 2019 | 1F | 1 | Probability | P5 | 3 | **35** | 0.35 | 0.61 | 0.46 | 0.34 | 0.26 | 0.20 | 0.13 |
| **10ii** | 17ii | June 2019 | 1F | 1 | Probability | P5 | 1 | **14** | 0.14 | 0.13 | 0.16 | 0.17 | 0.14 | 0.06 | 0.01 |
| **11a** | 14a | Nov 2018 | 2F | 1 | Probability | P1, P3 | 2 | **68** | 0.68 | 0.92 | 0.79 | 0.70 | 0.54 | 0.29 | 0.13 |
| **11b** | 14b | Nov 2018 | 2F | 1 | Probability | P1, P2 | 2 | **1** | 0.01 | 0.18 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| **11c** | 14c | Nov 2018 | 2F | 2 | Probability | P7 | 2 | **78** | 1.56 | 1.81 | 1.75 | 1.59 | 1.31 | 0.85 | 0.36 |
| **12** | 25 | Spec Set 1 | 1F | 5 | - | - | - | **-** | - | - | - | - | - | - | - |
|  |  |  |  | **36** |  |  |  |  | **17.06** | **23.45** | **20.57** | **17.54** | **13.42** | **8.55** | **4.26** |