Comparison of key skills specifications 2000/2002 with 2004 standardsX015461July 2004Issue 1

Mark Scheme (Results)

Summer 2023

Pearson Edexcel International GCSE

In Mathematics A (4MA1) Paper 2HR

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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. E.g. 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.

* **Parts of question**

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

Brackets and speech marks:

0.32 × 200 (= 64) the brackets here mean that the calculation is required for the mark and not the answer – however the answer would also secure the mark. If a student gave
0.32 × 200 = 68 they would still gain the mark as the method is correct and does not require the calculation to be correct for the award of the mark.

64 alone would also gain the mark.

200 – “146”

This shows that the calculation requires 200 minus the calculation that gave 146; if the calculation was shown but inaccurately worked out then the method mark would still be gained.

Eg 146 should have come from 0.73 × 200

If the student had given 0.73 × 200 = 156 and then given 200 – 156 this would have gained the method mark…. the 156 came from a correct calculation even though the arithmetic was incorrect.

| **International GCSE Maths**  |
| --- |
| **Apart from questions 16, 21, 23, 24 and 25 (where the mark scheme states otherwise) 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) | 25 ± ……. **or**……. – 12**or**(−5)2 – 4 × 3 or (−5)2 – 4(3) or −5 × −5 − 4 × 3 or −5 × −5 – 4(3) |  | 2 | M1 for either 25 or –12 in the correct place **or** the correct substitution shown with brackets around –5 |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 13 |  | A1(M0A0 for −37 without any working) |
|  | (b) |  |  | 2 | M1 for any 3 correct terms **or** for 4 out of 4 correct terms ignoring signs  **or**for … **or**for … |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* |  |  | A1 oeIgnore solutions/roots if correct expansion seen |
|  |  |  |  |  |  | **Total 4 marks** |

| **2** |  | 9, 18, 27, 36 **and** 12, 24, 36**or** 36**or** a multiple of 36 **or**(9 × 12 =) 108 **or**32 × 4 (= 36) (from Venn diagram or table) |  | 4 | M1 for at least two multiples of 9 and 12 **or** 36 **or** a multiple of 36 |
| --- | --- | --- | --- | --- | --- |
|  |  | “4” × 7.6(0) or “3” × 4.8(0) **or**“30.4” or “14.4” **or**“4*n*” × 7.6(0) or “3*n*” × 4.8(0) |  |  | M1 for a correct method to find the cost of 4 or 8 or 12 etc of packets of pens **or**3 or 6 or 9 etc packets of pencils |
|  |  | “4” × 7.6(0) + “3” × 4.8(0) **or**“30.4” + “14.4” **or**“4*n*” × 7.6(0) + “3*n*” × 4.8(0) |  |  | M1 for a correct combination of number of packets of pens × 7.6(0) **+**number of packets of pencils × 4.8(0)with an intention to addeg

|  |  |
| --- | --- |
|  pens pencils |  |
|  4 × 7.60 + 3 × 4.8 = |  44.8(0) |
|  8 × 7.60 + 6 × 4.8 = |  89.6(0) |
| 12 × 7.60 + 9 × 4.8 = | 134.4(0) |
| 16 × 7.60 + 12 × 4.8 = | 179.2(0) |
| 36 × 7.60 + 27 × 4.8 = | 403.2(0) |
| 48 × 7.60 + 36 × 4.8 = | 537.6(0) |

 |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 44.8(0) |  | A1 allow 45 if 44.8(0) seenallow 4480 p or pence if £ sign crossed outM3A0 for 44.8*n* where *n* is an integer (eg 134.4(0)) |
|  |  |  |  |  |  | **Total 4 marks** |

| **3** |  | 3.3 or or or  oe or 180 + 18 or 198 oe |  | 3 | B1 for working out the time in hours or minutes |
| --- | --- | --- | --- | --- | --- |
|  |  | 515 ÷ 3.3 or 515 ÷or 515 ÷or oe |  |  | M1 Units must be consistent |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 156 |  | A1 allow 156 – 156.1SCM1 for 515 ÷ 3.18 (= 161.9… or 162)  |
|  |  |  |  |  |  | **Total 3 marks** |

| **4** |  |   |  | 2 | M1 for −7*n* + *k* (*k* ≠ 45) or −7 × *n* + *k* (*k* ≠ 45) or*n* × −7 + *k* (*k* ≠ 45)(*k* may be zero or absent or negative) |
| --- | --- | --- | --- | --- | --- |
|  |  |  | 45 – 7*n* |  | A1 oe eg 45 – 7 × *n* oe or −7 × *n* + 45 oe or *Un* = 45 – 7*n*  oe or 38 – 7(*n* – 1) oe NB: award full marks for eg *x* = 45 – 7*n* oe or *n*th term = −7 × *n* + 45 oe or but only M1 for *n* = 45 – 7*n* oe |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* |  |  |  | **Total 2 marks** |

| **5** |  | (= 60 000) oe or (= 60 000) oe or(2 × 9600) + 40 800 (= 60 000) oe |  | 4 | M1 for working out the area of the trapezium |
| --- | --- | --- | --- | --- | --- |
|  |  | [60 000] ÷ 10 000 (= 6) or10 000 × 6 (= 60 000) |  |  | M1 ft their area (must come from a two dimensional area)Allow  |
|  |  | 49 650 ÷ [6] |  |  | M1 dep on either previous M1 ft their number of hectaresAllow  |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 8275 |  | A1 |
|  |  |  |  |  |  | **Total 4 marks** |

| **6** | (a) | 7 × 5 × 14 (= 490) oe **or** 7 × 14 (= 98) **and** 400 ÷ 5 (= 80) |  | 4 | M1 for working out the pay per week or pay per day |
| --- | --- | --- | --- | --- | --- |
|  |  | “490” – 400 (= 90) **or** “98” – “80” (= 18) **or** “98” ÷ “80” oe **or “**490” ÷ 400 oe **or** 1.225 oe |  |  | M1 |
|  |  |  oe **or** oe **or**  oe **or** oe **or**“1.225” – 1 (= 0.225) |  |  | M1 dep on M2 |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 22.5 |  | A1 oe allow 23% with M3 awarded |
|  | (b) | E.g. 1 − 0.06 (= 0.94) or 100(%) − 6(%) (= 94(%)) or(= 245) oe |  | 3 | M1  |
|  |  | E.g. 23 030 ÷ “0.94” or23 030 ÷ “94” × 100 or23 030 × 100 ÷ “94” or“245” × 100 |  |  | M1 |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 24 500 |  | A1 |
|  |  |  |  |  |  | **Total 7 marks** |

| **7** | (a) |  | 1 | 1 | B1 cao |
| --- | --- | --- | --- | --- | --- |
|  | (b) |  | −6 | 1 | B1 Allow 3−6 |
|  |  |  |  |  |  | **Total 2 marks** |

| **8** | (a) | or oror or oe or oe |  | 2 | M1 for a correct first step Condone = rather than > or any other sign for this mark. |
| --- | --- | --- | --- | --- | --- |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* |  |  | A1 oe eg (sight of correct answer in working space and just (*x* =) ⎼2 on answer line gains M1 only) |
|  | (b) |  |  | 3 | B3 for all 3 correct Allow ,and B2 for 2 correctB1 for 1 correctAllow < and > signsSCB2: , and (for all 3)Allow < and > signs |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* |  |  |  | **Total 5 marks** |

| **9** |  | or oroe or oe |  | 6 | M1 |
| --- | --- | --- | --- | --- | --- |
|  |  | orororoe |  |  | M1 for finding *BC* or *AD*Can be written on the diagram |
|  |  |  (= 42.4(024)…) oror or |  |  | M1 for finding *CD* or *BA*Can be written on the diagram |
|  |  | (*r* =)“42.4(024…)” ÷ 2*π* (= 6.74(855…)) |  |  | M1 for finding the radius of the cylinder |
|  |  | (*V* =) *π* × “6.74(855…)”2 × “26.4(959…)” |  |  | M1 dep on previous M mark for the use of  |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 3790 |  | A1 allow answers in the range 3737 – 3794Accept answers in standard form |
|  |  |  |  |  |  | **Total 6 marks** |

| **10** |  | 104 × 5 (= 520) or 127 × 7 (= 889) oroe |  | 3 | M1  |
| --- | --- | --- | --- | --- | --- |
|  |  | “889” – “520” – 132 or “369” – 132 oroe or oe |  |  | M1 (*x* = Sunday) |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 237 |  | A1 |
|  |  |  |  |  |  | **Total 3 marks** |

| **11** |  |  |  | 2 | B2 oe for all 3 correct egor Accept *a* =9, *b* = 15 and *c* = 125B1 for a quotient in the form of or a product in the formwhere 2 from *p* or *q* or *r* are correct eg or Allow or or or or so long as not added to any other termsAccept two from *a* = 9 or *b* = 15 or *c* = 125Accept or where *y* is constant |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **Total 2 marks** |

| **12** | (a) |  | D | 1 | B1 allow d |
| --- | --- | --- | --- | --- | --- |
|  | (b) |  | C | 1 | B1 allow c |
|  | (c) |  | B | 1 | B1 allow b |
|  |  |  |  |  |  | **Total 3 marks** |

| **13** |  |  oe **or** oe **or** oe **or** oe **or**(= 1.076…) oe **or**(= 1.076…) oe |  | 5 | M1 |
| --- | --- | --- | --- | --- | --- |
|  |  | (= 1.025) oe **or**(= 1.025) **or**  |  |  | M1 |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 2.5 |  | A1 Accept answers in the range 2.4 – 2.6from correct workingNB Do not allow an answer in the range 2.4 – 2.6 if it comes from awrt 7.6% oe or 7.7% oe divided by 3Do not accept an answer if it is in the range that comes from a simple interest method |
|  |  |  |  |  |  | **Total 3 marks** |

| **14** | (a) | 20 20 22 23 25 26 26 27 28 29 29 |  | 3 | M1 for ordering the numbersAllow one omission or error in the list |
| --- | --- | --- | --- | --- | --- |
|  |  | 22 and 28 identified for LQ and UQeg 20 20 22 23 25 26 26 27 28 29 29 |  |  | M1 for identifying 22 **and** 28 (22 **and** 28 implies the first M1) |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 6 |  | A1  |
|  | (b) |  | Akari and reason using IQR | 1 | B1 ft from part (a) Akari as the IQR is lower/smaller oe (IQR must be part of the statement)Must have a value in (a) to compare the IQRs |
|  |  |  |  |  |  | **Total 4 marks** |

| **15** |  |  |  | 3 | M1 for finding the probability of a head |
| --- | --- | --- | --- | --- | --- |
|  |  | or or 0.253 |  |  | M1 for a complete method |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* |  |  | A1 oe Accept 0.015(625) or 1.55(625)% truncated or rounded  |
|  |  |  |  |  |  | **Total 3 marks** |

| **16** |  | or  |  | 3 | M1 for explicitly multiplying the numerator and the denominator by or  |
| --- | --- | --- | --- | --- | --- |
|  |  | or or oeor or oe |  |  | M1 dep on M1 (numerator expanded for 2 terms which need to be all correct and denominator may be 4 terms which need to be all correct) |
|  |  | *Working required* |  |  | A1 allow  (dep on M2)  |
|  |  |  |  |  |  | **Total 3 marks** |

| **17** |  |  |  | 4 | M1 for removing cube root |
| --- | --- | --- | --- | --- | --- |
|  |  | oe**or** |  |  | M1 for multiplying by denominator and expanding in a **correct** equation**or**for gathering *x* terms on one side and the other terms on the other side in a **correct** equation in fractional form |
|  |  |  |  |  | M1 for gathering terms in *x* on one side and other terms the other side in a **correct** equation **or**for removing all fractions |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* |  |  | A1 or SCB2 for or can also be  |
|  |  |  |  |  |  | **Total 4 marks** |

| **18** |  | *DP* × 12 = 30 × 14 or *DP* × 12 = 420 or(*DC* + 12) × 12 = 30 × 14 or (*DC* + 12) × 12 = 420 or 12*DC* + 144 = 420 or*DC* + 12 = 35 or(*DP*) = (= 35) |  | 3 | M1 |
| --- | --- | --- | --- | --- | --- |
|  |  | “35” – 12 or 23 + 12 = 35 oror |  |  | M1 |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 23 |  | A1 |
|  |  |  |  |  |  | **Total 3 marks** |

| **19** |  | (19 + 15 + 4) – 30 or 38 – 30 or 19 + 15 – 26or*x*19 − *x*15 − *x*4or 19 – *x* + *x* + 15 – *x* + 4 = 30 oe |  | 4 | M1 for a **correct** method to find the number of people booking breakfast and dinner | M1A1 for a fully correct Venn diagram8 11 74or for  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | 8  |  |  | A1 can be shown in a Venn diagram or a valid calculation |
|  |  | or oe |  |  | M1 for the use of  where *k* < 30 or where *n* > 8 |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* |  |  | A1 oe awrt 0.064 or awrt to 6.4% |
|  |  |  |  |  |  | **Total 4 marks** |

| **20** |  | 180 – 78 – 78 oeor (90 – 78) × 2 oe |  | 2 | M1 for a complete **correct** method to find angle *ABC*. This is not awarded if the angles are incorrectly labelled unless they have clearly started again (Ignore incorrect angles on the diagram if a student shows a correct method leading to the required answer) |
| --- | --- | --- | --- | --- | --- |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 24 |  | A1 award full marks if 24 is seen in the correct place on the diagram unless contradicted on the answer line |
|  |  |  |  |  |  | **Total 2 marks** |

| **21** |  | Eg | eg |  | 5 | M1 for substitution of  (or ) into  to obtain an equation in *x* only (or *y* only) |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | E.g. | E.g. |  |  | M1ft dep on previous M1 for multiplying out and collecting terms, forming a three term quadratic in any form of  *ax*2 + *bx* + *c* (= 0) where at least 2 coefficients (*a* or *b* or *c*) are correct |
|  |  | E.g.oror  | E.g.oror |  |  | M1ft dep on first M1 method to solve **their** 3 term quadratic using any correct method (allow one sign error and some simplification – allow as far as eg  **or**  or if factorising allow brackets which expanded give 2 out of 3 terms correct)**or** correct values for *x* **or** correct values for *y*Accept (*x* =) 0.6(66..) rounded or truncated or (*y* =) 2.3(33…)  |
|  |  | **and** |  or **and** or  |  |  | M1ft dep on previous M1 for substituting **their** 2 found values of *x* or *y* into one of the two given equations**or** fully correct values for the other variable (correct labels for *x* / *y*) |
|  |  |  |   |  | A1 oe dep on M2 allow *x* = −1.5, *y* = −2 *x* = 0.66(6…), *y* = 2.33(3…) truncated or rounded |
|  |  | *Working required* |  |  |  | **Total 5 marks** |

| **22** | (a) | or **and**  |  | 2 | M1 |
| --- | --- | --- | --- | --- | --- |
|  |  |  | 17.9 |  | A1 awrt 17.9 |
|  | (b) | (= = 24.2(487…)) or(= = 24.2(487…)) |  | 3 | M1 |
|  |  | oror or**and** or  |  |  | M1 |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 49.1 |  | A1 awrt 49.1 |
|  |  |  |  |  |  | **Total 5 marks** |

| **23** |  | oe or oe or(*p* =) 4 |  | 5 | M1 for using or Condone missing brackets around 7*p* – 3  |
| --- | --- | --- | --- | --- | --- |
|  |  | *a* = 32 **or** *d* = ⎼7 **or** 32 25 18 |  |  | A1 dep on M1 (32 and ⎼7 may be embedded in the *Sn* formula or embedded in *U*n formula) |
|  |  |  |  |  | M1 The values of *a* and *d* must be correctCondone missing brackets around *n* – 1  |
|  |  | oe |  |  | A1 (can be implied by *n* = 29 and/or *n* = ) |
|  |  | *Working required* | 29 |  | A1 dep on M2 |
|  |  |  |  |  |  | **Total 5 marks** |

| **23****ALT** |  | 7*p* – 3 = 8*p* + *d*4*p* + 2 = 8*p* + 2*d*4*p* + 2 = 7*p* – 3 + *d* | ⎼3= *p* + *d* 2 = 4*p* + 2*d* 5 = 3*p* + *d* |  | 5 | M1 for using to set up 2 equations for *U*2 **and** *U*3 |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | *a* = 32 **or** *d* = ⎼7 **or** 32 25 18 |  |  | A1 dep on M1 (32 and ⎼7 may be embedded in the *Sn* formula or embedded in *U*n formula) |
|  |  |  |  |  | M1 The values of *a* and *d* must be correctCondone missing brackets around *n* – 1 |
|  |  | oe  |  |  | A1 (can be implied by *n* = 29 and/or *n* = ) |
|  |  | *Working required* | 29 |  | A1 dep on M2 |
|  |  |  |  |  |  | **Total 5 marks** |

| **4** |  | egoe or  |  | 5 | M1 | M2 for (vol SF =) 27 or or 33 or  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | *R* = 3*r* oe or1:3 or 3:1 or 3 or  |  |  | M1 ( a correct scale factor of 3 or *R* = 3*r* oe implies the first M1) |
|  |  | eg oe ororoe oroe oroe |  |  | M1 for a **correct** equation based on volumes with only one variable eg *R* or *r* or *x* (M3 foroe or oroe or |
|  |  | or |  |  | M1 dep on previous M mark |
|  |  | *Working required* |  |  | A1 oe dep on M2 |
|  |  |  |  |  |  | **Total 5 marks** |
| **25** |  | (gradient of *AB* =)  or  |  | 6 | M1 for the use of  or for  embedded in a linear equation eg  |
|  |  | (gradient of *AB* =) oe**or** (midpoint of *AB* =)oe |  |  | M1 for a correct expression for the gradient which may be seen in an equation **or** for a correct expression for the midpoint which may be seen in an equation.  |
|  |  | oe or oe **or**oe or oe |  |  | M1 for setting up a **correct** equation for *AB* in terms of gradient **or**for setting up a **correct** equation for the line given and the midpoint |
|  |  | oe or oe **and**oe or oe |  |  | A1 for 2 **correct** equations |
|  |  | *k* = ⎼1 **and** *j* = ⎼10 |  |  | A1 for a correct value of *k* **and** a correct value of *j* |
|  |  | *Working required* | (−2, 3) |  | A1 dep on previous M1 |
|  |  |  |  |  |  | **Total 6 marks** |

| **26** | (a) |  | 2 | 1 | B1 cao |
| --- | --- | --- | --- | --- | --- |
|  | (b) |  | 3 | 1 | B1 cao |
|  | (c) |  | 1 | 1 | B1 cao |
|  |  |  |  |  |  | **Total 3 marks** |

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