# Mark Scheme (Results)

## January 2021

Pearson Edexcel International GCSE
In Mathematics A (4MA1)
Paper 2FR

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# General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- Types of mark
    - M marks: method marks
    - A marks: accuracy marks
    - B marks: unconditional accuracy marks (independent of M marks)
- Abbreviations
    - cao – correct answer only
    - ft – follow through
    - isw – ignore subsequent working
    - SC - special case
    - oe – or equivalent (and appropriate)
    - dep – dependent
    - indep – independent
    - eeoo – each error or omission

- No working

  If no working is shown then correct answers normally score full marks

  If no working is shown then incorrect (even though nearly correct) answers score no marks.

- With working

  If there is a wrong 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.

  If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.

  If a candidate misreads a number from the question. Eg. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review. If there is a choice of methods shown, mark the method that leads to the answer on the answer line; where no answer is given on the answer line, award the lowest mark from the methods shown.

  If there is no answer on the answer line then check the working for an obvious answer.

- 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: eg. Incorrect cancelling of a fraction that would otherwise be correct.

  It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.

  Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

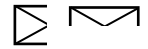
- Parts of questions

  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded to another.

**International GCSE Maths**

**Apart from Q13, 20 & 21 (where the mark scheme states otherwise) the correct answer, unless obtained from an incorrect method, should be taken to imply a correct method.**

| Q | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| **1** | (a) | | 12 348 | 1 | B1 |
| | (b) | | 84 312 | 1 | B1 |
| | (c) | | 1,3 | 2 | B2 for both correct values<br>-1 eeoo |
| | (d) | | 2,3 | 2 | B2 for both correct values<br>-1 eeoo |
| | | | | | **Total 6 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **2** | (a) | | Wednesday | 1 | B1 | |
| | (b) | 4 : 2.5 or 16 : 10 oe | | 2 | M1 | |
| | | | 8 : 5 | | A1 | M1 A0 for 5 : 8 |
| | (c) | | 3.5 “envelopes” | 1 | B1 | Accept  for half an envelope |
| | (d) | $\frac{6}{14}$ | | 2 | M1 | |
| | | | $\frac{3}{7}$ | | A1 | |
| | (e) | eg Heights of bars (cms): 7, 5.5, 3 or heights of 3.5, 2.75, 1.5 cms | bars at correct heights and correct scale | 2 | B2 | B2 for all bars at correct heights with a correct scale (at least one value, not contradicted. 0 implied)<br>If not B2 then B1 for 1 error on heights **or** no scale, but with heights in correct proportion eg 7, 5.5, 3 cms |
| | | | | | | **Total 8 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **3** | (a) (i) | | kilometres | 1 | B1 | Accept km or kms |
| | (ii) | | litres | 1 | B1 | |
| | (iii) | | square cm | 1 | B1 | Accept sq cm, square centimetres, $cm^2$ etc. |
| | (b) | | 1.8 → 2.2 metres | 2 | B2 | B2 for 1800 → 2200 mm<br>or 180 → 220 cm<br>or 1.8 → 2.2 m<br>If not B2, then B1 for metres, centimetres or millimetres |
| | | | | | | **Total 5 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **4** | (a) (i) | | Sphere | 1 | B1 | |
| | (a) (ii) | | Cone | 1 | B1 | |
| | (a) (iii) | | Prism | 1 | B1 | Accept hexagon prism or hexagonal prism |
| | (b) (i) | | 8 | 1 | B1 | |
| | (ii) | | 12 | 1 | B1 | |
| | (c) | 54 ÷ (9 × 2) | | 2 | M1 | |
| | | | 3 | | A1 | |
| | | | | | | **Total 7 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **5** | (a) | 4 – – 6 or – 6 – 4 or – 10 | | 2 | M1 | Identifying 4 and – 6 only.<br>or for stating 10 or – 10 |
| | | | 10 | | A1 | |
| | (b) | – 6, – 5, – 1, 3, 4<br>**or** 4, 3, – 1, – 5, – 6 | | 2 | M1 | Putting temperatures in ascending or descending order. |
| | | | – 1 | | A1 | |
| | (c) | $\frac{3}{5}\times 100$ oe | | 2 | M1 | accept $\frac{3}{5}$ or 0.6 oe |
| | | | 60 | | A1 | |
| | (d) | – 6 + 8 | | 2 | M1 | |
| | | | 2 | | A1 | Accept +2 |
| | | | | | | **Total 8 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **6** | $\frac{4}{15}\times 1200\ (=320)$<br>**or** for $\frac{3}{15}$ or $\frac{8}{15}$ seen | | 4 | M1 | |
| | 1200 – "320" (= 880) **and** "880" ÷ 11 (=80)<br>**or** $\frac{3}{11}\times 880\quad (=240)$ oe<br>**or** $\frac{3}{15}\times 1200\quad (=240)$ oe | | | M1 | |
| | 1200 – ("320" + "240") **or** 880 – 240 (= 640)<br>**or** $\frac{8}{11}\times 880\quad (=640)$<br>**or** $\frac{8}{15}\times 1200$ oe | | | M1 | |
| | | 320, 240, 640 | | A1 | Must be on correct answer lines or clearly attributed to cake *A*, *B* and *C*, otherwise withhold final A mark. |
| | | | | | **Total 4 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **7** | (a) | | D | 1 | B1 | |
| | (b) | | 4 hours 52 minutes | 2 | B1 B1 | |
| | (c) | time = 40 + 45 (= 85 minutes oe) or 1 hr 25 min | | 3 | M1 | accept 60 + 25<br>May be implied by 70 ÷ 40 |
| | | (“85” – 15) ÷ 40 | | | M1 | dep 1st M1 |
| | | | 1.75 | | A1 | oe eg 1.750 or $\frac{7}{4}$ |
| | (d) | | $T = 40k + 15$ | 2 | B2 | B1 for $40k + 15$ or $T = 40k + a$ ($a \neq 15$)<br>Accept $40 \times k$ etc |
| | | | | | | **Total 8 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **8** | (Berlin) 120 ÷ 1.16 (= 103.45) | | 4 | M1 | |
| | (Dubai) 600 × 0.24 ÷ 1.16 (= 124.14) oe or 144 ÷ 1.16 | | | M1 | |
| | “124.14” – “103.45” | | | M1 | dep on M2 Accept “103.45” – “124.14” or rounded/truncated values |
| | | 20.69 | | A1 | allow 20.68 to 20.7(0) |
| | | | | | **Total 4 marks** |

| **Alternative Mark Scheme for Q8** | | | | | |
|---|---|---|---|---|---|
| **8** | (Dubai = ) 600 × 0.24 (=144) | | 4 | M1 | |
| | “144” – 120 = 24 | | | M1 | |
| | “24” ÷ 1.16 | | | M1 | dep on M2 for a fully correct method |
| | | 20.69 | | A1 | allow 20.68 to 20.7(0) |
| | | | | | **Total 4 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **9** | (a) | | 107 | 1 | B1 | Accept 105 → 109 |
| | (b) | 360 – 135 or 180 + 45 | | 2 | M1 | |
| | | | 225 | | A1 | |
| | | | | | | **Total 3 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **10** | (a) | $(60 \div 24) \times 100$ or $\frac{100}{24} \times 60$ | | 2 | M1 | Complete method<br>accept $4.16 \times 60$ |
| | | | 250 | | A1 | cao |
| | (b) | $\frac{30-24}{24}(\times 100)$ oe or $30 \div 24$ $(=1.25)$ or $\frac{125}{100}$<br>or $\frac{30}{24}(=1.25)$<br>or $\frac{"250"}{2} - 100$ | | 2 | M1 | ft *their* 250 from (a) |
| | | | 25 | | A1 | cao |
| | | | | | | **Total 4 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **11** | (a) | $5 \times (-2)^2 - (-2)^3$ ( = 20 – –8) | | 2 | M1 | for correct expression<br>or at least one of 20 or $5 \times 4$ or – – 8 or (+) 8 |
| | | | 28 | | A1 | |
| | (b) | | $2p(4p - 1)$ | 2 | B2 | B1 for $p(8p - 2)$ or $2(4p^2 - p)$<br>or $2p(4p - 1)$ with two terms inside the bracket with one term correct. |
| | (c) | | $12t^2 - 8t$ | 2 | B2 | B1 for $12t^2$ or $-8t$ |
| | (d) | $5x^2 + 20x - 2x - 8$ | | 2 | M1 | for 4 correct terms (ignoring signs)<br>or 3 correct terms with correct signs.<br>or $5x^2 + 18x$ + ...<br>or … + 18$x$ − 8 |
| | | | $5x^2 + 18x - 8$ | | A1 | |
| | | | | | | **Total 8 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **12** | 0.5 × $\pi$ × $6^2$ ( = 56.54…) **or** 12 × 6 ( = 72)<br>**or** $\pi$ × $6^2$ oe | | 3 | M1 | |
| | "72" – "56.54…" | | | M1 | dep M1 for a complete method |
| | | 15.5 | | A1 | 15.4 to 15.5 |
| | | | | | **Total 3 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **13** | $2x - 3 = 20 \div 5$ or $10x - 15 = 20$ | | 3 | M1 | |
| | $2x$ = "4" + 3 oe or $10x$ = 20 + "15"<br>$10x$ = 35 oe | | | M1 | For collecting terms, ft their expansion |
| | | 3.5 oe | | A1 | dep M1<br>accept $\frac{7}{2}$ or $\frac{35}{10}$ |
| | | | | | **Total 3 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **14** | (a) (i) | | 24, 30 | 1 | B1 | No repeats |
| | (ii) | | 21, 23, 25, 27, 29 | 1 | B1 | No repeats |
| | (b) | | $(A \cup B)'$ or $A' \cap B'$ | 1 | B1 | or $(B \cup A)'$ or $B' \cap A'$ |
| | | | | | | **Total 3 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **15** | (a) | | $81k^8$ | 2 | B2 | B1 for 81 or $k^8$ seen in their final answer. |
| | (b) | | $7m^4n^6$ | 2 | B2 | B1 for $7m^4$ or $n^6$ in a product with no other terms in $m$ or $n$ |
| | | | | | | **Total 4 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **16** | (a) | vertices at (–9, 6) (–9, 9) (–3, 9) (–6, 6) | Shape in correct position | 2 | B2 | B1 for congruent shape in correct orientation but wrong position **or** quadrilateral with 2 or 3 vertices correct. |
| | (b) | vertices at (7, 3) (10, 6) (13, 6) (13, 3) | Shape in correct position | 1 | B1 | |
| | (c) | | enlargement<br><br>scale factor 2<br>centre (– 3, 3) | 3 | B1<br><br>B1<br>B1 | for enlargement, enlarge, etc so long as no mention of rotation, reflection or translation, flip, move etc.<br>SF 2, double, two times etc.<br>(– 3, 3) stated. Accept about, from etc. with no mention of line, or column vector. |
| | | | | | | **Total 6 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **17** | $x \times 1.05 = 1.26$ oe<br>eg $(x =)\ 1.26 \div 1.05\ (= 1.2)$ | or $30 \times 1.26$ (= 37.80) | or $30 \div 1.05$ (= 28.57) | | 3 | M1 |
| | $30 \times$"1.2" | "37.80" $\div 1.05$ | "28.57…" $\times 1.26$ | | | M1 |
| | | | | 36 | | A1 cao<br>If no marks awarded, SC B1 for one operation used correctly, even with another incorrect operation.<br>eg $1.26 \times 0.95 \times 30$ oe<br>or $1.26 \times 1.05 \times 30$ oe<br>or $1.26 \div 0.95 \times 30$ oe |
| | | | | | | **Total 3 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **18** | | $y \geq 1$ oe<br>$x \leq 3$ oe<br>$y \leq 3x - 2$ | 3 | B1<br>B1<br>B1 | Condone < and > in place of ≤ and ≥ throughout.<br><br>SC B1 if no marks awarded, recognition of lines $x = 3$ and $y = 1$.<br>Allow incorrect inequality and condone use of equals signs<br>eg $y < 1$, $x = 3$<br>may be seen on diagram. |
| | | | | | **Total 3 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **19** | (a) | | Pacific | 1 | B1 | Accept $1.357 \times 10^5$ |
| | (b) | $1.119 \times 10^5 - 1.797 \times 10^4$ | | 2 | M1 | Accept 111 900 – 17 970 oe<br>or 93 930 or −93 930 |
| | | | $9.393(0) \times 10^4$ | | A1 | Accept $(\pm)\ 9.393(0) \times 10^4$<br>or $(\pm)\ 9.39 \times 10^4$ or $(\pm)\ 9.4 \times 10^4$ |
| | | | | | | **Total 3 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **20** | eg<br>$(x \pm 20)(x \pm 1)$ | $\dfrac{-(-21) \pm \sqrt{(-21)^2 - 4 \times 1 \times 20}}{2 \times 1}$<br>**or** $\left(x - \dfrac{21}{2}\right)^2 - \left(\dfrac{21}{2}\right)^2 + 20 = 0$ | | 3 | M1 | If factorising, allow brackets which expanded give 2 out of 3 terms correct – if using formula or completing the square allow one sign error and some simplification – allow as far as eg<br>$\dfrac{21 \pm \sqrt{441 - 80}}{2}$ or eg $\left(x - \dfrac{21}{2}\right)^2 - \dfrac{361}{4} = 0$ oe |
| | $(x - 20)(x - 1)$ | eg $\dfrac{21 \pm \sqrt{441 - 80}}{2}$ or<br>$\dfrac{21 \pm \sqrt{361}}{2}$ or $\dfrac{21 \pm 19}{2}$<br>**or** $x = \pm\sqrt{\dfrac{361}{4}} + \dfrac{21}{2}$ oe | | | M1 | dep on M1<br>for correct factorisation,<br>or a correct expression for $x$ if completing the square.<br>or a correct substitution into quadratic formula with some processing. |
| | | | 1, 20 | | A1 | for both correct values,<br>dep on 1st M1 with no incorrect working. |
| | | | | | | **Total 3 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **21** | $(11 \times 3) + (8 \times 5) + (6 \times 7) + (5 \times 9)$ (= 160)<br>(= 33 + 40 + 42 + 45 = 160) | | 4 | M1 | Correct numerical products using midpoints (allowing one error) with intention to add.<br>May be seen in table. |
| | "160" + $x$ = 4. 25 × (11 + 8 + 6 + 5 + $x$) oe<br>or $\frac{"160"+x}{"30"+x} = 4.25$<br>or "160" + $x$ = 4.25 × "30" + 4.25$x$ | | | M1 | dep M1 for correct equation ft *their* 160. |
| | "160" – "127.5" = 4.25$x$ – $x$<br>or 32.5 = 3.25$x$ | | | M1 | Isolating $x$ and number terms |
| | | 10 | | A1 | dep 1st M1 |
| | | | | | **Total 4 marks** |

| **Alternative Mark Scheme for question 21** | | | | | |
|---|---|---|---|---|---|
| **21** | $(11 \times 3) + (8 \times 5) + (6 \times 7) + (5 \times 9)$<br>(= 33 + 40 + 42 + 45 = 160) | | 4 | M1 | Correct numerical products using midpoints (allowing one error) with intention to add.<br>May be seen in table. |
| | 4.25$y$ = "160" + [$y$ – (11 + 8 + 6 + 5)] oe<br>4.25$y$ = 160 + $y$ – 30 | | | M1 | dep M1 for correct equation ft *their* 160, where $y$ = total number of pupils |
| | 4.25$y$ – $y$ = 160 – 30<br>or 3.25$y$ = 130<br>or $y$ = 40 | | | M1 | Isolating $y$ and number terms<br>**or** $y$ = 40 |
| | | 10 | | A1 | dep 1st M1 |
| | | | | | **Total 4 marks** |
| | | | | | **TOTAL FOR PAPER 100 MARKS** |