# Mark Scheme (Results)

# November 2020

## Pearson Edexcel International GCSE
## 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
  - 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 11, 15, 19 and 22b 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) | | Tonga | 1 | B1 cao |
| | (b) | | 5 hundred(s) | 1 | B1 for 5 hundred(s) or 500 |
| | (c) | | four thousand, four hundred and thirty seven | 1 | B1 all numbers must be as words |
| | (d) | | 8458 | 1 | B1 cao |
| | (e) | 8047 + 2864 | | 2 | M1 for ‘any value from table’ + 2864 |
| | | | 10 911 | | A1 cao |
| | | | | | **Total 6 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **2** | (a) | | sphere | 1 | B1 |
| | (b) | | 12 | 1 | B1 cao |
| | (c) | | 10 | 1 | B1 cao |
| | | | | | **Total 3 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **3** | (a) | | 243 | 1 | B1 | cao |
| | (b) | | Multiplying previous term by 3 | 1 | B1 | for multiplying previous term by 3 oe<br>"×3" or 81×3 |
| | (c) | | 19 683 | 1 | B1 | cao |
| | | | | | | **Total 3 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **4** | (a) | | 2.7 | 1 | B1 | condone 2.7 million |
| | (b) | | Malaysia | 1 | B1 | cao |
| | (c) | | Correct bar drawn | 1 | B1 | for correct bar at a height of 5.4 (within half small square)<br>allow any bar width or location (no gap required) condone stick at correct height. |
| | (d) | | Russia | 1 | B1 | cao |
| | | | | | | **Total 4 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **5** | (a) | | 3.0 – 3.2 | 1 | B1 | for in the range 3.0 – 3.2 |
| | (b) | | Parallelogram | 1 | B1 | allow trapezium |
| | (c) | | 2 | 1 | B1 | cao |
| | (d) | | Correctly labelled | 1 | B1 | Angle *DAB* or angle *DCB* or both labelled |
| | (e) | $\frac{1}{2}(6+10)\times 4$ | | 2 | M1 | for correct application of formula<br>allow triangle method |
| | | | 32 | | A1 | cao |
| | | | | | | **Total 6 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **6** | $5 \times 25$ (= 125) | | 4 | M1 | total number of balloons |
| | '125' ÷ 32 (= 3.9….) | | | M1 | |
| | '125' – (32 × 3) or 125 – 96 **or** $3\frac{29}{32}$ | | | M1 | |
| | | 29 | | A1 | |
| | | | | | **Total 4 marks** |

| **Alternative Mark Scheme for Q6** | | | | | |
|---|---|---|---|---|---|
| **6** | $5 \times 25$ (= 125) | | 4 | M1 | |
| | $32 \times 3$ (= 96) **or** $32 \times 4$ (= 128) | | | M1 | |
| | '125' – (32 × 3) or '125' – 96 | | | M1 | |
| | | 29 | | A1 | |
| | | | | | **Total 4 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **7** | $180° - (104° + 42°)$ (= 34°) or $\frac{180° - '34°'}{2}$ | | 4 | M1 | for one correct stage |
| | | 73 | | A1 | for 73 |
| | • Angles in a triangle sum to 180° or (angles in a triangle sum to 180°)<br>• Angle *BDC* and angle *DBA* are alternate angles<br>• Base angles in an isosceles triangle are equal<br>**or** (Allied / co-interior angles add up to 180°) | correct reasons | | B2<br><br><br><br><br>(B1 | dep fully correct method.<br>for all correct reasons for the method used<br>NB allied angles may not be needed if using *ABD* sum to 180°<br>dep M1 for one correct reason) |
| | | | | | **Total 4 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **8** | (a) | 20 + 45 or 20 + 9 × 5 | | 2 | M1 | |
| | | | 65 | | A1 | |
| | (b) | 164 – 20 (= 144) | | 3 | M1 | |
| | | '144' ÷ 9 (= 16) | | | M1 | |
| | | | 16 | | A1 | cao |
| | (c) | | | 2 | M1 | for $T = an + 20$ or $T = 9n + k$ or $9n + 20$ |
| | | | $T = 9n + 20$ | | A1 | for $T = 20 + 9n$ or $T = 9n + 20$ |
| | | | | | | **Total 7 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **9** | (a) | | 28 | 1 | B1 | cao |
| | (b) | | 18 | 1 | B1 | cao |
| | (c) | | 0.85 | 1 | B1 | cao |
| | (d) | $\frac{45}{60}, \frac{24}{60}, \frac{28}{60}, \frac{40}{60}$ or<br>0.75, 0.4, 0.466…, 0.666… or<br>75%, 40%, 46.6%, 66.6% | | 2 | M1 | for a method to compare the fractions<br><br>If M0, award B1 for any three of these fractions in the correct order or for all fractions (or dec or perc) in correct reverse order |
| | | | $\frac{2}{5}, \frac{7}{15}, \frac{2}{3}, \frac{3}{4}$ | | A1 | allow answers in any form (dec or perc) |
| | (e) | $\frac{36}{96}$ oe | | 2 | M1 | for fraction or for partial simplification. |
| | | | $\frac{3}{8}$ | | A1 | cao<br>correct answer scores full marks |
| | | | | | | **Total 7 marks** |

| | | | | |
|---|---|---|---|---|
| **10** | 72 ÷ 3 (= 24) or $\frac{x}{68}=\frac{72}{3}$ | | 4 | M1 |
| | '24' × 68 (= 1632) or $(x=)\frac{72}{3}\times 68$ oe | | | M1 |
| | '1632' ÷ 60 (= 27.2) **or** 30 × 60 (= 1800) or '1632' ÷ 3600 (= $\frac{34}{75}$ = 0.453(333...) ) | | | M1 |
| | | Yes with correct figures | | A1 Yes and 27.2 **or** (1632 and 1800) seen<br>or Yes and 0.453 oe seen |
| | | | | **Total 4 marks** |

| **Alternative Mark Scheme for Q10 (calculation in minutes)** | | | | |
|---|---|---|---|---|
| **10** | 72 ÷ 60 (= 1.2) | | 4 | M1 |
| | '1.2' ÷ 3 (= 0.4) | | | M1 |
| | 68 × '0.4' (= 27.2) | | | M1 |
| | | Yes, with correct figures | | A1 Yes and 27.2 seen |
| | | | | **Total 4 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **11** | $\frac{10}{24}+\frac{9}{24}$ or $\frac{10n}{24n}+\frac{9n}{24n}$ or eg $\frac{40+36}{96}$ $\left(=\frac{76}{96}\right)$ | | 2 | M1 | for writing a sum, and each fraction with a common denominator, eg $\frac{10}{24}+\frac{9}{24}$ |
| | $\frac{10}{24}+\frac{9}{24}=\frac{19}{24}$ or eg $\frac{40+36}{96}=\frac{76}{96}=\frac{19}{24}$ | clearly shown | | A1 | dep on M1<br>continued to clearly show given result |
| | | | | | **Total 2 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **12** | (a) | | $4m + 8$ | 1 | B1 | do not isw further incorrect working |
| | (b) | $2x = −19 – 5$ **or** $2x = −24$ **or** $x=\frac{-19-5}{2}$ or $x=\frac{-24}{2}$ | | 2 | M1 | |
| | | | $−12$ | | A1 | cao |
| | | | | | | **Total 3 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **13** | (a) | | Correct mirror line $x = −1.5$ | 1 | B1 | Correct line drawn at $x = −1.5$ allow freehand with intention to draw at $−1.5$ |
| | (b) | | Shape drawn | 2 | B2<br>(B1 | for correct shape with vertices at $(−1,2)$, $(−1, 4)$, $(−3, 2)$ and $(−3, 5)$<br>for a correct orientation or 90° clockwise turn about correct point) |
| | | | | | | **Total 3 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **14** (a) | **Spinner B**<br>**Spinner A**<br>**1** (2) (3) 4 5<br>**2** (3) 4 5 6<br>**3** 4 5 6 7 | Correct values | 2 | B2<br>(B1 | for all 9 correct values<br>5 or 6 or 7 or 8 correct values) |
| (b) | | | 2 | M1 | for $\frac{6}{m}$ where $m > 6$ or $\frac{n}{12}$ where $n < 12$ |
| | | $\frac{6}{12}$ | | A1ft | $\frac{"6"}{12}$ oe ft their table.<br>isw incorrect cancelling. |
| (c) | $\frac{'3'}{12} \times 84$ | | 2 | M1 | allow "a fraction" × 84<br>fraction cannot be zero or improper |
| | | 21 | | A1 | cao |
| | | | | | **Total 6 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **15** | | | 3 | M1 | for continual prime factorisation (at least two consecutive steps correct) or at least two stages of a factor tree, or table, correct. |
| | | | | M1 | for a fully correct factor tree or a list (2,2,2,2,5,11) or<br>2 × 2 × 2 × 2 × 5 × 11 |
| | | $2^4 \times 5 \times 11$ | | A1 | dep M2 for $2^4 \times 5 \times 11$ (with working seen) |
| | | | | | **Total 3 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **16** | (a) | | 2 460 000 | 1 | B1 | accept 2,460,000 or 246 0000 |
| | (b) | | $7.4 \times 10^{-4}$ | 1 | B1 | |
| | (c) | | | 2 | M1 | for correct value not in standard form e.g. $58.3 \times 10^5$ or $583 \times 10^4$ or $0.583 \times 10^7$ oe |
| | | | 5 830 000 | | A1 | 5 830 000 or $5.83 \times 10^6$<br>do not isw. |
| | | | | | | **Total 4 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **17** | | | 3 | M1 | for one of<br>- 5 numbers with a median of 8<br>- 5 numbers with a mode of 5<br>- 5 numbers with a range of 10<br>- 5 numbers with a sum of 45 |
| | | | | M1 | for two of<br>- 5 numbers with a median of 8<br>- 5 numbers with a mode of 5<br>- 5 numbers with a range of 10<br>- 5 numbers with a sum of 45 |
| | | 5, 5, 8, 12, 15 | | A1 | Note: The numbers can be in any order |
| | | | | | **Total 3 marks** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **18** | (a) | | 33.75 | 1 | B1 | oe eg 33.750 |
| | (b) | | 33.85 | 1 | B1 | allow $33.84\dot{9}$ or $33.849^{r}$ or "33.8499…"<br>do NOT allow 33.879 without indication of recurring "9" |
| | | | | | | **Total 2 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **19** | $\frac{70\times40}{0.02}$ or $\frac{68\times40}{0.02}$ or $\frac{70\times43}{0.02}$ or $\frac{68\times43}{0.02}$ | | 2 | M1 | for a correct expression using a suitable approximation.<br>0.02 is the only acceptable denominator. |
| | $\frac{70\times40}{0.02}=140\,000$ **or**<br><br>$\frac{68\times40}{0.02}=\frac{2720}{0.02}=136\,000$ **or**<br><br>$\frac{70\times43}{0.02}=\frac{3010}{0.02}=150\,500$ **or**<br><br>$\frac{68\times43}{0.02}=\frac{2924}{0.02}=146\,200$ | Correct figures | | A1 | If student says 'no' then do not award the A mark<br>Intermediate step required unless rounded to 1sf |
| | | | | | **Total 2 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **20** | $4.3^2 + 6.4^2$ or 59.45 | | 4 | M1 | for squaring and adding |
| | $\sqrt{4.3^2 + 6.4^2}$ or $\sqrt{59.45}$<br>or 7.71(038…) or 7.7 | | | M1 | dep 1st M1 for square rooting |
| | e.g ('7.71' + 4.3 + 6.4) × 22 or<br>'18.4' × 22 or<br>('8' + 4.3 + 6.4) × 22 or<br>'18.7' × 22 or<br>'19' × 22 or<br>'20' × 22 | | | M1 | dep 2nd M1 for a non-rounded perimeter × 22<br>or 18 × 22 or 19 × 22<br>accept 20 × 22 |
| | | \$418 | | A1 | answer must come from 19 |
| | | | | | **Total 4 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **21** | 15 × 24 (= 360) **or** 25 × 18 (= 450) | | 3 | M1 | may be implied by 810 seen |
| | $\frac{'360'+'450'}{40}$ $(=\frac{810}{40})$ | | | M1 | dep on M1 |
| | | 20.25 oe | | A1 | for 20.25<br>accept 20.3 (allow 20 from correct working) |
| | | | | | **Total 3 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **22** (a) | | | 2 | M1 | for $(x \pm 6)(x \pm 7)$ |
| | | $(x + 6)(x - 7)$ | | A1 | for $(x + 6)(x - 7)$ or $(x - 7)(x + 6)$<br>isw roots given if candidate solves the quadratic = 0 |
| (b) | $3x - 8x < 3 - 15$ or $15 - 3 < 8x - 3x$ | | 3 | M1 | accept as equation or with the wrong inequality sign. |
| | $-5x < -12$ or $12 < 5x$ | | | M1 | accept as equation or with the wrong inequality sign. |
| | | $x > 2.4$ | | A1 | Accept $2.4 < x$ or $x > \frac{12}{5}$ oe<br>allow $(-\infty, 2.4)$<br><br>award M1 M1 A0 for 2.4 with = sign or no inequality or incorrect inequality sign. |
| | | | | | **Total 5 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **23** (a) | | 0 | 1 | B1 | condone $150^0$ |
| (b) | | $-2$ | 1 | B1 | condone $3^{-2}$ |
| | | | | | **Total 2 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **24** | See appendix 1 | | 3 | M1 | for $y = x$ correctly drawn |
| | | | | M1 | for $x = 4$ **and** $y = -2$ correctly drawn |
| | | Correct region identified | | A1 | for correct region identified<br>region may be shaded or left unshaded<br>Condone missing label if region is clear and no contradictory labels |
| | | | | | **Total 3 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **25** | $y=\frac{7-5x}{2}$ or $y=\frac{7}{2}-\frac{5}{2}x$ or $y=3.5-2.5x$ or $2y=7-5x$ oe | | 2 | M1 | for making $y$ or $2y$ the subject |
| | | −2.5 | | A1 | for $-\frac{5}{2}$ or −2.5 |
| | | | | | **Total 2 marks** |

| | | | | | |
|---|---|---|---|---|---|
| **26** | $\cos 35°=\frac{15}{AB}$ or $\sin 55°=\frac{15}{AB}$ | | 5 | M1 | |
| | $(AB=)\frac{15}{\cos 35°}$ (=18.3) or $(AB=)\frac{15}{\sin 55°}$ (=18.3) | | | M1 | NB 18.3(116...) |
| | '18.3' × 4 (= 73.2) | | | M1 | dep 1st M1 |
| | 80 − '18.3' × 4 or 80 – '73.2' | | | M1 | |
| | | 6.75 | | A1 | accept 6.75 – 6.8 |
| | | | | | **Total 5 marks** |

| **Alternative Mark Scheme for Q26 [do not mix and match with above MS]** | | | | | |
|---|---|---|---|---|---|
| **26** | 15 × 4 (= 60) | | 5 | M1 | |
| | $\cos 35°=\frac{'60'}{AE}$ or $\sin 55°=\frac{'60'}{AE}$ | | | M1 | |
| | $(AE=)\frac{'60'}{\cos 35°}$ (= 73.2) or $(AE=)\frac{'60'}{\sin 55°}$ (= 73.2) | | | M1 | dep 1st M1 |
| | 80 – '73.2' | | | M1 | |
| | | 6.75 | | A1 | accept 6.75 – 6.8 |
| | | | | | **Total 5 marks** |

**Appendix 1**