**GCSE Mathematics (1MA1) – Foundation Tier Paper 3F**

**November 2019 student-friendly mark scheme**

**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 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 2 (Total 1 mark)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | 10 | B1 | 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** |
|  |  | B1 | This mark is given for the correct answer only |

**Question 4 (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 5 (Total 1 mark)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 4000 | B1 | 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** |
|  | 3 : 5 | 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** |
|  | *w* = (4 × 8) + 3  = 32 + 3 | M1 | This mark is given for a method to find the value of *w* |
| 35 | A1 | This mark is given for the correct answer only |

**Question 8 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 15 + 6 = 21 | B1 | This mark is given for the 6th term of the sequence |
| 21 + 7 = 28 | B1 | This mark is given for the 7th term of the sequence |

**Question 9 (Total 6 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
| (a) | |  |  |  | | --- | --- | --- | | **Pet** | **Tally** | **Frequency** | | dog | ⏐⏐⏐⏐ ⏐⏐⏐ | 8 | | rabbit | ⏐⏐⏐ | 3 | | cat | ⏐⏐⏐⏐ | 5 | | hamster | ⏐⏐ | 2 | | B2 | This mark is given for a table with all frequencies correct  (B1 is given for two tallies correct) |
| (b) | 10  9  8  7  6  5  4  3  2  1  0  dog rabbit cat hamster | B1 | This mark is given for labelling the horizontal axis with pets |
| B1 | This mark is given for labelling the vertical axis with frequency |
| B1 | This mark is given for data from the frequency table accurately represented |
| (c) | dog | B1 | This mark is given for the most popular pet stated |

**Question 10 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | segment | P1 | This mark is given for a diameter drawn correctly |
| (b) |  | P1 | This mark is given for a segment drawn and labelled correctly |

**Question 11 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | (5 × 20) – (13 × 7.50) | P1 | This mark is given for a process to find the cost of the bicycle lights |
| 100 – 97.50 | P1 | This mark is given for a process to find the amount of change Dylan should get |
| 2.50 | A1 | This mark is given for the correct answer only |
| (b) | × 120 = 24 | M1 | This mark is given for a method to find the amount of the price of the bicycle |
| 120 – 24 = 96 | A1 | This mark is given for the correct answer only |

**Question 12 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 3 × 450 = 1350g | P1 | This mark is given for a process to find the weight of the small boxes |
|  | P1 | This mark is given for a process to find the number of large boxes |
| 6 | A1 | This mark is given for the correct answer only |

**Question 13 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working an or answer examiner might expect to see** | **Mark** | **Notes** |
|  | 74 – 31 | M1 | This mark is given for identifying the ages of the youngest and oldest people in the social club |
| 43 | A1 | This mark is given for the correct answer only |

**Question 14 (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 15 (Total 4 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | × 800 = 440  × 800 = 360 | P1 | This mark is given for a process to find out the number of boys and girls at the school |
| × 800 = 248 | P1 | This mark is given for a process to find the number of students who have packed lunches |
| × 440 = 176 | P1 | This mark is given for a process to find the number of boys who have packed lunches |
| 248 – 176 = 72 | A1 | This mark is given for the correct answer only |

**Question 16 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 1 – 0.4 – 0.25 = 0.35 | P1 | This mark is given for a process to find the combined probability of picking a blue or green counter |
| = 0.05 | P1 | This mark is given for a process to use the ratio to find the probability of picking a blue counter or picking a green counter |
| 3 × 0.05  4 × 0.05 | P1 | This mark is given for a process to use the ratio to find the probability of picking a blue counter or picking a green counter in the ratio 3: 4 |
| blue = 0.15  green = 0.2 | A1 | This mark is given for the correct answer only |

**Question 17 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | –10, –6, 2, 6 | B2 | These marks are given for four values correctly  (B1 is given for 2 or 3 values correct) |
| (b) |  | M1 | This mark is given for a at least five point correctly plotted |
| A1 | This mark is given for a correct graph from –1 to 4 |

**Question 18 (Total 2 marks)**

| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| --- | --- | --- | --- |
|  | *y* = 3 | B2 | These marks are given for a correctly drawn reflection  (B1 is given for a correct reflection in any line other than *y* = 3) |

**Question 19 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 4*x* – 24 = 44  4*x* = 68 | M1 | This mark is given for a first step to find the value of *x* |
| *x* = 17 | A1 | This mark is given for the correct answer only |

**Question 20 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working an or answer examiner might expect to see** | **Mark** | **Notes** |
|  | *A*  *B* | B1 | This mark is given for labelling sets *A* and *B* |
| 6  12  *A*  *B* | A1 | This mark is given for 6, 12 placed in the intersection of *A* and *B* |
| 3 9  1 5 7 11 13  2 4  8 10  6  12  *A*  *B* | M1 | This mark is given for one of  3, 9 only in set *A*  or  2, 4, 8, 10 in set *B* only  or  1, 5, 6, 11, 13 in (*A* ∪ *B*)′ only |
| C1 | This mark is given for a completely correct Venn diagram |

**Question 21 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 158 220 – 146 500 = 11 720 | M1 | This mark is given for a method to find the amount of profit made |
|  | × 100 | M1 | This mark is given for a method to find the percentage profit made |
|  | 8 | A1 | This mark is given for the correct answer only |

**Question 22 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | *x*2 + 5*x* – 9*x* – 45 | M1 | This mark is given for three terms correct |
| *x*2 – 4*x* – 45 | A1 | This mark is given for the correct answer only |
| (b) | 3(3*x*2 + 2*x*) | M1 | This mark is given for a partial factorisation |
| 3*x*(3*x* + 2) | 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) |  | M1 | This mark is given for 836.4 or 5.3048091 seen |
| 157.66825 | A1 | This mark is given for the correct answer only |
| (b) | 157.7 | B1 | This mark is given for the correct answer only |

**Question 24 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  |  | M1 | This mark is given for drawing a suitable line of best fit |
| A1 | This mark is given for an answer in the range 30 to 40 |

**Question 25 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | (1 × 7.5) + (2 × 12.5) + (7 × 17.5) + (8 × 22.5)  = 7.5 + 25 + 122.5 + 180 | M1 | This mark is given for a method to find four products within the intervals |
|  | M1 | This mark is for a method to find ∑*ft* ÷ 18 |
| 18.6 | A1 | This mark is given for a correct answer in the range 18.61 to 18.62 |

**Question 26 (Total 1 mark)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 1 cm3 = 1000 mm3  37 cm3 = 37 000 mm3 | B1 | This mark is given for the correct answer only |

**Question 27 (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 28 (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 29 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | 180 – 117 = 63 | P1 | This mark is given for a process to find the other angle in the parallelogram |
| 180 –  = 108 | P1 | This mark is given for a process to find the interior angle of the pentagon |
| 108 – 63 | P1 | This mark is given for a process to find the value of *x* |
| 45 | A1 | This mark is given for the correct answer only |

**Question 30 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | = 56.25*π* | M1 | This mark is given for a method to find the area of **A** |
| **=** 6.25*π* | M1 | This mark is given for a method to find the area of **B** |
| *r* 2 =  = √6.25 = 2.5 | A1 | This mark is given for a complete process to show the radius of **B** is 2.5 cm |