Pearson Edexcel

# Mark Scheme (Results)

## January 2022

Pearson Edexcel International GCSE
Mathematics A (4MA1)
Paper 1FR

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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
- awrt – answer which rounds to
- 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.

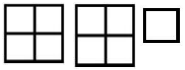
- Parts of questions

  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 Questions 5b and 24 the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method** | | | | |
| **Q** | **Working** | **Answer** | **Mark** | **Notes** |
| **1** (a)(i) | | 10 or 28 | 1 | B1 accept 10 **or** 28 **or** 10 and 28 |
| (ii) | | 27 | 1 | B1 |
| (iii) | | 23 | 1 | B1 |
| (b)(i) | | 3578 | 1 | B1 |
| (ii) | | 57 + 38 **or** 37 + 58 | 1 | B1 |
| | | | | **Total 5 marks** |

| | | | | |
|---|---|---|---|---|
| **2** (a) | | Isosceles | 1 | B1 |
| (b) | | Correct lines of symmetry drawn | 1 | B1 with no additional lines |
| (c) | | 5 | 1 | B1 |
| | | | | **Total 3 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **3** (a) | | 600 | 1 | B1 | |
| (b) | | 4.5 | 1 | B1 | |
| (c) | 3 × 1000 (= 3000) **or** 225 ÷ 1000 (= 0.225) | | 4 | M1 | |
| | "3000" ÷ 225 (= 13.3...) oe **or**<br>3 ÷ 0.225 (= 13.3...) oe | | | M1 | |
| | "3000" – ("13" × 225) **or**<br>[3 – (13 × "0.225")] × 1000 | | | M1 | for a complete method |
| | | 75 | | A1 | |
| | | | | | **Total 6 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **4** (a) | | 14 | 1 | B1 | |
| (b) | | Cruise  <br>Skiing  | 2 | B1 correct symbol for Cruise<br>B1 correct symbols for Skiing | |
| (c) | | | 2 | M1 $\frac{7}{a}$ where $a \geq 7$ **or** $\frac{b}{40}$ where $b \leq 40$ | |
| | | $\frac{7}{40}$ | | A1 oe | |
| | | | | | **Total 5 marks** |

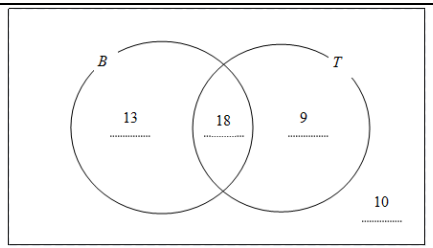
| | | | | | | |
|---|---|---|---|---|---|---|
| **5** | (a)(i) | | 27 | 1 | B1 | |
| | (ii) | | Add 5 | 1 | B1 | accept +5 or use of $5n+2$ |
| | (b) | | No and reason | 1 | B1 | e.g. 'because the unit digit of 256 is not 2 or 7' or it is not in the form $5n+2$ |
| | | | | | | **Total 3 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **6** | (a) | | 0.4, 0.407, 0.47, 0.477, 0.74 | 1 | B1 | |
| | (b) | | $\frac{7}{10}$ | 1 | B1 | oe |
| | (c) | | | 2 | M1 | for $\frac{30}{48}$ oe |
| | | | $\frac{5}{8}$ | | A1 | |
| | (d) | | 0.23 | 1 | B1 | |
| | (e) | $1-\left(\frac{1}{2}+\frac{2}{5}\right)\left(=\frac{1}{10}\right)$ oe | | 3 | M1 | for a method to find the remaining fraction of beads |
| | | 3 × "10" **or** $3\div"\frac{1}{10}"$ oe | | | M1 | |
| | | | 30 | | A1 | |
| | | | | | | **Total 8 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **7** | (a) | | $2c + 7d$ | 2 | B2 | (B1 for $2c$ or $7d$) |
| | (b) | | $40ef$ | 1 | B1 | |
| | (c) | $5r = 8 + 3$ or $5r = 11$ or $-3 - 8 = -5r$ or $-11 = -5r$ or $r - \frac{3}{5} = \frac{8}{5}$ or $(8 + 3) \div 5$ | | 2 | M1 | for a correct first step or for a calculation for $r$ |
| | | | 2.2 | | A1 | oe |
| | | | | | | **Total 5 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **8** | (a) | ($DBC$ =) 180 – (93 + 42) (= 45) **OR** ($x$ =) 93 + 42 | | 2 | M1 | for method to find angle $DBC$ **OR** using exterior angle is equal to the sum of the two opposite interior angles |
| | | | 135 | | A1 | |
| | (b)(i) | 360 – (90 + 100 + 114) oe | | 2 | M1 | for a complete method to find $y$ |
| | | | 56 | | A1 | |
| | (ii) | | Angles at a point sum to 360° | 1 | B1 | |
| | | | | | | **Total 5 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **9** | 0.4 × 2500 (1000) **or** 0.6 × 2500 (= 1500) oe | | 4 | M1 | for finding 40% or 60% of 2500 |
| | 2500 – "1000" – 300 (= 1200) oe **or** "1500" – 300 (= 1200) oe | | | M1 | for method to find the remaining money |
| | "1200" ÷ (3 + 7) × 7 oe | | | M1 | for method to find the amount of money spent on food |
| | | 840 | | A1 | |
| | | | | | **Total 4 marks** |

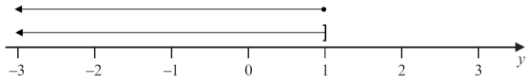
| | | | | | |
|---|---|---|---|---|---|
| **10** | |  | 3 | B3<br>(B2<br>(B1 | for a fully correct Venn diagram<br>for 3 correct values)<br>for 1 or 2 correct values) |
| | | | | | **Total 3 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **11** | $0 \times 5 + 1 \times 5 + 2 \times 3 + 3 \times 10 + 4 \times 7 + 5 \times 6$ (= 99)<br>**or** 0 + 5 + 6 + 30 + 28 + 30 (= 99) | | 3 | M1 | for at least 4 correct products with intention to add |
| | "99" ÷ 36 | | | M1 | |
| | | 2.75 | | A1 | oe If no other marks awarded, award SC B1 for 2.8(88…) |
| | | | | | **Total 3 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **12** | (a) | | Reflection | 2 | B1 | for reflection with no mention of translate, enlarge, rotate, move |
| | | | $x = -1$ | | B1 | for $x = -1$ with no mention of a vector, SF, centre or angle |
| | (b) | | Triangle drawn with vertices at (4, 2) (4, 8) (8, 2) | 2 | B2<br>(B1 | for a correct enlargement<br>for an enlarged triangle scale factor 2 in wrong position **or** 2 out of out 3 vertices in the correct position) |
| | | | | | | **Total 4 marks** |
| | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **13** | (a) | | $3(2x - 5)$ | 1 | B1 |
| | (b) | | $T = 200c - 50d$ | 3 | B3 for $T = 200c - 50d$ oe<br><br>(B2 for $T = 200c + kd$ **or** $T = kc - 50d$ **or** $200c - 50d$)<br><br>(B1 for $200c$ **or** $-50d$ **or** $50d$ **or** $T = kc + pd$ where $k \neq 0$ or 200 and $p \neq 0$ or $\pm 50$) |
| | | | | | **Total 4 marks** |

| | | | | |
|---|---|---|---|---|
| **14** | | | 2 | M1 for 2.72(02...) **or** 26.01 **or** 8.67 **or** 11.4 **or** 11.39 |
| | | 11.390(2941) | | A1 |
| | | | | **Total 2 marks** |

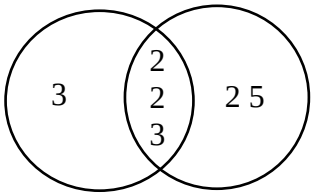
| Q | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **15** (a) | | −2, −1, 0, 1, 2 | 2 | B2 for −2, −1, 0, 1, 2 with no additions or repeats<br>(B1 for 4 of −2, −1, 0, 1, 2 with no additions or repeats<br>**or**<br>for 6 values with no more than one incorrect value e.g. all of −2, −1, 0, 1, 2, 3<br>**or**<br>for 5 values with one error) |
| (b) |  | Closed circle at $x = 1$<br>and<br>a line with an arrow to the left | 1 | B1 for a closed circle at $x = 1$ and a line with an arrow of any length to the left<br><br>Allow ] for a closed circle<br><br>Allow a line without an arrow if it reaches to at least −3 |
| | | | | **Total 3 marks** |

| | | | | |
|---|---|---|---|---|
| **16** | 0.65 × 300 oe | | | M1 |
| | | 195 | | A1<br>(SCB1 for 105) |
| | | | | **Total 2 marks** |

| | | | | |
|---|---|---|---|---|
| **17** | $12.8^2 + x^2 = 16^2$ oe or<br>$163.84 + x^2 = 256$ or<br>$(x^2 =)\, 16^2 - 12.8^2\ (= 92.16)$ or<br>$(x^2 =)\, 256 - 163.84\ (= 92.16)$ | | 4 | M1 for applying Pythagoras theorem correctly<br>Allow<br>$\cos^{-1}\left(\frac{12.8}{16}\right)(= 36.9...)$ **and**<br>$\frac{x}{\sin(36.9...)} = \frac{16}{(\sin 90)}$ |
| | $(x =)\, \sqrt{16^2 - 12.8^2}\ (= \sqrt{92.16})\ (= 9.6)$ or<br>$(x =)\, \sqrt{256 - 163.84}\ (= \sqrt{92.16})\ (= 9.6)$ | | | M1 for square rooting<br>Allow $x = \frac{16}{(\sin 90)} \times \sin(36.9...)$ |
| | (12.8 – "9.6") + "9.6" + "9.6" + 16 + 16 + 16 oe | | | M1 (dep on M1) for a complete method to find the perimeter |
| | | 70.4 | | A1 oe e.g. $\frac{352}{5}$ |
| | | | | **Total 4 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **18** | (a) | | 15, 0, −1, 3 | 2 | B2 for 4 correct values<br>(B1 for 2 or 3 correct values) |
| | (b) | (−2, 15) (−1, 8) (0, 3) (2, −1) (3, 0) (4, 3) | | 2 | M1 (dep on B1) ft from (a) for at least 5 points plotted correctly |
| | | | correct graph | | A1 for a correct graph<br>(clear intention to go through all the points and which must be curved at the bottom)<br>**Note**: If a fully correct graph is shown, but an incomplete table is shown in (a), then award the marks for (a) |
| | | | | | **Total 4 marks** |

| | | | | |
|---|---|---|---|---|
| **19** | | | 4 | B1 for 80 |
| | for $\frac{a+75}{2} = 74$ oe **or** 73 | | | M1 for setting up an equation using the median **or** for 73 |
| | for 80 – 16 (= 64) oe | | | M1 for using the range correctly **or** for 64 |
| | | 64, 73, 80 | | A1 answers can be in any order |
| | | | | **Total 4 marks** |

<table>
<tr><td>20 (a)</td><td>36, 72, 108, ... and 120, 240, 360, ...<br>or<br>2, 2, 3, 3 and 2, 2, 2, 3, 5<br>or<br> 

<table>
<tr><td>2</td><td>36</td><td>120</td></tr>
<tr><td>2</td><td>18</td><td>60</td></tr>
<tr><td>3</td><td>9</td><td>30</td></tr>
<tr><td></td><td>3</td><td>10</td></tr>
</table>
or $\frac{36\times120}{12}$ or 2, 2, 2, 3, 3, 5 oe</td><td></td><td>2</td><td>M1for any correct valid method e.g.<br>for starting to list at least three multiples of each number<br><br>2, 2, 3, 3 and 2, 2, 2, 3, 5 seen<br>(may be in a factor tree or a ladder diagram and ignore 1) (Allow 2 × 2 as 4)<br><br>or a fully correct “Venn” diagram</td></tr>
<tr><td></td><td></td><td>360</td><td></td><td>A1 or $2^3 \times 3^2 \times 5$ oe (allow $2^3 . 3^2 . 5$)</td></tr>
<tr><td>(b)</td><td></td><td>$5^2 \times 7^4 \times 11$</td><td>2</td><td>B2 for $5^2 \times 7^4 \times 11$ (in any order)<br>(B1 for 660 275 or<br>correct unsimplified product or<br>$5^a \times 7^b \times 11^c$ where 2 of a, b and c are correct)</td></tr>
<tr><td></td><td></td><td></td><td></td><td>Total 4 marks</td></tr>
</table>

| | | | | |
|---|---|---|---|---|
| **21** | $220 \div 80$ (= 2.75 or $\frac{11}{4}$) oe | | | M1 for a method to find the time from B to C |
| | $72 \times \frac{50}{60}$ (= 60) oe | | | M1 for a method to find the distance from C to D<br>Allow 0.83(333…) to 2 dp truncated or rounded |
| | $\frac{245+220+"60"}{2.5+"2.75"+\frac{50}{60}}\left(=\frac{525}{73/12}\right)$ oe | | | M1 for a complete method to find the average speed for entire journey<br>0.83(333…) to 2 dp truncated or rounded<br>6.0(8333…) to 2 sf truncated or rounded |
| | | 86.3 | | A1 for 86.3 – 86.4 |
| | | | | **Total 4 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **22** | (a) | | 50 000 | 1 | B1 |
| | (b) | | $6\times10^{-5}$ | 1 | B1 |
| | (c) | $2.5\times10^{512-700}$ **or** $2.5\times10^{n}$ **or** $0.25\times10^{-187}$ **or** $p\times10^{-188}$ where $1 \leq p < 10$ | | 2 | M1 |
| | | | $2.5\times10^{-188}$ | | A1 |
| | | | | | **Total 4 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **23** | (a) | | $x^9$ | 1 | B1 cao |
| | (b) | | $64y^6$ | 2 | B2 for $64y^6$<br>(B1 for $ky^6$ where $k \neq 64$ **or**<br>$64y^m$ where $m \neq 6$) |
| | (c) | $(n \pm 3)(n \pm 4)$ | | 2 | M1 for $(n \pm 3)(n \pm 4)$ or<br>$(n + a)(n + b)$ where $ab = 12$ or<br>$a + b = -7$<br>Condone use of a different letter to $n$ |
| | | | $(n - 3)(n - 4)$ | | A1 |
| | | | | | **Total 5 marks** |

| | | | | |
|---|---|---|---|---|
| **24** | 3 × 2.5 (= 7.5) oe or 2 × 3 × 2.5 (= 15) oe or<br>12 × 3 (= 36) oe or 2 × 12 × 3 (= 72) oe or<br>12 × 2.5 (= 30) | | 6 | M1 for area of rectangle |
| | (2 × 3 × 2.5) + (2 × 12 × 3) + (12 × 2.5) (= 117) or<br>(2 × 7.5) + (2 × 36) + (12 × 2.5) (= 117) or<br>15 + 72 + 30 (= 117) | | | M1 for a complete method to find the surface area |
| | 1 + 0.1 (= 1.1) **or**<br>100(%) + 10(%) (= 110(%)) **or**<br>$\frac{26.95}{110}$ (= 0.245) oe | | | M1 |
| | 26.95 ÷ "1.1" (= 24.5(0)) **or**<br>26.95 ÷ "110" × 100 (= 24.5(0)) **or**<br>26.95 × 100 ÷ "110" (= 24.5(0)) oe **or**<br>"0.245" × 100 (= 24.5(0)) oe | | | M1 dep on previous M1 |
| | "117" ÷ 15 (= 7.8 or 8) **and** "8" × "24.50" (= 196) **or**<br>"117" ÷ 15 (= 7.8 or 8) **and** 200 ÷ "24.5" (= 8.1...) **or**<br>"117" ÷ 15 (= 7.8 or 8) **and** 200 ÷ "8" (= 25) | | | M1for working with a whole number of tins (rounded up) to reach figures where a decision can be made |
| | | Correct figures to show that Jonty is correct | | A1 e.g. 196<br>7.8 or 8 **and** 8.1...<br>24.5 **and** 25 |
| | | | | **Total 6 marks** |

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