**GCSE Mathematics (1MA1)**

**Themed papers – Ratio and proportion**

**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 or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | B = 2N  D = 2B  N = 6 so B = 12 | M1 | This mark is given for a complete method to find a value for D (the number of cousins David has) |
| D = 24 | A1 | This mark is given for the correct answer only |

**Question 2 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | Number of women in the choir:  60 ÷ 2 = 30  Number of men in the choir:  30 ÷ 3 = 10 | P1 | This mark is given for a process to find out the number of men in the choir |
| Number of children in the choir:  60 – 30 – 10 = 20 | P1 | This mark is given for a process to find out the number of children in the choir |
| 20 : 10 | P1 | This mark is given for a process to find out the ratio of the number of children in the choir to the number of men in the choir |
| = 2 : 1 so *n* = 2 | A1 | This mark is given for the correct answer only |

**Question 3 (Total 1 mark)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 3 : 5 | B1 | This mark is given for the correct answer only |

**Question 4 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | Ali’s company will use  = 18 workers  Hayley’s company will use  = 24 workers | P1 | This mark is given for a process to find the number of workers needed by each company |
| 24 – 18 | P1 | This mark is given for a process find out how many more workers Hayley’s company will need |
| 6 | A1 | 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** |
| --- | --- | --- | --- |
|  | 495 ÷ 3 = 165 | P1 | This mark is given for a process find the value of the £1 coins |
| 124 × 0.50 = 62 | P1 | This mark is given for a process to find the value of the 50p coins |
| 495 – 165 – 124 = 206  206 × 0.20 = 41.20 | P1 | This mark is given for a process to find the value of the 20p coins |
| 165 + 62 + 41.20 = 268.20 | A1 | This mark is given for the correct answer only |

**Question 6 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | × 3 = 72 | P1 | This mark is given for a process to find out how many stamps Tom originally had |
| × 3 = 90 | P1 | This mark is given for a process to find out how many stamps Tom had after buying some from Adam |
| 90 – 72 | P1 | This mark is given for a process to find how many stamps Tom bought from Adam |
| 18 | A1 | This mark is given for the correct answer only |

**Question 7 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 1 : 3 | B1 | This mark is given for the correct answer only |
| (b) | 56 × | M1 | This mark is given for a complete method to find the number of grey tiles |
| 42 | A1 | This mark is given for the correct answer only |

**Question 8 (Total 1 mark)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 4.5 : 2.25 =  :  = 2 : 1 | B1 | This mark is given for the correct answer only |

**Question 9 (Total 3 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | 6 ÷ 2 = 3 | 1 | This mark is given for showing a method to find a cost for 1 m of cotton fabric |
| 6 × 2.5 = 15 | 1 | This mark is given for showing a method to find the cost of silk fabric in comparison to cotton fabric |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 2 m | 6 m | 8 m | 9 m | | cotton | 6 | **18** | **24** | **27** | | silk | **15** | **45** | **60** | **67.5** | | 1 | This mark is given for the correct answer only |

**Question 10 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working an or answer examiner might expect to see** | **Mark** | **Notes** |
|  | Number of flats = 50 ÷ 5 × 8 = 80 | P1 | This mark is given for a process to find the number of flats in the village |
| Number of houses = 80 ÷ 4 × 7 | P1 | This mark is given for a process to find the number of houses in the village |
| 140 | A1 | This mark is given for the correct answer only |

**Question 11 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 100 – 30 = 70 | P1 | This mark is given for a process to find out the percentage of people who are women |
| 28 ÷ 0.7 | P1 | This mark is given for a process to find out how many people were at the meeting |
| 40 | A1 | This mark is given for the correct answer only |

**Question 12 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 2 × 7 : 5 × 3 : 6 × 4  14 : 15 : 24 | P1 | This mark is given for a process to find the ratio of the number of pens of each colour sold |
| 212 ÷ (14 + 15 + 24) | P1 | This mark is given for a process to find the proportion of green pens sold |
| × 24 | P1 | This mark is given for a process to find the number of green pens sold |
| 96 | A1 | This mark is given for the correct answer only |

**Question 13 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 120 ÷  = 120 × | M1 | This mark is given for a method to find a solution |
| 200 | A1 | This mark is given for the correct answer only |
| (b) | Each tap fills the pool at the same rate  Rate of filling does not change over time | C1 | This mark is given for a correct explanation |

**Question 14 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | = 18  *A* = 2 × 18 = 36°  *B* = 3 × 18 = 54° | P1 | This mark is given for a process to find values for angles *A* and *B* |
| cos 36° = 0.809 | P1 | This mark is given for writing a value for cos *A* |
| *AB* =  = | P1 | This mark is given for a process to find the length *AB* |
| 17.3 | A1 | This mark is given for the correct answer in the range 17.3 to 17.4 |

**Question 15 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | Ratio of blue pens : green pens : red pens is 8 : 20 : 5 | 1 | This mark is given for a method to find ratios of the three colours of pens |
| pens are red;  greatest number of pens = 99 | 1 | This mark is given for finding the fraction of red pens |
| 15 | 1 | This mark is given for the correct answer only |

**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 | 7 | Jun-18 | 3F | 2 | Ratio | R6 | 1 | 90 | 1.79 | 1.98 | 1.96 | 1.91 | 1.77 | 1.24 | 0.42 |
| 2 | 21 | Nov-19 | 1F | 4 | Ratio | N12, R4, R6 | 3 | 63 | 2.53 | 3.64 | 3.17 | 2.6 | 1.56 | 1.11 | 0.42 |
| 3 | 6 | Nov-19 | 3F | 1 | Ratio | R4 | 1 | 60 | 0.6 | 0.77 | 0.69 | 0.6 | 0.45 | 0.32 | 0.2 |
| 4 | 28 | Nov-19 | 2F | 3 | Ratio | R10, R13 | 1 | 60 | 1.8 | 2.66 | 2.31 | 1.85 | 1.03 | 0.44 | 0.21 |
| 5 | 6 | Jun-17 | 2F | 4 | Number | N2, N8, N13 | 1 | 56 | 2.24 | 3.58 | 3.13 | 2.4 | 1.45 | 0.54 | 0.1 |
| 6 | 23 | Nov-19 | 2F | 4 | Ratio | R4, R5, R8 | 3 | 54 | 2.14 | 3.48 | 2.95 | 2.18 | 0.97 | 0.37 | 0.23 |
| 7a | 5a | Jun-17 | 3F | 1 | Ratio | R8 | 1 | 52 | 0.52 | 0.85 | 0.73 | 0.57 | 0.34 | 0.1 | 0.01 |
| 7b | 5b | Jun-17 | 3F | 2 | Number | N11 | 3 | 70 | 1.4 | 1.93 | 1.83 | 1.58 | 1.08 | 0.44 | 0.1 |
| 8 | 14 | Jun-19 | 2F | 1 | Number | N2, R5 | 3 | 24 | 0.24 | 0.73 | 0.45 | 0.19 | 0.06 | 0.02 | 0.01 |
| 9 | 15 | Nov-17 | 3F | 2 | Ratio | R4 | 1 | 36 | 1.08 | 2.14 | 1.51 | 1.06 | 0.63 | 0.27 | 0.08 |
| 10 | 20 | Jun-18 | 1F | 3 | Ratio | R6, | 3 | 33 | 0.99 | 2.31 | 1.75 | 0.95 | 0.33 | 0.11 | 0.03 |
| 11 | 11 | Nov-18 | 3F | 3 | Ratio | R9 | 3 | 29 | 0.88 | 2.57 | 1.39 | 0.82 | 0.34 | 0.12 | 0.16 |
| 12 | 27 | Jun-19 | 1F | 4 | Ratio | R3,R5 | 3 | 16 | 0.63 | 2.08 | 0.98 | 0.47 | 0.27 | 0.13 | 0.03 |
| 13a | 23a | Nov-18 | 1F | 2 | Ratio | R10 | 1 | 5 | 0.09 | 0.51 | 0.14 | 0.07 | 0.04 | 0.05 | 0 |
| 13b | 23b | Nov-18 | 1F | 1 | Ratio | R10 | 3 | 12 | 0.12 | 0.43 | 0.19 | 0.11 | 0.05 | 0.04 | 0.01 |
| 14 | 25 | Nov-18 | 3F | 4 | Geometry | R5, G20 | 3 | 5 | 0.19 | 1.74 | 0.39 | 0.12 | 0.02 | 0 | 0 |
| 15 | 22 | Nov-17 | 3F | 3 | Ratio | R5 | 3 | 3 | 0.09 | 0.6 | 0.16 | 0.05 | 0.03 | 0.02 | 0 |
|  |  |  |  | **44** |  |  |  |  | **17.33** | **32** | **23.73** | **17.53** | **10.42** | **5.32** | **2.01** |