**GCSE Mathematics (1MA1)**

**Themed papers – Speed, distance, time**

**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 4 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
| (a) | 186 ÷ 3 | M1 | This mark is given for a method to find the average speed |
| 62 | A1 | This mark is given for the correct answer only |
| (b) | 58 × 4 | M1 | This mark is given for a method to find the total distance driven |
| 232 | A1 | This mark is given for the correct answer only |

**Question 2 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 52 ÷ 4 = 13 | M1 | This mark is given for a method to find many litres of petrol there are in one quarter of a tank |
| 3 × 13 | M1 | This mark is given for a method to find out how much petrol is needed to fill the other three quarters of the tank |
| 39 | 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** |
| (a) | 07 29 – 07 22 = 07  7 minutes | B1 | This mark is given for the correct answer only |
| (b) | 09 00 – 07 22  09 00 – 08 00 = 1 hour  08 00 – 07 22 = 38 minutes | M1 | This mark is given for a method to find the time taken by the train to get to London |
| 1 hour 38 minutes  or 98 minutes | A1 | This mark is given for a correct answer only |

**Question 4 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 09 05 – 08 25 = 40 minutes | B1 | This mark is given for the correct answer only |
| (b) | 08 45 + 17 = 09 02  Daniel takes to 09 04 bus from Whitefield to Manchester | P1 | This mark is given for a process to find out what time Daniel gets to the bus stop and which bus he then takes |
| The bus from Whitefield arrives in Manchester at 09 35  09 35 + 15 = 09 50 | P1 | This mark is given for finding out what time Daniel’s bus arrives and what time he arrives at work |
| Yes, Daniel gets to work by 10 a.m. | C1 | This mark is given for a correct conclusion supported by correct working |

**Question 5 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 08 06 – 07 46 = 20 minutes | B1 | This mark is given for the correct answer only |
| (b) | First train from Horwich to Leyland leaves at 08 39  Arrives in Leyland at 09 12 | B1 | This mark is given for the correct answer (or an equivalent time using correct notation) |
| (c) | 08 53 | B1 | This mark is given for the correct answer (or an equivalent time using correct notation) |

**Question 6 (Total 4 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
| (a)(i) | 10 30 a.m. – 9 00 a.m. = 1 hours | M1 | This mark is given for a method to find out how long Ruth walked for |
|  | 1 × 4 = 6 | A1 | This mark is given for the correct answer only |
| (b) | 10 30 a.m. + 50 minutes + 75 minutes  = 10.30 a.m. + 2 hours and 5 minutes | M1 | This mark is given for a method to find out how long it took Ruth to walk home |
| 12 35 p.m. | A1 | 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** |
|  | 560 ÷ 34.5 = 16.23… | P1 | This mark is given for a process to find the number of gallons of petrol used |
| 16.23… × 4.55 = 73.855… | P1 | This mark is given for a process to convert from gallons to litres |
| 73.855… × 1.08 = 79.76…. | P1 | This mark is given for a process to work out how the cost of the petrol the car used |
| 79.76 | A1 | This mark is given for the correct answer only |

**Question 8 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 14 48 – 13 30 = 1 hour 18 minutes | P1 | This mark is given for a process to find the time taken for Nimer to arrive at the hotel |
| 1 hour 18 minutes =  1 hours = 1.3 hours | P1 | This mark is given for a process to find the number of hours taken |
| = | P1 | This mark is given for a process to find the average speed (distance/time) |
| 50 (mph) | 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** |
| (a) | The vertical scale is not linear | 1 | This mark is given for a correct comment |
| (b) | The tend is upwards | 1 | This mark is given for a correct comment |

**Question 10 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | From 12 45 until 13 30 = 45 minutes | B1 | This mark is given for the correct answer only |
| (b) | Steve travels 25 km in 0.5 hours | M1 | This mark is given for a method to find Steve’s average speed |
| = 50 | A1 | This mark is given for the correct answer only |

**Question 11 (Total 6 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 1300 | B1 | This mark is given for the correct answer only |
| (b) | 5 | B1 | This mark is given for the correct answer only |
| (c) | 2 – 0.6 = | M1 | This mark is given for taking readings from graph |
| 1.4 (km) | A1 | This mark is given for the correct answer only |
| (d) | Horizontal line on the graph from (13 40, 3.5) to (13 50, 3.5) | B1 | This mark is given for a correct line drawn on the graph |
| Line that starts from (13 50, 3.5) and ends at (14 15, 0) | B1 | This mark is given for a correct line drawn on the graph |

**Question 12 (Total 5 marks)**

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| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 56 + 61 = 117 miles | P1 | This mark is given for a process to find total distance travelled from Liverpool to Sheffield |
| 56 ÷ 70 = 0.8 hrs (or 48 minutes) | P1 | This mark is given for a process to find time taken to travel from Liverpool to Manchester |
| 0.8 hrs + 1.25 hrs = 2.05 hrs | P1 | This mark is given for a correct process to find the total time taken to travel from Liverpool to Sheffield |
| 117 ÷ 2.05 = 57.1 (km/h) | A1 | This mark is given for a correct answer (in the range 57 to 57.1) |
| (b) | The time taken for the two parts of the journey must be the same  or  The distance from Leeds to York is  of the distance from Barnsley to Leeds | C1 | This mark is given for a correct explanation |

**Question 13 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) |  | P1 | This mark is given for using time = |
| × 60 × 60 | P1 | This mark is given for a complete process to find a solution |
| 18 (seconds) | A1 | This mark is given for a correct answer in the range 18–20 |
| (b) | An overestimate, since the plane travels at more then 200 mph | C1 | This mark is given for a correct explanation related to the response to part (a) |

**Question 14 (Total 6 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working an or answer examiner might expect to see** | **Mark** | **Notes** |
|  | 0835 to 1105 = 2.5 hours  2.5 × 110 = 275 miles | P1 | This process mark is given for a process to find distance from Manchester to London |
| 0835 to 1135 = 3 hours  275 + 37 = 312 miles  312 ÷ 3 = 104 mph | P1 | This process mark is given for a process to find speed for Gill’s journey from Manchester to London |
| 110 mph – 104 mph | P1 | This process mark is given for a complete process to find difference in speeds |
| 6 (mph) | A1 | This accuracy mark is given for the correct answer only |

**Question 15 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 24, 48, 72, 96, 120, …  20, 40, 60, 80, 100, 120, … | P1 | This mark is given for a process to list multiples of 24 and 20 with at least 3 numbers in each list, or an expansion of 24 and 20 into factors |
| 120 minutes (or 2 hours) | A1 | This mark is given for a correct answer identifying the lowest common multiple (LCM) |
| 9.30 a.m. | A1 | This mark is given for a correct answer only |

**Question 16 (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** | **5** | **4** | **3** | **2** | **1** | **U** |
| 1a | 9a | Jun-18 | 2F | 2 | Ratio | R11 | 1 | **89** | 1.77 | 1.98 | 1.94 | 1.87 | 1.72 | 1.27 | 0.52 |
| 1b | 9b | Jun-18 | 2F | 2 | Ratio | R11 | 1 | **85** | 1.7 | 1.97 | 1.91 | 1.81 | 1.62 | 1.17 | 0.5 |
| 2 | 8 | Jun-19 | 3F | 3 | Number | N1, N2, N12 | 2 | **77** | 2.32 | 2.91 | 2.83 | 2.63 | 1.99 | 0.93 | 0.23 |
| 3a | 12a | Jun-19 | 2F | 1 | Number | N13 | 1 | **97** | 0.97 | 1 | 0.99 | 0.99 | 0.98 | 0.93 | 0.72 |
| 3b | 12b | Jun-19 | 2F | 2 | Ratio | R1 | 1 | **75** | 1.49 | 1.84 | 1.74 | 1.6 | 1.35 | 0.89 | 0.31 |
| 4a | 9a | Jun-18 | 3F | 1 | Number | N13 | 1 | **79** | 0.79 | 0.94 | 0.9 | 0.84 | 0.72 | 0.51 | 0.23 |
| 4b | 9b | Jun-18 | 3F | 3 | Number | N13 | 3 | **72** | 2.16 | 2.65 | 2.51 | 2.34 | 1.96 | 1.23 | 0.41 |
| 5a | 5a | Mock Set 3 | 3F | 1 | − | − | − | **−** | − | − | − | − | − | − | − |
| 5b | 5b | Mock Set 3 | 3F | 1 | − | − | − | **−** | − | − | − | − | − | − | − |
| 5c | 5c | Mock Set 3 | 3F | 1 | − | − | − | **−** | − | − | − | − | − | − | − |
| 6a | 9a | Jun-19 | 1F | 2 | Ratio | R1, R11 | 1 | **45** | 0.9 | 1.62 | 1.25 | 0.91 | 0.61 | 0.34 | 0.15 |
| 6b | 9b | Jun-19 | 1F | 2 | Ratio | N13, R1 | 1 | **73** | 1.45 | 1.83 | 1.72 | 1.56 | 1.3 | 0.87 | 0.37 |
| 7 | 22 | Jun-19 | 3F | 4 | Ratio | N2, R1, R5, R11 | 3 | **40** | 1.59 | 3.14 | 2.45 | 1.63 | 0.79 | 0.24 | 0.06 |
| 8 | 27 | Nov-19 | 3F | 4 | Ratio | R1, R11 | 2 | **34** | 1.34 | 2.48 | 1.74 | 1.32 | 0.8 | 0.34 | 0.04 |
| 9a | 8a | Nov-17 | 2F | 1 | Statistics | S2 | 2 | **28** | 0.28 | 0.29 | 0.3 | 0.28 | 0.25 | 0.23 | 0.19 |
| 9b | 8b | Nov-17 | 2F | 1 | Statistics | S2 | 2 | **69** | 0.69 | 0.8 | 0.75 | 0.71 | 0.64 | 0.47 | 0.3 |
| 10a | 16a | Nov-19 | 1F | 1 | Algebra | A14, R1 | 2 | **74** | 0.74 | 0.9 | 0.82 | 0.75 | 0.6 | 0.46 | 0.4 |
| 10b | 16b | Nov-19 | 1F | 2 | Algebra | A14, R1 | 2 | **22** | 0.43 | 1.13 | 0.64 | 0.4 | 0.2 | 0.18 | 0.14 |
| 11a | 11a | Mock Set 2 | 1F | 1 | − | − | − | **−** | − | − | − | − | − | − | − |
| 11b | 11b | Mock Set 2 | 1F | 1 | − | − | − | **−** | − | − | − | − | − | − | − |
| 11c | 11c | Mock Set 2 | 1F | 2 | − | − | − | **−** | − | − | − | − | − | − | − |
| 11d | 11d | Mock Set 2 | 1F | 2 | − | − | − | **−** | − | − | − | − | − | − | − |
| 12a | 20a | Jun-17 | 2F | 4 | Ratio | R1, R11 | 3 | **14** | 0.57 | 1.26 | 0.77 | 0.52 | 0.32 | 0.14 | 0.05 |
| 12b | 20b | Jun-17 | 2F | 1 | Ratio | R11 | 3 | **2** | 0.02 | 0.04 | 0.03 | 0.02 | 0.01 | 0.01 | 0 |
| 13a | 24a | Nov-18 | 1F | 3 | Ratio | N4, R1, R11 | 3 | **7** | 0.21 | 1.08 | 0.34 | 0.18 | 0.1 | 0.08 | 0.05 |
| 13b | 24b | Nov-18 | 1F | 1 | Number | N14 | 3 | **0** | 0 | 0.06 | 0.01 | 0 | 0 | 0 | 0 |
| 14 | 20 | Mock Set 1 | 1F | 4 | − | − | − | **−** | − | − | − | − | − | − | − |
| 15 | 18 | Mock Set 1 | 3F | 3 | − | − | − | **−** | − | − | − | − | − | − | − |
| 16a | 28a | Mock Set 2 | 2F | 3 | − | − | − | **−** | − | − | − | − | − | − | − |
| 16b | 28b | Mock Set 2 | 2F | 1 | − | − | − | **−** | − | − | − | − | − | − | − |
|  |  |  |  | **60** |  |  |  |  | **19.42** | **27.92** | **23.64** | **20.36** | **15.96** | **10.29** | **4.67** |