**GCSE Mathematics (1MA1)**

**Themed papers – Factors multiples and primes**

**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 1 mark)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working an or answer examiner might expect to see** | **Mark** | **Notes** |
|  | 18 | B1 | This mark is given for the correct answer only |

**Question 2 (Total 1 mark)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | Two factors from 1, 2, 3, 4, 6, 12 | B1 | This mark is given for two correct factors |

**Question 3 (Total 1 mark)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | Any two factors from 1, 3, 5 and 15 | B1 | This mark is given for the correct answer only |

**Question 4 (Total 1 mark)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | 48 or 56 | B1 | This mark is given for the correct answer only |

**Question 5 (Total 1 mark)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | 42 or 48 |  | This mark is given for the correct answer only |

**Question 6 (Total 1 mark)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 14 | B1 | 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** |
|  | 1, 2, 3, 6, 9, 18 | 2 | These marks are given for all six factors with none incorrect  (1 mark is given for at least 3 factors) |

**Question 8 (Total 1 mark)**

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

**Question 9 (Total 1 mark)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 42 | B1 | 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) | 22 | B1 | This mark is given for the correct answer only |
| (b) | 63 (= 7 × 9) | B1 | This mark is given for the correct answer only |
| (c) | 49 (= 7 × 7) | B1 | 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** |
|  | 1, 2, 3, 4, 6, 9, 12, 18, 36  3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36 | P1 | This mark is given for listing at least 4 factors of 36  **OR**  for listing 4 multiples of 3 |
| P1 | This mark is given for listing all the factors of 36 and all multiples of 3 to 36  **OR**  for one correct answer (3 or 9) |
| 3 and 9 | A1 | This mark is given for the complete correct answer only |

**Question 12 (Total 4 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | Machine A rate per hour = 6 ×  = 36 | P1 | This mark is given for a process to find the number of parts made every hour by Machine A |
| Machine B rate per hour = 13 ×  = 52 | P1 | This mark is given for a process to find the number of parts made every hour by Machine B |
| Parts made by Machine A = 36 × 12  Parts made by Machine B = 52 × 10 | P1 | This mark is given for a process to find the total number of parts made by Machine A and by Machine B |
| 432 + 520 = 952 | A1 | This mark is given for the correct answer only |

**Question 13 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 1, 2, 3, 5, 6, 10, 15, 30 | B2 | These marks are is given for the correct answers only  (B1 is given for at least three correct factors shown) |

**Question 14 (Total 1 mark)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working an or answer examiner might expect to see** | **Mark** | **Notes** |
|  | 23 or 29 | B1 | This mark is given for a correct answer only |

**Question 15 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | Any one of 2 + 30 , 3 + 29, 5 + 27, 7 + 25, 11 + 21, 13 + 19, 17 + 15, 23 + 9 seen | M1 | This mark is given for finding two numbers with a sum of 32 (at least one of which is prime) |
| 3 and 29 or  13 and 19 | A1 | This mark is given for a correct answer only |

**Question 16 (Total 2 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | Two from 2, 3, 5, 7, 11, 13, 17, 19, 23, 29  or one from 1, 4, 9, 16, 25 | 1 | This mark is given for identifying any two prime numbers or a square number |
| 2, 7 or  3, 13 or  5, 11 or  2, 23 | 1 | This mark is given for two correct prime numbers which add to a square number |

**Question 17 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 36  2, 18  2, 2, 9  2, 2, 3, 3 | 1 | This mark is given for a complete method to find prime factors, which could be shown on a complete factor tree with no more than one arithmetic error |
| 2 × 2 × 3 × 3 | 1 | This mark is given for the correct answer only |

**Question 18 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 56  2 × 28  2 × 2 × 14 | M1 | This mark is given for a complete method to find prime factors |
| 2 × 2 × 2 × 7 or 23 × 7 | A1 | This mark is given for the correct answer only |

**Question 19 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 2, 3, 5 | M1 | This mark is given for a method to for a correct start to a factor tree (2 correct branches) |
| 2 × 2 × 2 × 3 × 3 × 5 | M1 | This mark is given for a fully correct tree or correct factors as a list |
| 23 × 32 × 5 | A1 | This mark is given for the correct answer only |

**Question 20 (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 21 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | Prime factors of 72 are 2, 2, **2, 3, 3**  Prime factors of 90 are **2, 3, 3**, 5 | M1 | This mark is given for a method to find the prime factors of both 72 and 90 |
| HCF = 2 × 3 × 3  = 18 | A1 | This mark is given for the correct answer only |

**Question 22 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working an or answer examiner might expect to see** | **Mark** | **Notes** |
|  | 108 = **2** × **2** × **3** × **3** × **3**  120 = 2 × 2 × **2** × 3 × **5** | M1 | This mark is given for a method to list the prime factors of 108 or 120 |
| 2 × 2 × 3 × 3 × 3 × 2 × 5 | M1 | This mark is given for a method to find the LCM of 108 and 120 |
| 1080 | A1 | This mark is given for the correct answer only |

**Question 23 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 25 | B1 | This mark is given for the correct answer only |
| (b) | 24 | B1 | This mark is given for the correct answer only |
| (c) | 23 and 29 | B1 | This mark is given for the correct answer only |

**Question 24 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 40, 80, 120, 160, 200, 240, 280, …  56, 112, 168, 224, 280, …  40 = 2 × 2 × 2 × 5 = 23 × 5  56 = 2 × 2 × 2 × 7 = 23 × 7 | M1 | This mark is given for listing at least 5 multiples of both 40 and 56  OR  This mark is given for a correct method to write either 40 or 56 as a product of prime factors. |
| 23 × 5 × 7 = 280 | A1 | This mark is given for the correct answer only |
| (b) | 22 × 3 × 5 = 60 | B1 | This mark is given for the correct answer only |

**Question 25 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | 3 + 8 = 11 | B1 | This mark is given for a correct example (which may be different to the one shown here) |
| (b) | 2 × 7 = 14 | B1 | This mark is given for a correct example (which may be different to the one shown here) |
| (c) | 9 × 9 = 81 | B1 | This mark is given for a correct example (which may be different to the one shown here) |

**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 | 4 | Nov-19 | 3F | 1 | Number | N4 | 1 | 99 | 0.99 | 1 | 0.99 | 0.99 | 0.98 | 0.91 | 0.66 |
| 2 | 1 | Nov-19 | 3F | 1 | Number | N4 | 1 | 95 | 0.95 | 0.97 | 0.97 | 0.95 | 0.92 | 0.82 | 0.52 |
| 3 | 3 | Jun-19 | 2F | 1 | Number | N4 | 1 | 90 | 0.9 | 0.98 | 0.97 | 0.94 | 0.89 | 0.75 | 0.44 |
| 4 | 2 | Jun-19 | 3F | 1 | Number | N4 | 1 | 89 | 0.89 | 0.98 | 0.96 | 0.93 | 0.87 | 0.73 | 0.39 |
| 5 | 2 | Nov-17 | 2F | 1 | Number | N4 | 1 | 88 | 0.88 | 0.96 | 0.93 | 0.89 | 0.84 | 0.75 | 0.48 |
| 6 | 5 | Jun-18 | 1F | 1 | Number | N4 | 1 | 86 | 0.86 | 0.97 | 0.94 | 0.9 | 0.82 | 0.69 | 0.47 |
| 7 | 3 | Nov-17 | 3F | 2 | Number | N4 | 1 | 72 | 1.44 | 1.67 | 1.6 | 1.47 | 1.28 | 0.97 | 0.51 |
| 8 | 3 | Nov-18 | 1F | 1 | Number | N4 | 1 | 71 | 0.71 | 0.85 | 0.78 | 0.71 | 0.62 | 0.54 | 0.47 |
| 9 | 3 | Mock Set 2 | 2F | 1 | − | − | − | − | − | − | − | − | − | − | − |
| 10 | 6 | Mock Set 3 | 2F | 3 | Number | − | − | − | − | − | − | − | − | − | − |
| 11 | 6 | Jun-18 | 2F | 3 | Number | N4 | 3 | 70 | 2.1 | 2.72 | 2.56 | 2.29 | 1.77 | 1.08 | 0.47 |
| 12 | 18 | Jun-19 | 2F | 4 | Ratio | N13, R1, R11 | 3 | 68 | 2.71 | 3.77 | 3.47 | 2.99 | 2.15 | 1.02 | 0.26 |
| 13 | 6 | Jun-18 | 3F | 2 | Number | N4 | 1 | 66 | 1.32 | 1.69 | 1.56 | 1.39 | 1.15 | 0.79 | 0.33 |
| 14 | 4 | Jun-19 | 1F | 1 | Number | N4 | 1 | 62 | 0.62 | 0.91 | 0.82 | 0.66 | 0.46 | 0.27 | 0.12 |
| 15 | 10 | Nov-18 | 1F | 2 | Number | N4 | 1 | 55 | 1.09 | 1.76 | 1.43 | 1.11 | 0.67 | 0.41 | 0.25 |
| 16 | 9 | Nov-17 | 3F | 2 | Number | N4 | 1 | 54 | 1.07 | 1.6 | 1.4 | 1.1 | 0.74 | 0.37 | 0.15 |
| 17 | 23 | Nov-17 | 1F | 2 | Number | N4 | 1 | 45 | 0.89 | 1.45 | 1.21 | 0.92 | 0.55 | 0.26 | 0.19 |
| 18 | 22 | Jun-17 | 1F | 2 | Number | N2 | 1 | 42 | 0.83 | 1.62 | 1.26 | 0.85 | 0.38 | 0.09 | 0.02 |
| 19 | 24 | Mock Set 1 | 1F | 3 | − | − | − | − | − | − | − | − | − | − | − |
| 20 | 7 | Nov-17 | 2F | 2 | Number | N4 | 2 | 42 | 0.83 | 1.47 | 1.16 | 0.84 | 0.49 | 0.2 | 0.02 |
| 21 | 24 | Jun-19 | 1F | 2 | Number | N4 | 1 | 40 | 0.79 | 1.39 | 1.11 | 0.81 | 0.52 | 0.24 | 0.08 |
| 22 | 20 | Nov-19 | 1F | 3 | Number | N4 | 1 | 36 | 1.09 | 1.96 | 1.52 | 1.07 | 0.57 | 0.32 | 0.19 |
| 23a | 8a | Jun-17 | 2F | 1 | Number | N6, | 1 | 75 | 0.75 | 0.97 | 0.92 | 0.81 | 0.63 | 0.38 | 0.21 |
| 23b | 8b | Jun-17 | 2F | 1 | Number | N4 | 1 | 94 | 0.94 | 0.99 | 0.98 | 0.97 | 0.95 | 0.84 | 0.48 |
| 23c | 8c | Jun-17 | 2F | 1 | Number | N4 | 1 | 34 | 0.34 | 0.7 | 0.52 | 0.33 | 0.16 | 0.05 | 0.01 |
| 24a | 21a | Jun-18 | 2F | 2 | Number | N4 | 1 | 39 | 0.77 | 1.4 | 1.08 | 0.8 | 0.5 | 0.18 | 0.03 |
| 24b | 21b | Jun-18 | 2F | 1 | Number | N4 | 1 | 23 | 0.23 | 0.52 | 0.37 | 0.22 | 0.09 | 0.02 | 0 |
| 25 | 8 | Mock Set 2 | 1F | 3 | Number | − | − | − | − | − | − | − | − | − | − |
|  |  |  |  | **50** |  |  |  |  | **23.99** | **33.3** | **29.51** | **24.94** | **19** | **12.68** | **6.75** |