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

Mark Scheme (Results)

January 2023

Pearson Edexcel International GCSE

In Mathematics A (4MA1) Paper 1H

**Edexcel and BTEC Qualifications**

Edexcel and BTEC qualifications are awarded by Pearson, the UK’s largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at [www.edexcel.com](http://www.edexcel.com) or [www.btec.co.uk](http://www.btec.co.uk). Alternatively, you can get in touch with us using the details on our contact us page at [www.edexcel.com/contactus](http://www.edexcel.com/contactus).

**Pearson: helping people progress, everywhere**

Pearson aspires to be the world’s leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We’ve been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: [www.pearson.com/uk](http://www.pearson.com/uk)

January 2023

Question Paper Log Number P72437RA

Publications Code 4MA1\_1H\_MS\_2023

All the material in this publication is copyright
© Pearson Education Ltd 2023

**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 ofthe question CANNOT be awarded to another.

| **International GCSE Maths**  |
| --- |
| Apart from Questions 2, 3, 13, 19, 22, 23 and 24 (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 |  | 6 × 11 + 18 × 25 + 30 × 23 + 42 × 15 + 54 × 6 (= 2160) **or**66 + 450 + 690 + 630 + 324 (= 2160)[lower bound products are: 0, 300, 552, 540, 288][upper bound products are: 132, 600, 828, 720, 360] |  | 4 | M2 for at least **4** correct products added (need not be evaluated) **or**If not M2 then award:M1 for consistent use of value within interval (including end points) for at least **4** products which must be addedorcorrect midpoints used for at least **4** products and not added |
|  |  | “2160” ÷ “80” |  |  | M1 dep on at least M1Allow division by their Σ*f* provided addition or total under column seen |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 27 |  | A1  |
|  |  |  |  |  |  | **Total 4 marks** |

| 2 |  |  or |  | 3 | M1 for expansion of bracket on the LHS or dividing the RHS by 3 with two terms |
| --- | --- | --- | --- | --- | --- |
|  |  | or 1 = 4*x* oroe or ⎼4*x* = ⎼1 or oe or oe |  |  | M1 ft (dep on 4 terms) for terms in *x* on one side of equation; number terms on the other  |
|  |  | *Working required* |  |  | A1 oe dep on M1 awarded |
|  |  |  |  |  |  | **Total 3 marks** |

| 3 |  | **Two pairs** of intersecting arcs with equal radii centre *A* and *B*  |   | 2 | M1 for arcs that intersect within or on the guidelines **or** correct perpendicular bisector without arcs. |
| --- | --- | --- | --- | --- | --- |
|  |  | *Working required* | Bisector with construction arcs |  | A1 for a fully correct bisector with two intersecting arcs |
|  |  |  |  |  |  | **Total 2 marks** |

| 4 |  | 3 × 180 (= 540) or 360 – [(180 – 90) + (180 – 135) + (180 – 67) + (180 – 119)] (= 51) or360 – (90 + 45 + 113 + 61) (= 51) |  | 3 | M1 |
| --- | --- | --- | --- | --- | --- |
|  |  | 90 + 135 + 67 + 119 + *x* = “540” oe411 + *x* = “540” oe or“540” – (90 + 135 + 67 + 119) or3 × 180 – (90 + 135 + 67 + 119) oe or540 – 411 or 180 – “51” oe |  |  | M1 |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 129 |  | A1 |
|  |  |  |  |  |  | **Total 3 marks** |

| 5 |  | 2 : 3 : 15 oe or 20 or (1 : 5) × 3 or(1 : 5 =) 3 : 15 or 2*n* : 3*n* : 15*n* e.g. 4 : 6 : 30 orG(reen) = 2, O(range) = 3 , Y(ellow) = 15 |  | 3 | M1 |
| --- | --- | --- | --- | --- | --- |
|  |  | oe or 14 × 2 oroe oroe |  |  | M1  |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 28 |  | A1 or 28 : 42 : 210 or 28 , 42 , 210If not in this order must be labelled correctly |
|  |  |  |  |  |  | **Total 3 marks** |

| 6 | (a) | 18 000 + 14 × 1160 (= 34 240) oe or18 000 + 16 240 (= 34 240) |  | 4 | M1 |
| --- | --- | --- | --- | --- | --- |
|  |  | “34 240” – 32 000 (= 2240) or (= 1.07)  |  |  | M1 |
|  |  | or (= 107) or “1.07” – 1 (= 0.07) |  |  | M1 |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 7 |  | A1 |
|  | (b) | e.g. 1 − 0.15 (= 0.85) or 100(%) − 15(%) (= 85(%))  |  | 3 | M1 |
|  |  | e.g. 39 865 ÷ 0.85 or39 865 ÷ 85 × 100 oe  |  |  | M1 |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 46 900 |  | A1 |
|  |  |  |  |  |  | **Total 7 marks** |

| 7 |  | 1 – (0.24 + 0.4) (= 0.36) oe or 3*x* + *x* = 1 – (0.24 + 0.4) oe  |  | 4 | M1 |
| --- | --- | --- | --- | --- | --- |
|  |  | 48 ÷ 0.24 (= 200) or“0.36” ÷ 4 (= 0.09) or“0.36” ÷ 4 × 3 (= 0.27)  |  |  | M1 |
|  |  | “0.27” × “200” or“200” × “0.36” ÷ 4 × 3 (“200” – 48 – “80”) ÷ 4 × 3 |   |  | M1 for a complete method |
|  |  |  | 54 |  | A1 |
|  |  |  |  |  |  | **Total 4 marks** |

| 7**ALT** |  | 1 – (0.24 + 0.4) (= 0.36) oe or 3*x* + *x* = 1 – (0.24 + 0.4) oe  |  | 4 | M1 |
| --- | --- | --- | --- | --- | --- |
|  |  | 48 ÷ 24 (= 2) oe or |  |  | M1 |
| oe or |
| oe |
|  |  | oe or |  |  | M1 for a complete method |
| oe or  |
| oe |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 54 |  | A1 |
|  |  |  |  |  |  | **Total 4 marks** |

| 8 |  | or or  |  | 5 | M1 | M2 for oe(= 28.0030…) or 28 |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | oe or 28 oroe or 28  |  |  | M1 |
|  |  | oe or 44oe or 88 |  |  | M1 for use of *πd* or oeAllow any value of *AB* > 18 if M2 not scored |
|  |  | “28…” + “43.9…” (= 71.9900…) or“28” + “44” |  |  | M1ft from previous M1Allow *their* *d* + *their*  |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 72 |  | A1 awrt 72 |
|  |  |  |  |  |  | **Total 5 marks** |

| 9 | (a) |  | 0.000 625 | 1 | B1 |
| --- | --- | --- | --- | --- | --- |
|  | (b) | 25 000 000 oe e.g. 25 × 106 or 0.25 × 108**or** 2.5 × 10*n**n* ≠ 7 |  | 2 | M1 |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 2.5 × 107 |  | A1 |
|  |  |  |  |  |  | **Total 3 marks** |

| 10 | (a) | or or  |  | 2 | M1 or for (*y* ± *a*)(*y* ± *b*) where *ab* = −48 or *a* + *b* = −2 |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | A1 oe Allow any letter for *y* |
|  | (b) |  |  | 1 | B1 allow Allow any letter for *x* |
|  | (c) |  oe or oe |  | 3 | M1 Condone = rather than > or any other sign for this mark. |
|  |  | or or or or oe |  |  | M1 Condone = rather than > or any other sign for this mark. |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* |  |  | A1 oe accept Must have correct sign on answer line dep on M1 (sight of correct answer in working space and just (*w* =) oe on answer line gains M2 only) |
|  |  |  |  |  |  | **Total 6 marks** |

| 11 |  |  |  | 3 | B3 oe for all three correct(B2 oe for any two correct)(B1 oe for any one correct) equivalent to oe equivalent to oe equivalent to oeAllow the following inequalities  oe oe oe |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Total 3 marks** |

| 12 | (a) |  |  | 1 | B1 oe |
| --- | --- | --- | --- | --- | --- |
|  | (b) |  | −6 | 1 | B1 |
|  |  |  |  |  |  | **Total 2 marks** |

| 13 |  |  **or** |  | 3 | M1 for multiplying 3*x* by (2*x* – 5) with **both** terms correct or |
| --- | --- | --- | --- | --- | --- |
| **or** | for multiplying (2*x* – 5) by (2*x* – 5) with 3 out of 4 terms correct or |
|  | for multiplying (2*x* – 5) by (2*x* – 5) and getting… **or**  …(not for ) |
|  |  | oe **or** |  |  | M1ft (dep) for multiplying the product of 3*x* and (2*x* – 5) by (2*x* – 5) with 3 out of 4 terms correct or |
| oe **or** | for multiplying the product of 3*x* and (2*x* – 5) by (2*x* – 5) and getting… **or** … |
|  oe **or** | for multiplying the product of (2*x* – 5) and (2*x* – 5) by 3*x* with 3 out of 4 terms correct or |
|  | for multiplying the product of (2*x* – 5) and (2*x* – 5) by 3*x* with 2 out of 3 terms correct or  |
|  | Expansion in one stage will lead to without firstly expanding two factors – awardM2 for 3 out of 4 terms correct M1 for 2 out of 4 terms correct  |
|  |  | *Working required* |  |  | A1 dep on M1 |
|  |  |  |  |  |  | **Total 3 marks** |

| 14 | (a) |  | 12 and 4.5 | 1 | B1 allow oeMay be awarded if plotted correctly on the graph |
| --- | --- | --- | --- | --- | --- |
|  | (b) |  | Correct graph | 2 | M1 ft for at least 5 points plotted correctly (± half square) |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* |  |  | A1 for correct curve between *x* = 0.5 and *x* = 5(clear intention to go through all the points and which must be curved)**Note**: If a fully correct graph is shown, but an incomplete table is shown in (a), then award the marks for (a)  |
|  |  |  |  |  |  | **Total 3 marks** |

| 15 | (a) |  | ,  | 2 | B1 for correct probabilities for the first cardAllow equivalent probabilities e.g  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | , , ,  |  | B1 for correct probabilities for the second cardAllow equivalent probabilities |
|  | (b) |  or 1 –  – –  |  | 2 | M1ft(All probabilities must be less than 1) |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* |  |  | A1ft oe probability must be less than 1Allow equivalent decimal to at least 2 sf (truncated or rounded) for  (= 0.027(77..)) |
|  | (c)  |  or oe or **and** oe or **and** oe |  | 3 | M1ft(All probabilities must be less than 1) |
|  |  |  or oe or 1 – –  oe or 1 – –  oe  |  |  | M1ft |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* |  |  | A1ft oe probability must be less than 1Allow equivalent decimal to at least 2 sf (truncated or rounded) for  (= 0.38(88..)) |
|  |  |  |  |  |  | **Total 7 marks** |

| 16 |  | oe |  | 5 | M1  |
| --- | --- | --- | --- | --- | --- |
|  |  | (= 44.…)  |  |  | M1 |
|  |  | 180 – “44.…” – 64 (= 71.9…) |  |  | M1 accept 72 |
|  |  | oror or |  |  | M1 for *DE*2 or *DE*  |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* | 20.7 |  | A1 awrt 20.7 |
|  |  |  |  |  |  | **Total 5 marks** |

| 17 |  | or or oe |  | 3 | M1 (NB. Not for )Constant of proportionality must be a symbol such as *k* (Allow *c* for *k* for this mark only) | M2 for oe |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | oe or  oe |  |  | M1 for substitution of *x* and *y* into a correct formula  |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* |  |  | A1 oe e.g Award 3 marks if answer is on the answer line and  clearly given in the body of working of the script |
|  |  |  |  |  | **Total 3 marks** |

| 18 | (a) |  |  | 1 | B1 allow  |
| --- | --- | --- | --- | --- | --- |
|  | (b)(i) |  | −46 | 1 | B1 cao |
|  | (ii) | or oe or oe |  | 2 | M1 |
|  |  | *Correct answer scores full marks (unless from obvious incorrect working)* |  |  | A1 allow oe |
|  |  |  |  |  |  | **Total 4 marks** |

| 19 |  | 45.225 or 45.235 or5.115 or 5.125 or8.45 or 8.55 |  | 5 | B2 for all 6 correct (B1 for 4 or 5 correct)Accept for 45.235for 5.125for 8.55 |
| --- | --- | --- | --- | --- | --- |
|  |  | (= 4.7479…) |  |  | M1 for correct substitution into the *UB* where 45.23 <  ≤ 45.235 5.115 ≤  < 5.128.45 ≤  < 8.5 |
|  |  | (= 4.6900…) |  |  | M1 for correct substitution into the *LB* where 45.225 ≤ < 45.23 5.12 <  ≤ 5.125 8.5 <  ≤ 8.55 |
|  |  | *Working required* | 4.7 and correct reason |  | A1 dep on M24.7 and both answers round to 4.7 oe e.g.1 dp or 2 sf |
|  |  |  |  |  |  | **Total 5 marks** |
| 20 |  | or oe |  | 5 | M1 for volume of cylinder (in terms of one variable, e.g. *x* or *r*) |
|  |  |  |  |  | M1ft for differentiating an expression in one variable to find 800 **or** (must come from a cubic in the form or or  where *a* ≠ 0 and *b* ≠ 0) |
|  |  |  |  |  | M1ft dep on previous M1 for equating their to zero (must be a quadratic in the form or  where *a* ≠ 0 and *b* ≠ 0) |
|  |  | or  or9.2(13177…)  |  |  | A1 for a correct value of *x*Allow use of quadratic formula |
|  |  | *Award marks within the range from correct working* | 4914 |  | A1 accept 4910 – 4914  |
|  |  |  |  |  |  | **Total 5 marks** |

| 21 |  | (= 14.4(76…)) oe  |  | 5 | M1 for finding the area of the sector |
| --- | --- | --- | --- | --- | --- |
|  |  | (= 10.9(56…) or 11) oe or oe |  |  | M1 for finding the area of the triangle(Allow use of cosine rule/sine rule/SOHCAHTOA/Pythagoras to find *AC* (5.6(427.8…)) and *OM* (3.8(8328…)) where *M* is the midpoint of *AC*) |
|  |  | “14.4(76…)” – “10.9(56…)” (= 3.520…) |  |  | M1 for finding the shaded area with all figures from correct working  |
|  |  | “3.5(20…)” × 14 × 3 × 60 “3.5(20…)” × 2520  |  |  | M1  |
|  |  | *Award marks within the range from correct working* | 8870 |  | A1 accept 8820 – 8950 from correct working  |
|  |  |  |  |  |  | **Total 5 marks** |

| 22 |  |  |  | 4 | M1 for the use of *n*th term = *a* + (*n* – 1)*d* to find *n* |
| --- | --- | --- | --- | --- | --- |
|  |  |  or  |  |  | A1  |
|  |  |  or  oe |  |  | M1 for the use of *Sn* formula (must be in terms of *t*) Allow their expression for *n* dep on M1 |
|  |  | *Working required* | *p* = 2*q* = 4 *r* = 2 |  | A1 dep on M2 allow Values of *p*, *q* and *r* must come from correct working |
|  |  |  |  |  |  | **Total 4 marks** |

| 23 |  | or **or**(gradient =)  or 0.6 oe |  | 6 | M1 for correct gradient which may be seen in an equation. Condone or 0.6*x* |
| --- | --- | --- | --- | --- | --- |
|  |  | *k* = −2 |  |  | B1 for *k* = −2 |
|  |  | oe or (3, 4) |  |  | M1 for finding the midpoint (use of their *k* where *k* < 0) |
|  |  | **or** (*m* =)  |  |  | M1ft their gradient for use of *m*1 × *m*2 = −1Allow −= −1.67 or better |
|  |  |  or *c* = 9 or |  |  | M1 dep on M3 |
|  |  | *Working required* | 5*x* + 3*y* = 27 |  | A1 allow equation in any form where *p*, *q* and *r* are integers |
|  |  |  |  |  |  | **Total 6 marks** |

| 24 | e.g.oe or oe or oe oroe |  | 5 | M1 |
| --- | --- | --- | --- | --- |
|  | e.g.oe or oe **or** or |  |  | M2 for 2 correct paths seenM1 for 1 correct path seenAny correct path for *OC* passing through *A* or *B* involving a variable |
|  | e.g.oe or  oe or oe or or or or or or or  |  |  | M1 for comparing coefficients of **a** and **b** for (*OC* and *CE*) **or** **(***OC* and *OE*) **or** (*CE* and *OE*)*OC* is a multiple of *OE*Two different paths for *OC* |
|  |  | 1 : 5 |  | A1 dep M2 oe e.g 2 : 10 |
|  | *Working required* |  |  |  | **Total 5 marks** |

| 24**ALT** | e.g.oe or oe or oe oroe |  | 5 | M1 |
| --- | --- | --- | --- | --- |
|  | e.g.oe  |  |  | M1 |
|  | e.g.oe |  |  | M1 |
|  | oe oroe and oe or or or  |  |  | M1 |
|  |  | 1 : 5 |  | A1 dep on M2 oe e.g 2 : 10 |
|  | *Working required* |  |  |  | **Total 5 marks** |

Pearson Education Limited. Registered company number 872828
with its registered office at 80 Strand, London, WC2R 0RL, United Kingdom