**GCSE Mathematics (1MA1)**

**Themed papers – Buttons and counters**

**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 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working an or answer examiner might expect to see** | **Mark** | **Notes** |
|  | 49 – 20 = 29 | P1 | This mark is given for  where *a* > 29 or  where *b* < 49 |
|  | A1 | This mark is given for the correct answer (or equivalent fraction) |

**Question 2 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 35 + 50 +75 = 160 | M1 | This mark is given for a method to find out the total of the counters given to Sameena, Henry and Lucas |
|  | M1 | This mark is given for writing the number of counters left in the bag as a fraction of the original total |
|  | A1 | This mark is given for the correct answer only |

**Question 3 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | (26 + 7) – (16 + 11)  = 33 – 27 | M1 | This mark is given for a method to find the totals of red and green counters |
| 6 | 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** |
|  | (20 × 7) + (21 × 3) + (22 × 1) = 225 | P1 | This mark is given for a process to find information about how many buttons there are in the incomplete table |
| 320 – 225 = 95  95 ÷ 19 | P1 | This mark is given for a complete process to find the missing frequency |
| 5 | A1 | This mark is given for the correct answer only |

**Question 5 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | D | B1 | This mark is given for the correct answer only |
| (b) | B | B1 | This mark is given for the correct answer only |
| (c) | 12 – (3 + 1 + 2) = 6 | M1 | This mark is given for finding the number of green counters in the bag |
| 6 + 2 = 8 | M1 | This mark is given for finding the number of green and yellow counters in the bag |
| = | C1 | This mark is given for a correct conclusion supported by accurate figures |

**Question 6 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 1 – 0.4 – 0.25 = 0.35 | P1 | This mark is given for a process to find the combined probability of picking a blue or green counter |
| = 0.05 | P1 | This mark is given for a process to use the ratio to find the probability of picking a blue counter or picking a green counter |
| 3 × 0.05  4 × 0.05 | P1 | This mark is given for a process to use the ratio to find the probability of picking a blue counter or picking a green counter in the ratio 3: 4 |
| blue = 0.15  green = 0.2 | 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** |
| --- | --- | --- | --- |
|  | × 100 | 1 | This mark is given representing the fraction or orange buttons in the jar |
| 45 | 1 | This mark is given for the correct answer only |

**Question 8 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 1 – 0.45 – 0.25 = 0.3 | P1 | This mark is given for a process to find the sum of the unknown probabilities |
| 2*x* + *x* = 0.3  *x* = 0.1  P(red) = 0.2, P(white) = 0.1 | P1 | This mark is given for a process to find the probabilities of taking red and white counters |
| Number of counters in the bag =  = 40  Number of red counters = 40 × 0.2 | P1 | This mark is given for a process to find the number of red counters |
| 8 | A1 | This mark is given for the correct answer only |
| (b) | 0.5 multiplied by an odd number will never be a whole number of counters, so there must be an even number of marbles in the box | C1 | This mark is given for a correct explanation |

**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** | 12 | Nov 2018 | 2F | 2 | Probability | P2 | 3 | **84** | 1.67 | 1.91 | 1.84 | 1.70 | 1.47 | 1.03 | 0.42 |
| **2** | 10 | June 2019 | 3F | 3 | Ratio | R3 | 1 | **73** | 2.18 | 2.81 | 2.66 | 2.34 | 1.81 | 1.22 | 0.60 |
| **3** | 7 | June 2019 | 3F | 2 | Number | N2 | 1 | **70** | 1.40 | 1.64 | 1.53 | 1.43 | 1.32 | 1.12 | 0.71 |
| **4** | 16 | June 2018 | 2F | 3 | Statistics | S2, S5 | 3 | **62** | 1.87 | 2.82 | 2.58 | 2.08 | 1.29 | 0.52 | 0.21 |
| **5a** | 7a | June 2018 | 1F | 1 | Probability | P3 | 2 | **90** | 0.90 | 0.98 | 0.96 | 0.94 | 0.88 | 0.75 | 0.47 |
| **5b** | 7b | June 2018 | 1F | 1 | Probability | P3 | 2 | **77** | 0.77 | 0.92 | 0.88 | 0.81 | 0.70 | 0.56 | 0.37 |
| **5c** | 7c | June 2018 | 1F | 3 | Probability | P2, N8 | 2 | **57** | 1.70 | 2.78 | 2.45 | 1.78 | 1.08 | 0.63 | 0.27 |
| **6** | 16 | Nov 2019 | 3F | 4 | Ratio | R5, P4 | 3 | **54** | 2.16 | 3.74 | 3.17 | 2.14 | 0.85 | 0.30 | 0.01 |
| **7** | 15 | Nov 2017 | 1F | 2 | Ratio | R8, R9, N11 | 1 | **44** | 0.87 | 1.73 | 1.30 | 0.86 | 0.44 | 0.33 | 0.17 |
| **8a** | 24a | June 2018 | 3F | 4 | Probability | P4, A21, R6 | 3 | **34** | 1.35 | 2.90 | 2.13 | 1.35 | 0.64 | 0.18 | 0.05 |
| **8b** | 24b | June 2018 | 3F | 1 | Probability | P4 | 2 | **12** | 0.12 | 0.35 | 0.21 | 0.10 | 0.03 | 0.01 | 0.00 |
|  |  |  |  | **26** |  |  |  |  | **14.99** | **22.58** | **19.71** | **15.53** | **10.51** | **6.65** | **3.28** |