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

**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.<br><br>P1 – process mark. This mark is generally given for setting up an appropriate process to find a solution in the context of the question.<br><br>A1 – accuracy mark. This mark is generally given for a correct answer following correct working.<br><br>B1 – working mark. This mark is usually given when working and the answer cannot easily be separated.<br><br>C1 – communication mark. This mark is given for explaining your answer or giving a conclusion in context supported by your working.<br><br>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 |
|---|---|---|---|
| | 70 | 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 |
|---|---|---|---|
| | 4.6 | 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 |
|---|---|---|---|
| | 3170 | B1 | This mark is given for the correct answer only |

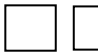
**Question 4 (Total 1 mark)**

| Part | Working an or answer examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | $\frac{2}{5}$ | 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 |
|---|---|---|---|
| | 0.15 | B1 | This mark is given for the correct answer only |

**Question 6 (Total 4 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| (a) | 8 + 8 + 8 = 24 | B1 | This mark is given for the correct answer only |
| (b) |  | C1 | This mark is given for a diagram which represents 12 pictorially |
| (c) | $(9 \times 8) + (\frac{1}{2} \times 8) + (\frac{1}{2} \times 8) + (\frac{1}{2} \times 8)$ | M1 | This mark is given for a method to find the total number of pictures sold |
| | 84 | A1 | This mark is given for finding the correct total number of pictures sold |

**Question 7 (Total 2 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | 1 hour 25 minutes = 60 + 25 = 85 minutes<br>$1\frac{1}{4}$ hours = 60 + 15 = 75 minutes | M1 | This mark is given for converting hours and minutes to minutes |
| | 85 – 75 = 10 minutes | A1 | This mark is given for the correct answer only |

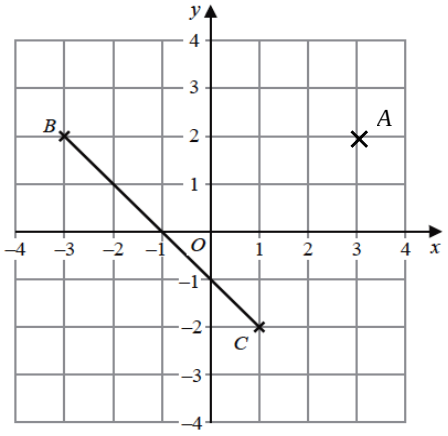
**Question 8 (Total 3 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | $4 \times 650 = 2600$ | P1 | This mark is given for finding the total weight of four blocks |
| | 3 kg = 3000g | P1 | This mark is given for converting 3 kg to 3000g |
| | 3000 – 2600 = 400 | A1 | This mark is given for finding the weight of the other block of wood |

**Question 9 (Total 2 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | 180 – (100 + 35) | M1 | This mark is given for a method for finding the value of *x* |
| | 45 | A1 | This mark is given for the correct answer only |

**Question 10 (Total 2 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| |  | B1 | This mark is given for the point *A* correctly plotted |
| | (–1, 0) | B1 | This mark is given for the correct answer only |

**Question 11 (Total 2 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | HHH HHT HTH HTT<br>THH THT TTH TTT | M1 | This mark is given for a at least four different combinations |
| | | A1 | This mark is given for a fully correct list of eight combinations with no extras and no repeats |

**Question 12 (Total 5 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| (a) | $3 \times 25 = 75$ | 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) | $0.7 \times 60 = 42$ | P1 | This mark is given for a process to use an approximation to 0.749 |
| | $0.7 \times 60$ is an underestimate but is still greater than 40, so Rehan is wrong | C1 | This mark is given for a correct conclusion |

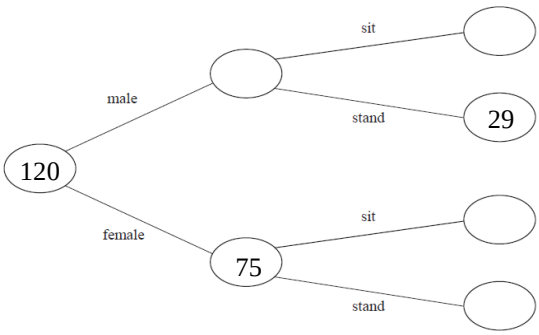
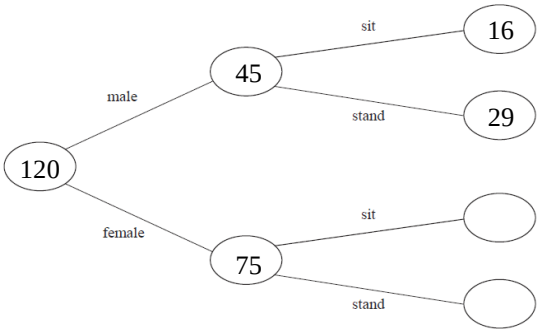
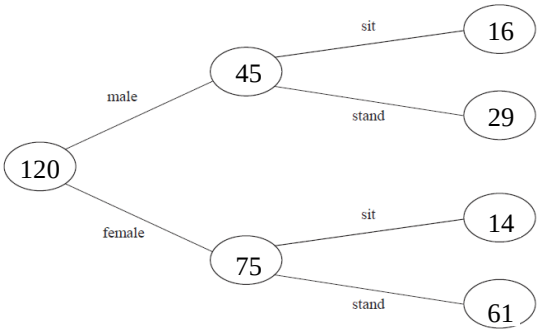
**Question 13 (Total 3 marks)**

| Part | Working an or answer examiner might expect to see | Mark | Notes |
|---|---|---|---|
| (a) | $10ab$ | B1 | This mark is given for the correct answer only |
| (b) | $3x + 5x = 8x$<br>$2y – y = y$ | M1 | This mark is given for $8x$ or $y$ seen |
| | $8x + y$ | 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 |
|---|---|---|---|
| | 23<br>× 15<br>115<br>230 | P1 | This mark is given for a process to carry out the multiplication |
| | 345 | P1 | This mark is given for the correct answer only |

**Question 15 (Total 4 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| (a) |  | C1 | This mark is given for putting 75 and 29 in the correct places on the frequency tree |
| |  | C1 | This mark is given for deducing<br>120 – 75 = 45 and 45 – 29 = 16 and placing 45 and 29 in the correct places on the frequency tree |
| |  | | This mark is given for deducing<br>30 – 16 = 14 and 74 – 14 = 61 and placing 14 and 61 in the correct places for a fully correct frequency tree |
| (b) | $\frac{29}{120}$ | B1 | This mark is given for the correct answer only |

**Question 16 (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 |
| | $\frac{25}{0.5} = 50$ | A1 | This mark is given for the correct answer only |

**Question 17 (Total 3 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | $x = 2 + 1$ | P1 | This mark is given for a process to solve $x - 1 = 2$ |
| | $x = 3$ | P1 | This mark is given for finding the value of $x$ |
| | $2x^2 = 2 \times 3^2 = 18$ | A1 | This mark is given for the correct answer only |

**Question 18 (Total 4 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | $\frac{360 - 60}{2} = 150$ | M1 | This mark is given for a method to find the value of $x$ |
| | $\frac{150}{360} \times 480 = 200$ | M1 | This mark is given for a method to find the number of students in school **A** who have tigers as their favourite animal |
| | $\frac{90}{360} \times 760 = 190$ | M1 | This mark is given for a method to find the number of students in school **B** who have tigers as their favourite animal |
| | Henry is not correct since School **A** has 10 more students who have tigers as their favourite animal | C1 | This mark is given for a correct conclusion |

**Question 19 (Total 2 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | $-3 \leq p < 1$ | C2 | These marks are given for a fully correct interval<br>(C1 given for either $-3 \leq p$ or $p < 1$ seen) |

**Question 20 (Total 3 marks)**

| Part | Working an or answer examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | $108 = \mathbf{2} \times \mathbf{2} \times \mathbf{3} \times \mathbf{3} \times \mathbf{3}$<br>$120 = 2 \times 2 \times \mathbf{2} \times 3 \times \mathbf{5}$ | M1 | This mark is given for a method to list the prime factors of 108 or 120 |
| | $2 \times 2 \times 3 \times 3 \times 3 \times 2 \times 5$ | 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 |

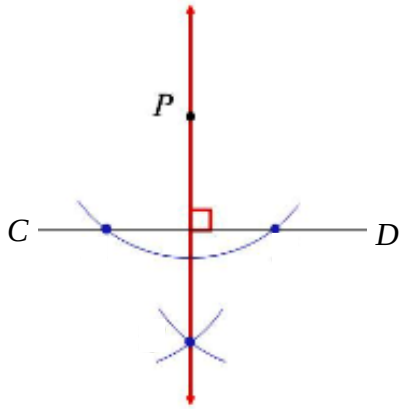
**Question 21 (Total 4 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | Number of women in the choir:<br>$60 \div 2 = 30$<br>Number of men in the choir:<br>$30 \div 3 = 10$ | P1 | This mark is given for a process to find out the number of men in the choir |
| | Number of children in the choir:<br>$60 - 30 - 10 = 20$ | P1 | This mark is given for a process to find out the number of children in the choir |
| | 20 : 10 | P1 | This mark is given for a process to find out the ratio of the number of children in the choir to the number of men in the choir |
| | = 2 : 1 so $n = 2$ | A1 | This mark is given for the correct answer only |

**Question 22 (Total 3 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | $1\frac{3}{4} = \frac{7}{4}$ $\quad 1\frac{1}{3} = \frac{4}{3}$ | P1 | This mark is given for a process to convert mixed numbers into improper fractions |
| | $\frac{7}{4} \times \frac{4}{3} = \frac{7}{3}$ | P1 | This mark is given for a correct multiplication |
| | $2\frac{1}{3}$ | A1 | This mark is given for a correct answer (or an equivalent mixed number) |

**Question 23 (Total 2 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| |  | C2 | These marks are given for a fully correct construction with all relevant arcs drawn<br>(C1 is given for a perpendicular line drawn from *P* to the line *CD*) |

**Question 24 (Total 4 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | $ACB = 180 - 75 - 51 = 54$ | M1 | This mark is given for a method to find the angle *ACB* |
| | $ACD = \frac{54}{2+1} = 18$<br>$DCB = \frac{54}{2+1} \times 2 = 36$ | M1 | This mark is given for a method to find the size of angles *ACD* and *DCB* |
| | $BDC = 180 - 51 - 36$ | M1 | This mark is given for a method to find the angle *BDC* |
| | $BDC = 93$ | A1 | This mark is given for the correct answer only |

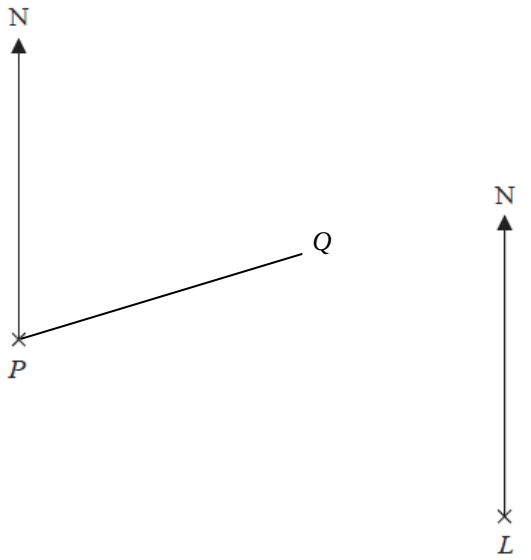
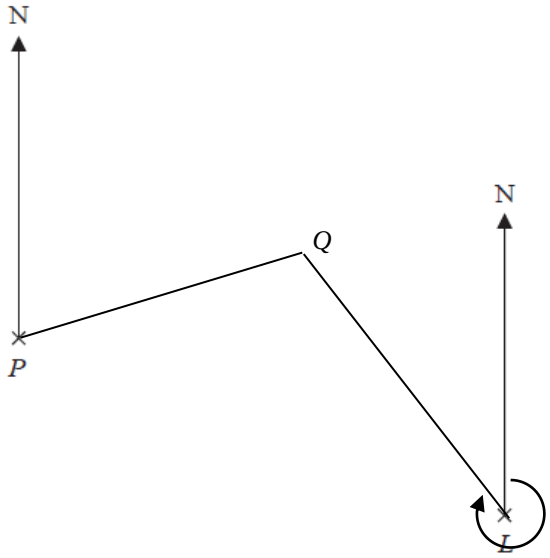
**Question 25 (Total 3 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | $4 \times 5 = 20$ kg<br>$5 \times 9 = 45$ 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 $\frac{71}{10} = 7.1$ kg<br>so Donna is incorrect | C1 | This mark is given for finding the average weights of the bricks with a correct conclusion stated |

**Question 26 (Total 3 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| (a) | $p^{(2 \times 5)} = p^{10}$ | B1 | This mark is given for the correct answer only |
| (b) | $\frac{12x^7y^3}{6x^3y} = \frac{12}{6} \times x^{(7-3)} \times y^{(3-1)}$ | M1 | This mark is given for a method to simplify the fraction |
| | $2x^4y^2$ | A1 | This mark is given for a correct answer only |

**Question 27 (Total 5 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| (i) |  | P1 | This mark is given for a process to draw a line at a bearing of 070° from *P* |
| | *PQ* = 12 × 1.5 = 18 km | P1 | This mark is given for a process to work out the actual distance *PQ* |
| | Distance on scale drawing:<br>18 ÷ 4 = 4.5 cm | P1 | This mark is given for a process to work out the distance *PQ* on the scale drawing |
| | Distance *QL* on scale drawing = 5 cm<br>Actual distance *QL* = 5 × 4 = 20 km | A1 | This mark is given for finding the distance *QL* (in the range 20 – 23 km) |
| (ii) |  <br>Bearing from *L* to *Q* is 320° | A1 | This mark is given for a bearing of *Q* from *L* (in the range 317 – 330) |

**Question 28 (Total 3 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | $2x + 3x + 10 \leq 90$ | P1 | This mark is given for a process to derive an inequality to find $x$ |
| | $5x \leq 80$<br>$x \leq 16$ | P1 | This mark is given for a process to solve the inequality found |
| | Thus the greatest value of $x = 16$ | A1 | This mark is given for the correct answer only |

**Question 29 (Total 4 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| (a) | $\frac{10}{15} \times 9$ | M1 | This mark is given for a method to find the length $PR$ |
| | 6 | A1 | This mark is given for the correct answer only |
| (b) | $GK = HK - HG = 10 - 4 = 6$ cm<br>$EG = GK = 6$ cm<br>$FG = HG = 4$ cm | P1 | This mark is given for a method to find the lengths of the sides of triangles $EGH$ and $KGF$ |
| | $EF = EG - FG = 2$ cm | A1 | This mark is given for the correct answer only |