**GCSE Mathematics (1MA1)**

**Themed papers – Right or wrong?**

**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 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 3 × 25 = 75 | P1 | This mark is given for a process to find the cost of three T-shirts |
| 200 – 60 – 75 = 65 | P1 | This mark is given for a process to find out how much money Rehan has after buying 1 pair of trainers and three T-shirts |
| 65 < 80, so Rehan does not have enough money | C1 | This mark is given for a correct conclusion |
| (b) | 0.7 × 60 = 42 | P1 | This mark is given for a process to use an approximation to 0.749 |
| 0.7 × 60 is an underestimate but is still greater than 40, so Rehan is wrong | C1 | This mark is given for a correct conclusion |

**Question 2 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working an or answer examiner might expect to see** | **Mark** | **Notes** |
| (a) | For example:  40 is a number in the sequence  80 is a number in the sequence | C1 | This mark is given for a correct example stated |
| (b) | For example:  No, because 85 is an odd number  No, because 85 is not in the 8 times table  No, because 8o is in the sequence and 85 is only 5 more, not 8 more | C1 | This mark is given for a correct reason stated |

**Question 3 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | The numbers must first be put in order | C1 | This mark is given for a correct reason |
| (b) | 22 – 12 | M1 | This mark is given for finding the largest and smaller numbers in the list |
| 10 | A1 | This mark is given for the correct answer only |
| (c) | = | M1 | This mark is given for adding the numbers and dividing by 7 |
| 16 | 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** |
| (a) | Jenny should multiply first so that she gets 12 – (2 × 4) = 4, not (12 – 2) × 4 = 40 | C1 | This mark is given for a statement identifying the incorrect order of operation |
| (b) | Rehan should put the numbers in order first so that he subtracts the smallest number from the largest number | C1 | This mark is given for a statement that the range is the difference between the greatest and least values |

**Question 5 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | Coby has carried out the calculation for the area, not the perimeter | P1 | This mark is given for a correct explanation |
| (b) | The length of one side of the triangle cannot be negative | P1 | This mark is given for a correct explanation |

**Question 6 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 70 ÷ 5 = 14 | B1 | This mark is given for the correct answer only |
| (b) | Fiona divided by 2 when she should have multiplied by 2 | B1 | This mark is given for the correct answer only |

**Question 7 (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 8 (Total 2 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
| (a) | Bill has increased 150 by 30% rather than 3%. He should have used 1.03, not 1.3 | B1 | This mark is given for a correct explanation |
| (b) | 150 × 0.97 = 145.5 | B1 | This mark is given for the correct answer only |

**Question 9 (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 10 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | Negative | B1 | This mark is given for the correct answer only |
| (b) | The point is far away from the line of best fit | C1 | This mark is given for a correct explanation |
| (c) | Debbie’s conclusion is unreliable because the point is outside the range of the scatter diagram | C1 | This mark is given for a correct explanation |

**Question 11 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 11, 13, 17, 19; 23, 29 | 1 | This mark is given for listing any of the numbers 11, 13, 17, 19, 23, 29 as prime numbers |
| No; 11, 13, 17 and 19 are between 10 and 20, and 23 and 29 are between 20 and 30 | 1 | This mark is given for the correct conclusion with supporting lists |

**Question 12 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | Jake; range of marks is smaller than Sarah’s | 1 | This mark is given for a correct explanation referring to spread, range or highest and lowest values |
| (b) | No, since stem not used – it should be 26 | 1 | This mark is given for a correct explanation |

**Question 13 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 23, 29 | B2 | These marks are given for the numbers 23 and 29 and no extra numbers  (B1 is given for at least one correct number and no more than one incorrect number) |
| (b) | Yes, because all other even numbers have 2 as a factor | C1 | This mark is given for a correct explanation |

**Question 14 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 5*n* ± … | B1 | This mark is given for finding 5*n* |
| 5*n* – 2 | B1 | This mark is for finding – 2 |
| (b) | No, since 3 × 42 = 48  or  No, since it would mean that *n*2 = 48 but *n* must have an integer value | C1 | This mark is given for a correct comment with evidence shown |

**Question 15 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 3.246 × 107 | B1 | This mark is given for the correct answer only |
| (b) | 0.00496 | B1 | This mark is given for the correct answer only |
| (c) | No; *B* is bigger since the power of 10 is bigger | C1 | This mark is given for a correct conclusion with a valid explanation given |

**Question 16 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 2100 × 0.4 = 840 | P1 | This mark is given for a process to find the three managers’ share of the bonus |
| 2100 – 840 = 1260 | P1 | This mark is given for a process to find the seven salesmens’ share of the bonus |
| 1260 ÷ 7 = 180 | P1 | This mark is given for a process to find one salesman’s share of the bonus |
| 2100 ÷ 10 = 210  = 0.1666 = 16.66% | P1 | This mark is given for a process to find the percentage difference between the actual bonus and the salesman’s suggestion |
| No, the salesman would only receive and extra 16.66%, not 25% | C1 | This mark is given for a correct conclusion supported by correct working |

**Question 17 (Total 2 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
| (a) | *x* is not a base angle | C1 | This mark is given for a correct explanation |
| (b) | alternate (not corresponding) angles are equal  or  allied (or co-interior) angles add up to 180 | C1 | This mark is given for a correct version of the first reason |

**Question 18 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | Median = 13th dress in order smallest to largest  Size 12 | B1 | This mark is given for the correct answer only |
| (b) | No , categories are not mutually exclusive (a woman could be in both categories) | C1 | This mark is given for a correct statement |

**Question 19 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 56 ×  = 168, 40 ×  = 120, 24 ×  = 72 | M1 | This mark is given for correct working to find at least one angle |
| 168°, 120°, 72° | A1 | This mark is given for all three angles drawn accurately (within ±2°) |
| French  Spanish  German | B1 | This mark is given for the correct labels on the diagram |
| (b) | No, since we don’t have actual figures for Lowry | C1 | This mark is given for a correct explanation |

**Question 20 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 200 + 3300 + 2000 + 0 + 1800 = 7300 | 1 | This mark is given for *fx* with *x* consistent within intervals |
| 7300 ÷ 20 | 1 | This mark is given Ʃ*fx* ÷ Ʃ*f* |
| 365 | 1 | This mark is given for the correct answer only |
| (b) | Yes, since outliers can affect the mean | 1 | This mark is given for a correct comment |

**Question 21 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 4 × 5 = 20 kg  5 × 9 = 45 kg | P1 | This mark is given for a process to find the weight of the red bricks or the blue bricks |
| 20 + 45 + 6 = 71 kg | P1 | This mark is given for a process to find the weight of all the bricks |
| Average weight of bricks is  = 7.1 kg  so Donna is incorrect | C1 | This mark is given for finding the average weights of the bricks with a correct conclusion stated |

**Question 22 (Total 1 mark)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | The result should be twice the original, not half | 1 | This mark is given for a correct explanation |

**Question 23 (Total 1 mark)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | The result should be twice the original, not half | 1 | 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** |
| **1a** | 12a | Nov-19 | 1F | 3 | Number | N2 | 3 | **93** | 2.78 | 2.9 | 2.88 | 2.81 | 2.65 | 2.38 | 2.05 |
| **1b** | 12b | Nov-19 | 1F | 2 | Ratio | R1 R10 N14 | 2 | **30** | 0.59 | 0.94 | 0.77 | 0.6 | 0.32 | 0.24 | 0.14 |
| **2a** | 13a | Jun-19 | 3F | 1 | Algebra | A23 | 2 | **87** | 0.87 | 0.97 | 0.95 | 0.92 | 0.85 | 0.61 | 0.18 |
| **2b** | 13b | Jun-19 | 3F | 1 | Algebra | A23 | 2 | **72** | 0.72 | 0.84 | 0.81 | 0.77 | 0.69 | 0.46 | 0.11 |
| **3a** | 6a | Jun-17 | 3F | 1 | Statistics | S4 | 1 | **85** | 0.85 | 0.97 | 0.95 | 0.91 | 0.82 | 0.61 | 0.25 |
| **3b** | 6b | Jun-17 | 3F | 2 | Statistics | S4 | 1 | **75** | 1.5 | 1.93 | 1.85 | 1.65 | 1.29 | 0.67 | 0.15 |
| **3c** | 6c | Jun-17 | 3F | 2 | Statistics | S4 | 1 | **77** | 1.53 | 1.94 | 1.86 | 1.7 | 1.35 | 0.73 | 0.15 |
| **4a** | 15a | Jun-18 | 3F | 1 | Number | N3 | 3 | **49** | 0.49 | 0.78 | 0.66 | 0.52 | 0.36 | 0.17 | 0.04 |
| **4b** | 15b | Jun-18 | 3F | 1 | Statistics | S4 | 3 | **74** | 0.74 | 0.91 | 0.88 | 0.8 | 0.65 | 0.38 | 0.11 |
| **5a** | 14a | Nov-19 | 3F | 1 | Geometry | G17 | 3 | **78** | 0.78 | 0.97 | 0.9 | 0.79 | 0.61 | 0.39 | 0.17 |
| **5b** | 14b | Nov-19 | 3F | 1 | Geometry | G16 | 3 | **37** | 0.37 | 0.69 | 0.49 | 0.37 | 0.22 | 0.09 | 0 |
| **6a** | 14a | Jun-19 | 1F | 1 | Number | N12 | 1 | **68** | 0.68 | 0.96 | 0.9 | 0.76 | 0.5 | 0.25 | 0.08 |
| **6b** | 14b | Jun-19 | 1F | 1 | Number | N8 | 2 | **12** | 0.12 | 0.41 | 0.21 | 0.08 | 0.03 | 0.01 | 0 |
| **7a** | 14a | Nov-18 | 2F | 1 | Probability | P1, P3 | 2 | **68** | 0.68 | 0.92 | 0.79 | 0.7 | 0.54 | 0.29 | 0.13 |
| **7b** | 14b | Nov-18 | 2F | 1 | Probability | P1, P2 | 2 | **1** | 0.01 | 0.18 | 0.01 | 0 | 0 | 0 | 0 |
| **7c** | 14c | Nov-18 | 2F | 2 | Probability | P7 | 2 | **78** | 1.56 | 1.81 | 1.75 | 1.59 | 1.31 | 0.85 | 0.36 |
| **8a** | 18a | Nov-18 | 2F | 1 | Ratio | R9 | 3 | **54** | 0.54 | 0.91 | 0.69 | 0.54 | 0.37 | 0.22 | 0.06 |
| **8b** | 18b | Nov-18 | 2F | 1 | Ratio | R9 | 1 | **15** | 0.15 | 0.65 | 0.27 | 0.13 | 0.04 | 0.01 | 0.02 |
| **9ai** | 16ai | Jun-19 | 2F | 1 | Number | N10, P3 | 2 | **82** | 0.82 | 0.95 | 0.92 | 0.86 | 0.76 | 0.61 | 0.37 |
| **9aii** | 16aii | Jun-19 | 2F | 1 | Number | N10, P3 | 2 | **48** | 0.48 | 0.8 | 0.63 | 0.47 | 0.36 | 0.28 | 0.2 |
| **9b** | 16b | Jun-19 | 2F | 1 | Probability | P4 | 2 | **47** | 0.47 | 0.81 | 0.69 | 0.5 | 0.3 | 0.13 | 0.03 |
| **9b** | 16c | Jun-19 | 2F | 2 | Probability | P1 | 2 | **48** | 0.95 | 1.51 | 1.27 | 1 | 0.69 | 0.38 | 0.14 |
| **10a** | 19a | Jun-18 | 3F | 1 | Statistics | S6 | 1 | **63** | 0.63 | 0.91 | 0.83 | 0.69 | 0.48 | 0.22 | 0.06 |
| **10b** | 19b | Jun-18 | 3F | 1 | Statistics | S6 | 2 | **33** | 0.33 | 0.54 | 0.45 | 0.36 | 0.24 | 0.09 | 0.02 |
| **10c** | 19c | Jun-18 | 3F | 1 | Statistics | S6 | 2 | **9** | 0.09 | 0.16 | 0.12 | 0.09 | 0.08 | 0.05 | 0.01 |
| **11** | 7 | Nov-17 | 2F | 2 | Number | N4 | 2 | **42** | 0.83 | 1.47 | 1.16 | 0.84 | 0.49 | 0.2 | 0.02 |
| **12a** | 10a | Nov-17 | 1F | 1 | Statistics | S4 | 1 | **42** | 0.42 | 0.66 | 0.52 | 0.43 | 0.33 | 0.23 | 0.17 |
| **12b** | 10b | Nov-17 | 1F | 1 | Statistics | S2 | 2 | **62** | 0.62 | 0.79 | 0.76 | 0.65 | 0.47 | 0.28 | 0.22 |
| **13a** | 10a | Jun-18 | 2F | 2 | Number | N4 | 1 | **49** | 0.98 | 1.71 | 1.47 | 1.05 | 0.56 | 0.2 | 0.05 |
| **13b** | 10b | Jun-18 | 2F | 1 | Number | N4 | 2 | **19** | 0.19 | 0.53 | 0.34 | 0.16 | 0.05 | 0.01 | 0.01 |
| **14a** | 25a | Jun-17 | 2F | 2 | Algebra | A24 A25 | 1 | **42** | 0.84 | 1.62 | 1.23 | 0.83 | 0.45 | 0.15 | 0.02 |
| **14b** | 25b | Jun-17 | 2F | 1 | Algebra | A2 A23 | 1 | **16** | 0.16 | 0.48 | 0.27 | 0.11 | 0.03 | 0.01 | 0 |
| **15a** | 28a | Nov-19 | 3F | 1 | Number | N9 | 1 | **31** | 0.31 | 0.7 | 0.52 | 0.29 | 0.09 | 0.02 | 0 |
| **15b** | 28b | Nov-19 | 3F | 1 | Number | N9 | 1 | **35** | 0.35 | 0.76 | 0.56 | 0.33 | 0.13 | 0.04 | 0 |
| **15c** | 28c | Nov-19 | 3F | 1 | Number | N9 | 2 | **61** | 0.61 | 0.82 | 0.76 | 0.62 | 0.4 | 0.19 | 0.01 |
| **16** | 22 | Nov-18 | 1F | 5 | Ratio | N2, R6, R9 | 3 | **39** | 1.93 | 3.61 | 2.66 | 1.97 | 1 | 0.6 | 0.25 |
| **17a** | 15a | Jun-18 | 2F | 1 | Geometry | G4 | 2 | **31** | 0.31 | 0.7 | 0.48 | 0.3 | 0.15 | 0.05 | 0.01 |
| **17b** | 15b | Jun-18 | 2F | 2 | Geometry | G1 | 2 | **38** | 0.38 | 0.63 | 0.48 | 0.37 | 0.28 | 0.21 | 0.14 |
| **18a** | 17a | Jun-17 | 3F | 1 | Statistics | S4 | 1 | **35** | 0.35 | 0.63 | 0.48 | 0.33 | 0.21 | 0.16 | 0.15 |
| **18b** | 17b | Jun-17 | 3F | 1 | Probability | P8 | 2 | **3** | 0.03 | 0.09 | 0.06 | 0.02 | 0.01 | 0 | 0 |
| **19a** | 14a | Jun-17 | 1F | 3 | Statistics | S2 | 2 | **39** | 1.18 | 2.37 | 1.72 | 1.07 | 0.6 | 0.36 | 0.2 |
| **19b** | 14b | Jun-17 | 1F | 1 | Statistics | S2 | 2 | **14** | 0.14 | 1.62 | 1.23 | 0.83 | 0.45 | 0.15 | 0.02 |
| **20a** | 27a | Nov-17 | 1F | 3 | Statistics | S4 | 1 | **10** | 0.3 | 0.92 | 0.51 | 0.27 | 0.11 | 0.06 | 0.01 |
| **20b** | 27b | Nov-17 | 1F | 1 | Statistics | S4 | 3 | **1** | 0.01 | 0.02 | 0.01 | 0 | 0 | 0 | 0 |
| **21** | 25 | Nov-19 | 1F | 3 | Statistics | S4 | 3 | **9** | 0.28 | 0.99 | 0.46 | 0.23 | 0.11 | 0.08 | 0.02 |
| **22** | 9 | Nov-17 | 1F | 1 | Number | N3 | 3 | **8** | 0.08 | 0.3 | 0.14 | 0.06 | 0.03 | 0.03 | 0.02 |
| **23** | 16 | Nov-18 | 1F | 1 | Ratio | R2 | 2 | **7** | 0.07 | 0.3 | 0.11 | 0.05 | 0.03 | 0.03 | 0.01 |
|  |  |  |  | **68** |  |  |  |  | **29.10** | **47.08** | **38.46** | **30.42** | **21.49** | **13.18** | **6.16** |