# Mark Scheme (Results)

# November 2018

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Foundation (Non-Calculator) Paper 1F

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**General marking guidance**
These notes offer general guidance, but the specific notes for examiners appertaining to individual questions  take precedence.

1    All candidates must receive the same treatment. Examiners must mark the last candidate in exactly the same way as they mark the first.

Where some judgement is required, mark schemes will provide the principles by which marks will be awarded; exemplification/indicative content will not be exhaustive. When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the response should be sent to review.

2    All the marks on the mark scheme are designed to be awarded; mark schemes should be applied positively. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme. If there is a wrong answer (or no answer) indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

**Questions where working is not required**: In general, the correct answer should be given full marks.
**Questions that specifically require working**: In general, candidates who do not show working on this type of question will get no marks – full details will be given in the mark scheme for each individual question.

3    **Crossed out work**
This should be marked **unless** the candidate has replaced it with
an alternative response.

4    **Choice of method**
If there is a choice of methods shown, mark the method that leads to the answer given on the answer line.

If no answer appears on the answer line, mark both methods **then award the lower number of marks.**

5    **Incorrect method**
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review for your Team Leader to check.

6    **Follow through marks**
Follow through marks which involve a single stage calculation can be awarded without working as you can check the answer, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

**7      Ignoring subsequent work**
It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question or its context. (eg. an incorrectly cancelled fraction when the unsimplified fraction would gain full marks).
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect (eg. incorrect algebraic simplification).

**8      Probability**
Probability answers must be given as a fraction, percentage or decimal.  If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

**9      Linear equations**
Unless indicated otherwise in the mark scheme, full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously identified in working (without contradiction elsewhere).  Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded (embedded answers).

**10     Range of answers**
Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and all numbers within the range.

**11     Number in brackets after a calculation**
Where there is a number in brackets after a calculation E.g. 2 × 6 (=12) then the mark can be awarded **either** for the correct method, implied by the calculation **or** for the correct answer to the calculation.

**12     Use of inverted commas**
Some numbers in the mark scheme will appear inside inverted commas E.g. "12" × 50 ; the number in inverted commas cannot be any number – it must come from a correct method or process but the candidate may make an arithmetic error in their working.

**13     Word in square brackets**
Where a word is used in square brackets E.g. [area] × 1.5 : the value used for [area] does **not** have to come from a correct method or process but is the value that the candidate believes is the area. If there are any constraints on the value that can be used, details will be given in the mark scheme.

**14     Misread**
If a candidate misreads a number from the question. Eg. uses 252 instead of 255; method or process marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review.

**Guidance on the use of abbreviations within this mark scheme**

**M**      method mark awarded for a correct method or partial method

**P**      process mark awarded for a correct process as part of a problem solving question

**A**      accuracy mark (awarded after a correct method or process; if no method or process
          is seen then full marks for the question are implied but see individual mark schemes
          for more details)

**C**      communication mark awarded for a fully correct statement(s)
          with no contradiction or ambiguity

**B**      unconditional accuracy mark (no method needed)


**oe**     or equivalent

**cao**    correct answer only

**ft**     follow through (when appropriate as per mark scheme)

**sc**     special case

**dep**    dependent (on a previous mark)

**indep**  independent

**awrt**   answer which rounds to

**isw**    ignore subsequent working

| Paper: 1MA1/1F | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Answer** | **Mark** | **Mark scheme** | **Additional guidance** |
| 1 | | 0.02, 0.152, 0.2, 0.37, 0.4 | B1 | for correct order | Accept reverse order |
| 2 | | 60 | B1 | cao | |
| 3 | | 5 | B1 | cao | |
| 4 | | 8000 | B1 | cao | |
| 5 | (a) | 22 | B1 | cao | |
| | (b) | 8 | B1 | cao | |
| | (c) | 7 × (2 + 3) = 35 | B1 | for correct placement of brackets | Allow alternative correct statements, eg [7 × (2 + 3)] = 35 |

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| 6 | Yes (supported) | P1 | starts process to find the number of tins or meals needed, <br> eg $2 \times \frac{1}{4} (= \frac{2}{4} = \frac{1}{2})$ or $14 \times \frac{1}{4} (= \frac{14}{4}$ oe) or $2 \times 14 (= 28)$ or $8 \div 2$ <br> **or** <br> to find the number of meals from 8 tins, eg $8 \div \frac{1}{4} (= 32)$ | Numbers may be expressed in decimal form |
| | | P1 | a complete process to find the number of tins needed, <br> eg $14 \times \frac{2}{4} (= 7)$ <br> **or** $8 \div 2$ and "$\frac{14}{4}$" <br> **OR** <br> to find the numbers of meals $8 \div \frac{1}{4} (= 32)$ and $2 \times 14 (= 28)$ <br> **or** $8 \div \frac{2}{4} (= 16)$ | |
| | | C1 | 'Yes' from a comparison of correct values, <br> eg 7 (and 8) **or** 32 and 28 **or** 16 (and 14) **or** $\frac{14}{4}$ and 4 | Correct working needs to be accompanied by a statement confirming enough food has been bought. |
| 7 | □ ⌐ | M1 | for use of scaling, eg at least one of 12, 5, and 6 **or** 23 <br> **OR** <br> for using the representation, eg $\frac{30}{4} (= 7.5)$ or 5.75 | May be seen on diagram. |
| | | M1 | for subtracting their total number of trees from 30, eg 30 – "23" (= 7) <br> **OR** <br> for subtracting the total number of squares from 7.5, <br> eg 7.5 – "5.75" (= 1.75) | "23" must be from addition of 12, 5 and 6 <br> Award 2 marks for 7 seen provided unambiguous <br> "5.75" must be from addition of correct decimals/fractions |
| | | C1 | oe | May be alternative representations, eg one square + half square + quarter square <br> or squares may be divided into 4 sections. <br> Any orientation acceptable. |

| Paper: 1MA1/1F | | | | | |
|---|---|---|---|---|---|
| Question | | Answer | Mark | Mark scheme | Additional guidance |
| 8 | (a) | −2, −1 | B1 | cao | |
| | (b) | Point at (2, 3) | B1 | cao | Allow without label provided unambiguous; allow if the cross is nearer to (2, 3) than other points. |
| | (c) | Line drawn | B1 | cao | Label not required; allow hand-drawn line. Allow any length provided intention is clear. |
| 9 | | 30 | M1 | $2 \times 9 + 3 \times 4$ | May be shown in stages but an intention to add $2 \times 9$ and $3 \times 4$ must be clear |
| | | | A1 | cao | |
| 10 | | 3 and 29 or 13 and 19 | M1 | for two numbers with a sum of 32, only one of which is prime, eg 5, 27 or 1, 31 | Do not accept 1 as a prime number. |
| | | | A1 | cao | |
| 11 | (a) | $\dfrac{10}{16}$ | B1 | cao | |
| | (b) | $\dfrac{11}{12}$ | M1 | for $\dfrac{10}{12}$ **OR** for using a suitable common denominator other than 12 with at least one of the two fractions correct, eg $\dfrac{2}{24} + \dfrac{20}{24}$ | |
| | | | A1 | for $\dfrac{11}{12}$ oe | Accept any equivalent fraction |

| Question | | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|---|
| 12 | (a) | 10 | B1 | cao | |
| | (b) | 30 | M1 | for using the graph to take one correct reading | May be shown on graph |
| | | | A1 | 30 or ft from correct use of graph | |
| 13 | | 4 : 1 : 2 | M1 | for start to express the statements as a ratio<br>eg 4 : 1, 1 : 4, 1 : 2 or 2 : 1<br>with clear and correct link to Azmol, Ryan, Kim<br><br>**OR** as algebraic expressions, two of 4*x*, *x* and 2*x*<br>eg 4*x* : *x*,  1*x* : 4*x*,  1*x* : 2*x*  or  2*x* : 1*x* with clear and correct link to Azmol, Ryan, Kim | Allow any equivalent ratio, integers only May be seen as part of an incorrect answer.<br><br>May be seen as integer multiples of these algebraic expressions. Any letter may be used. |
| | | | A1 | 4 : 1 : 2 oe | Accept 8 : 2 : 4 or equivalent ratios involving integers |
| | | | (SCB1 | 3 integer numbers in correct ratio but no ratio notation,<br>eg 4, 1, 2 or 20, 5, 10) | |
| 14 | | shown | M1 | for method to find angle *ADC*, eg 180 – 75 (= 105) | Must be clear link to angle *ADC*, may be marked on diagram |
| | | | M1 | for angle *BCD* = 50 | |
| | | | M1 | for method to find angle *ABC*, eg 360 – 100 – 50 – "105" | Must be clear method/explanation shown. Angle marked on diagram is not sufficient. |
| | | | C1 | (dep M3) for angles *ADC*, *BCD* and *ABC* correct and at least 2 appropriate reasons, eg vertically <u>opposite</u> <u>angles</u> are equal or <u>vertically</u> <u>opposite</u> angles are equal , <u>angles</u> on a straight <u>line</u> add to <u>180º</u>, <u>angles</u> in a <u>quadrilateral</u>/<u>kite</u> add up to <u>360º</u>; <u>angles</u> at a <u>point</u> add up to 360º | Underlined words need to be shown; reasons need to be linked to their method |

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| 15 (a) | 420 | P1 | starts process, eg 300 ÷ 5 (= 60) **or** 200 ÷ 2 (= 100) <br> **OR** builds up ratio to at least 300 ml orange juice with one error | |
| | | P1 | complete process, eg "60" × 5 + "60" × 2 or 300 : 120 | May be seen as "60" × 7 <br> "60" must come from correct method |
| | | A1 | cao | |
| (b) | explanation | C1 | explains that it will have no effect with reason, <br> eg because he only needs 120 m*l* of lemonade <br>     because he has no more orange juice to use | |
| 16 | No and explanation | C1 | 'No' and explanation with reference to multiplication or division <br> eg No he's incorrect as you would multiply the sides by a number rather than add | |
| 17 (a) | 32, 48, 24, 8, 37, 11 | C1 | starts to interpret information, eg 48 or 8 in correct place | |
| | | C1 | for 80 – 48 (= 32) and "32" – 8 (= 24) | |
| | | C1 | completes frequency tree correctly <br> SC: award C2 if all correct frequencies are shown as fractions of 80. | |
| (b) | $\dfrac{37}{61}$ | M1 | ft for $\dfrac{a}{\text{"61"}}$ with $a <$ "61" or $\dfrac{\text{"37"}}{b}$ with $b >$ "37" | Incorrect notation with "37" and "61"can earn the method mark but not the accuracy mark. |
| | | A1 | ft from diagram in (a) | Accept any equivalent fraction, decimal form 0.60(65...) or 0.61 or percentage form 60(.65...)% or 60% or 61% |

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| 18 | Jan's store (supported) | P1 | process to reduce £5 by 20% (= £4) **or** increase 400 by 30% (= 520) | May work in pence throughout<br>Accept any correct appropriate percentage process |
| | | P1 | process to reduce £5 by 20% (= £4) **and** increase 400 by 30% (= 520) | |
| | | P1 | (dep P2) process to find comparable values, eg 400 ÷ "4" **and** "520" ÷ 5 | May use £/g or any other comparable values |
| | | C1 | 'Jan's store' fully supported by correct comparative values, eg 100 (g/£) and 104 (g/£) | Do not award without correct comparable values and full working. |
| 19 | Shape drawn | B2 | for shape with vertices at (4, –3), (5, –4), (5, –5), (4, –5) | Shape does not have to be shaded.<br>Allow some tolerance on vertices as long as they are nearest to the desired points. |
| | | (B1 | for rotation of 180º about wrong centre) | This is shown by the orientation of the shape. |
| 20 | 9 | M1 | for a correct first step, using the laws of indices to simplify<br>eg $3^2$ or. $3^{7+\,-2}$ or $3^{7-3}$ or $3^{-2-3}$<br>OR for using exact values, eg. $2187 \times \frac{1}{9}$ (= 243) or $2187 \div 27$ (= 81)<br>or $\frac{1}{27 \times 9}$ (= $\frac{1}{243}$) | |
| | | A1 | cao | |
| 21 (a) | 6 or –6 | M1 | for $12^2 + 2 \times -3 \times 18$ (= 36) | Terms may be partially evaluated. |
| | | A1 | for 6 or –6, accept ±6 | Only one value is required for full marks |
| (b) | $s = \dfrac{v^2 - u^2}{2a}$ | M1 | for subtracting $u^2$ from both sides or dividing all terms by $2a$ as the first step | Must see this step carried out, not just the intention shown |
| | | A1 | $s = \dfrac{v^2 - u^2}{2a}$ oe | |

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| 22 | No (supported) | P1 | for start to process, eg $2100 \times \frac{40}{100}$ (= 840) **or** $100 - 40$ (= 60) | May compare bonus shares of a single salesman or total bonus share for all 7 salesmen. |
| | | P1 | for process to find the 7 salesmen's share of bonus, <br> eg $2100 -$ "840" (= 1260) **or** $2100 \times \frac{"60"}{100}$ (= 1260) | |
| | | P1 | for process to find bonus amount each salesman gets <br> eg "1260" ÷ 7 (= 180) <br> **OR** process to find the total bonus for all salesmen if shared equally, <br> eg $\frac{2100}{10} \times 7$ (= 1470) | |
| | | P1 | for process to compare what a single salesman gets under each scheme, <br> eg "180" $\times \frac{25}{100}$ (= 45) and "$\frac{2100}{10}$" – "180" (= 30) <br> **or** "180" $\times \frac{25}{100}$ (= 45) and "180" + "45" (= 225) oe and $\frac{2100}{10}$ (= 210) <br> **or** ($\frac{2100}{10}$ – "180") ÷ "180" × 100 (= 16.6...) <br><br> **OR** process to compare what all salesmen gets under each scheme, <br> eg "1260" $\times \frac{25}{100}$ (= 315) and "1470" – "1260" (= 210) <br> **or** "1260" $\times \frac{25}{100}$ (= 315) and "1260" + "315" (= 1575) oe and "1470" <br> **or** ("1470" – "1260") ÷ "1260" × 100 (= 16.6...) | |
| | | A1 | 'No' supported by correct figures, eg 45 and 30, 225 and 210, 315 and 210 <br> **or** 1575 and 1470 **or** 16.(6...)(% and 25%) | Do not award unless correct figures have been shown to support a statement made that the salesman was not correct. |

| Question | | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|---|
| 23 | (a) | 200 | M1 | for $120 \times 5 \div 3$ oe | |
| | | | A1 | cao | |
| | (b) | statement | C1 | Statement that each tap fills at the same rate or that the rate does not change over time<br>Examples<br>**Acceptable responses:**<br>Taps are running at the same speed<br>They (clearly referring to taps) all fill the pool with the same volume of water<br>The amount of water is the same in the same time (again referring to taps)<br>Each tap is doing a fifth of the filling<br>That all taps take equal time to fill the pool<br>All taps produce the same amount of water<br>That the water flow stays at the same rate over the whole time.<br><br>**Non acceptable responses**<br>It will take more time because there are less taps<br>The less taps used the longer it takes to fill the pool<br>That 1 tap can take up to 24 mins each<br>3 taps will take longer to fill the pool | Any statement referring to the same amount of water flowing from each tap is acceptable. |
| 24 | (a) | 16 to 20 | P1 | for using time $= \dfrac{\text{distance}}{\text{speed}}$, eg $\dfrac{1}{200}$ or $\dfrac{1}{213}$<br>**or** for 1 hour $= 60 \times 60 (= 3600)$ seconds | |
| | | | P1 | complete process, eg $\dfrac{1}{200} \times 60 \times 60$ oe or $\dfrac{1}{213} \times 60 \times 60$ | Calculation could be done in stages. |
| | | | A1 | for answer in range 16 to 20 | |
| | (b) | decision with reason | C1 | (dep on correct use of time $= \dfrac{\text{distance}}{\text{speed}}$) for reason related to their response to part(a),<br>eg overestimate as speed rounded down | |

| Paper: 1MA1/1F | | | | |
|---|---|---|---|---|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 25 | $x = 4.5, y = -1.5$ | M1 | correct process to eliminate one variable (condone one arithmetic error) | |
| | | M1 | (dep) for substituting found value in one of the equations **OR** correct process after starting again (condone one arithmetic error) | |
| | | A1 | for $x = 4.5, y = -1.5$ oe | Fractions do not need to be in simpleast form |
| 26 | shown | C1 | for method to find area of semicircle, eg $\pi \times 10^2 \div 2$ (= $50\pi$) | Can award first 3 marks if a value for $\pi$ is used |
| | | C1 | for method to find area of quarter circle, for $\pi \times 20^2 \div 4$ (= $100\pi$) | |
| | | C1 | for a complete method to find area shaded **and** area of square, eg $\pi \times 20^2 \div 4 - \pi \times 10^2 \div 2$ **and** $20 \times 20$ | Working out to find the area of the shaded region must be shown |
| | | C1 | fully correct working leading to $\frac{\pi}{8}$ | |
| 27 (a) | $\frac{7}{10}, \frac{4}{9}, \frac{5}{9}, \frac{4}{9}$ | B2 | for all probabilities correct (oe) | |
| | | (B1 | for 2 or 3 correct) | |
| (b) | $\frac{15}{90}$ | M1 | for $\frac{3}{10} \times \frac{5}{9}$ oe | |
| | | A1 | $\frac{15}{90}$ oe | Accept any equivalent fraction, decimal form 0.16(6...) or 0.17 or percentage form 16(.6...)% or 17% |

| Paper: 1MA1/1F | | | | |
|---|---|---|---|---|
| **Question** | **Answer** | **Mark** | **Mark scheme** | **Additional guidance** |
| 28 | 24 | P1 | starts process, eg $x + 11x = 180$ <br> **or** $180 \div 12 \ (= 15)$ <br> **or** interior angle + exterior angle = 180 oe | |
| | | P1 | complete process to find number of sides, <br> eg $360 \div (180 \div 12)$ | |
| | | A1 | cao | |

## Modifications to the mark scheme for Modified Large Print (MLP) papers.  Paper 1F.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:

Angles:  ±5°

Measurements of length:  ±5 mm

| PAPER: 1MA1_1F | | | |
|---|---|---|---|
| **Question** | | **Modification** | **Mark scheme notes** |
| 1 | | Wording 'five' added | Standard mark scheme |
| 3 | | Wording 'seven' added | Standard mark scheme |
| 7 | | Diagram enlarged.  Key moved above and to the left of the diagram. Squares divided into four sections.  Wording added 'There is one row to complete.' | Standard mark scheme |
| 8 | | Diagram enlarged.  Wording added 'It shows a point A, marked on a grid.' Cross changed to solid dot.  In part (b) Wording 'with a cross (x)' removed. | Standard mark scheme |
| 11 | | Wording 'some' removed and changed to 'five' | Standard mark scheme |

| PAPER: 1MA1_1F | | |
|---|---|---|
| **Question** | **Modification** | **Mark scheme notes** |
| 12 | Diagram enlarged.  Right axis labelled.  Graph line made thicker.<br>Axes labels moved to the left of the horizontal axis and above the vertical axis. | Standard mark scheme but additional tolerance is needed in taking readings from the graph; allow if the intention is clear. |
| 14 | Diagram enlarged.  Wording added 'Three angles are marked on the diagram: 50°, 75°, 100°.'<br>Angles moved outside of angle arcs and angle arcs made smaller. | Standard mark scheme |
| 15 | Frame around information removed | Standard mark scheme |
| 16 | Diagrams enlarged.  Diagram labels moved above the shapes and to the left-hand side of the shapes.<br>Braille only – will label rectangles A and B and give the shape measurements. | Standard mark scheme |
| 17 | Wording added 'It shows an incomplete frequency tree.'<br>Part (a): Wording added 'There are six spaces to fill.'  Diagram enlarged.<br>Braille only – will label answer spaces as shown below:<br>      (iii)<br>  (i)  (iv)<br>80      (v)<br>  (ii)  (vi) | Standard mark scheme |
| 18 | 3D boxes removed.<br>      Wording 'Box' added after 'Food Mart'.<br>      Wording 'Box' added after 'Jan's Store'. | Standard mark scheme |

| PAPER: 1MA1_1F | | |
|---|---|---|
| **Question** | **Modification** | **Mark scheme notes** |
| 19 | Wording added<br>'It shows shape A on a grid. A cut out shape is available if you wish to use it.'<br>Diagram enlarged.<br>Wording 'A' deleted from inside the shape. Wording 'shape A' added above the shape.<br>Shading has been changed to dotty shading. | Standard mark scheme |
| 26 | Diagram enlarged. Shading has been changed to dotty shading. DC labelled 20 cm. | Standard mark scheme |
| 27 | Wording added 'It shows an incomplete probability tree diagram.'<br>Part (a): Diagram enlarged.<br>Braille only – will label answer spaces as shown below.<br>Wording added 'There are four spaces to fill.'<br>        5/9<br>   3/10  (ii)<br>        (ii)<br>  (i)   (iv) | Standard mark scheme |