**GCSE Mathematics (1MA1)**

**Themed papers – Standard Form**

**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** |
| (a) | 5.62 × 10–3 | B1 | This mark is given for the correct answer only |
| (b) | 1452 | B1 | This mark is given for the correct answer only |

**Question 2 (Total 2 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | 0.045 × 103 = 4.5 × 101  4.5 × 10–3 = 4.5 × 10–3  450 = 4.5 × 102  0.45 × 10–1 = 4.5 × 10–2 | M1 | This mark is given for conversion to same format or three expressions in the correct order |
| 4.5 × 10–3, 0.45 × 10–1, 0.045 × 103, 450 | A1 | This mark is given for the correct order only |

**Question 3 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a)  (b) |  | P1 | This mark is given for a process to find how long the signal took to reach Mars |
| = 1.3 × 102  = 130 | A1 | This mark is given for finding the number of seconds the signal takes to reach Mars |
| The signal will take longer to reach Mars | C1 | This mark is given for a correct explanation |

**Question 4 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | ×  = 0.456 × 10–1 | M1 | This mark is given for a method to find an answer in standard form |
| 4.56 × 10–2 | 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) | 36 000 | B1 | This mark is given for the correct answer only |
| (b) | (2.8 ÷ 4.7) × 10−2−5  or  0.5957…× 10−7  or 5.957…× 10−8  or  0.00000005957… | M1 | This mark is given for a method multiply the two terms |
| 5.96 × 10−8 | A1 | This mark is given for the correct answer only |

**Question 6 (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 7 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 13.8 × 5.4 × 107 × 10–12  = 74.52 × 10–5  = 7.452 × 10–4 | 1 | This mark is given for the digits 7452 seen |
| 0.000 745 2 | 1 | This mark is given for the correct answer only |

**Question 8 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 8.623 × 10–5 | B1 | This mark is given for the correct answer only |
| (b) | × | M1 | This mark is given for a method to work out the calculation |
| 7.44 × 106 | A1 | 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** |
|  | For digits 1619...  or 4.90245 × 1012  or 3.0276 × 1012 | M1 |  |
| 1.6 | A1 | This mark is given for an answer in the range of 16 to 1.62 |

**Question 10 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | Jupiter | B1 | This mark is give for the correct answer only |
| (b) | 4.869 × 1024 – 3.302 × 1023  = 4.5388 × 1024 | B1 | This mark is give for the correct answer only |
| (c) | 4.35 × 109 ÷ 4.14 × 107 = 105.07… | M1 | This mark is given for a method to compare the distances of Venus and Neptune from Earth |
| Yes, Nishat is correct | A1 | This mark is given for a correct statement with supporting evidence |

**Question 11 (Total 3 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
| (a) | 0.00000797 | B1 | This mark is given for the correct answer only |
| (b) | = × (105 – –3) = 0.63 × 108 | M1 | This mark is given for a method to deal with calculations involving powers |
| 6.3 × 107 | A1 | This mark is given for the correct answer only in standard form |

**Question 12 (Total 3 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
| (a) | 104 000 | B1 | This mark is given for the correct answer only |
| (b) | 6 × 10-2 | A1 | This mark is given for the correct answer only |
| (c) | 300.3 × 106 ÷ 4.62 × 108 | M1 | This mark is given for setting up the correct calculation to divide the cost by the number of tins |
| 0.65 | A1 | This mark is given for the correct answer only, or given in standard form (6.5 10-1) |

**Question 13 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 5.49 × 10–3 | B1 | This mark is given for the correct answer only |
| (b) |  | M1 | for method to square each element, e.g. 64 and 103×2 or method to convert to ordinary numbers and square, e.g. 8000 × 8000 |
| 6.4 × 107 | A1 | This mark is given for the correct answer only |
| (c) |  | M1 | for method to convert to ordinary numbers,  e.g. 760 000 + 87 000 or 7.6 × 105 + 0.87 × 105 |
| 8.47 × 105 | A1 | This mark is given for the correct answer only |

**Question 14 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | (1.496 × 1011) ÷ (3 × 108) (= 498.666…) | M1 | This mark is given for a method to find the number of seconds taken for light to reach the earth |
| 498.666… ÷ (60 × 60) | A1 | This mark is given for converting the number of seconds into hours |
| 0.1385185185 = 0.139 to 3 significant figures | A1 | This mark is given for showing the answer to be 0.139 hours as required |
| (b) | For example, Danesh has multiplied the indices rather than adding them | 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** | **9** | **8** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | **U** |
| 1a | 8a | June 2019 | 2H | 1 | Number | N9 | 1 | 90 | 0.90 | 0.98 | 0.97 | 0.95 | 0.93 | 0.88 | 0.77 | 0.58 | - | - | 0.39 |
| 1b | 8b | June 2019 | 2H | 1 | Number | N9 | 1 | 96 | 0.96 | 0.99 | 0.99 | 0.98 | 0.97 | 0.95 | 0.90 | 0.79 | - | - | 0.67 |
| 2 | 10 | Mock Set 2 | 3H | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3a | 11a | June 2019 | 3H | 2 | Ratio | N9, R1, R10, R11 | 3 | 88 | 1.75 | 1.98 | 1.94 | 1.89 | 1.81 | 1.66 | 1.42 | 1.03 | - | - | 0.64 |
| 3b | 11b | June 2019 | 3H | 1 | Ratio | R10 | 3 | 84 | 0.84 | 0.98 | 0.95 | 0.92 | 0.87 | 0.79 | 0.66 | 0.45 | - | - | 0.25 |
| 4 | 7 | Nov 2019 | 2H | 2 | Number | N9 | 1 | 68 | 1.36 | 1.89 | 1.70 | 1.75 | 1.65 | 1.55 | 1.28 | 1.05 | - | - | 0.78 |
| 5a | 9a | Mock Set 1 | 2H | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5b | 9b | Mock Set 1 | 2H | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 6a | 7a | Nov 2019 | 3H | 1 | Number | N9 | 1 | 67 | 0.67 | 1.00 | 0.97 | 0.92 | 0.91 | 0.80 | 0.66 | 0.44 | - | - | 0.11 |
| 6b | 7b | Nov 2019 | 3H | 1 | Number | N9 | 1 | 72 | 0.72 | 1.00 | 0.97 | 0.96 | 0.90 | 0.88 | 0.73 | 0.45 | - | - | 0.23 |
| 6c | 7c | Nov 2019 | 3H | 1 | Number | N9 | 2 | 73 | 0.73 | 0.89 | 0.86 | 0.83 | 0.80 | 0.79 | 0.72 | 0.69 | - | - | 0.45 |
| 7 | 7 | Nov 2017 | 3H | 2 | Number | N9 | 1 | 57 | 1.14 | 2.00 | 1.74 | 1.61 | 1.63 | 1.46 | 1.25 | 0.97 |  |  | 0.69 |
| 8a | 7a | Nov 2018 | 2H | 1 | Number | N9 | 1 | 64 | 0.64 | 0.90 | 0.79 | 0.92 | 0.83 | 0.78 | 0.64 | 0.46 | - | - | 0.30 |
| 8b | 7b | Nov 2018 | 2H | 2 | Number | N9 | 1 | 49 | 0.98 | 1.80 | 1.76 | 1.51 | 1.40 | 1.18 | 0.89 | 0.68 | - | - | 0.45 |
| 9 | 9 | Mock Set 4 | 3H | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10a | 10a | June 2017 | 2H | 1 | Number | N9 | 1 | 74 | 0.74 | 0.98 | 0.92 | 0.85 | 0.77 | 0.67 | 0.53 | 0.36 | - | - | 0.21 |
| 10b | 10b | June 2017 | 2H | 1 | Number | N9 | 1 | 59 | 0.59 | 0.89 | 0.79 | 0.68 | 0.58 | 0.50 | 0.40 | 0.26 | - | - | 0.14 |
| 10c | 10c | June 2017 | 2H | 2 | Number | N9 | 2 | 45 | 0.90 | 1.74 | 1.42 | 1.09 | 0.87 | 0.66 | 0.42 | 0.19 | - | - | 0.06 |
| 11a | 8a | June 2017 | 1H | 1 | Number | N9 | 1 | 75 | 0.75 | 0.95 | 0.91 | 0.85 | 0.79 | 0.69 | 0.53 | 0.32 | - | - | 0.15 |
| 11b | 8b | June 2017 | 1H | 2 | Number | N9 | 1 | 39 | 0.78 | 1.70 | 1.35 | 1.03 | 0.76 | 0.49 | 0.25 | 0.08 | - | - | 0.02 |
| 12a | 4a | Mock Set 4 | 2H | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12b | 4b | Mock Set 4 | 2H | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12c | 4c | Mock Set 4 | 2H | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 13a | 7a | Mock Set 3 | 1H | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 13b | 7b | Mock Set 3 | 1H | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 13c | 7c | Mock Set 3 | 1H | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 14a | 7a | Mock Set 2 | 2H | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 14b | 7b | Mock Set 2 | 2H | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
|  |  |  |  | **42** |  |  |  |  | **14.45** | **20.67** | **19.03** | **17.74** | **16.47** | **14.73** | **12.05** | **8.80** |  |  | **5.54** |