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

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Mark Scheme (Results)

January 2019

Pearson Edexcel International GCSE

In Mathematics A (4MA1) Higher Tier

Paper 2H

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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, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

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 in another

| Question | | | **Working** | **Answer** | **Mark** | **Notes** | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | | 73 ÷ 200 (=0.365) **or** 73 × 100 (= 7300) or 1 cm = 2 m oe |  |  | M1 | |  | | M2 for  100 ÷  oe |
|  |  | | “0.365” × 100 **or** “7300” ÷ 200 73 ÷ 2 |  |  | M1 | | Allow their incorrectly converted 73 m ÷ 200 | |
|  |  | |  | 36.5 | 3 | A1 | |  | | |
| **2** | |  |  | 4*n* + 3 | 2 | B2oe | | e.g. 7 + 4(n – 1) or 4n + (7 – 4) etc  allow *Tn* = 4*n* + 3 or  *x* = 4*n* + 3 etc  If not B2 then award B1 for answer of  4*n* + *k* (*k* ≠ 3) or  *n* = 4*n* + 3 | | |
| 3 | |  | 90 ÷ (2 + 13 ) (= 6) **or** |  |  | M1 |  | | M2 for | |
|  | |  | “6” × 2 (=12) **or**”6” × 13 (=78) **or**  3(12 + *x*) = 90 + *x* |  |  | M1 |  | |
|  | |  | (“78” ÷ 2 ) – “12” **or** 2*x* = 54 **or “**78” × 3/2 –“78” – “12”oe |  |  | M1 | dep on a correct method for “78” and “12” | | | |
|  | |  |  | 27 | 4 | A1 |  | | | |

| **Question** |  | **Working** | **Answer** | **Mark** | **Notes** | |
| --- | --- | --- | --- | --- | --- | --- |
| **4** |  | *A*  *B*  5 7  9 11  1  3  2 4  6 12    8 10 |  |  | B4 fully correct Venn diagram with labels *A* and *B*  (If not B4 then B3 for 3 correct regions,  B2 for 2 correct regions  B1 for 1 correct region) | |
|  |  |  |  |
|  |  |  |  |
|  |  | Fully correct Venn diagram | 4 |
| 5 |  | 123 – 67 (=56) **or** 2*x* = 123 – 67 **or** 2*x* + *y* = 67 **or** 4*x* + *y* = 123 oe (*x* = length of tile, *y* = width of tile) |  |  | M1 |  |
|  |  | e.g. “56” ÷ 2 (=28) |  |  | M1 | for method to find length or width |
|  |  | 67 – 56 (=11) **or** 67 – 2×”28” (=11)**or** 123 – 4×”28” (=11) |  |  | M1 | for method to find other dimension |
|  |  | (67 – 2×”11”) × (123 – 2×”11”)**(**45 × 101)**or** 123 × 67 – 12 × “28” ×” 11”  (8241 – 3696) |  |  | M1 | dep on M2 |
|  |  |  | 4545 | 5 | A1 |  |

| Question | | **Working** | **Answer** | **Mark** | **Notes** | |
| --- | --- | --- | --- | --- | --- | --- |
| 6 | (a) | 2 × 2 × 2 × 2 × 2 × 3 **or** 2× 2 × 2 × 3 × 5 e.g.   |  |  |  | | --- | --- | --- | | 2 | **96** | **120** | | 2 | 48 | 60 | | 2 | 24 | 30 | | 3 | 12 | 15 | |  | 4 | 5 |  |  |  |  | | --- | --- | --- | | 6 | **96** | **120** | | 4 | 16 | 20 | |  | 4 | 5 | |  |  | M1 | for one number written as product of prime factors number may be at the end of factor trees or on ‘ladder’ diagrams  **or**  Use of table method (allow 1 error), 2 examples shown but could have 2, 3, 4, 6, 12, 24 along the side  **or**  at least 2 factors for each (excluding 1, 96, 120) |
|  |  |  | 24 | 2 | A1 | or 2³ × 3 oe |
|  | (b) |  |  |  | M1 | for 2*m* × 3*n* × 5*p* × 7*q* × 11*r* with at least two of  *m* = 4, *n* = 1, *p* = 2, *q* = 2, *r* = 1 (or omission of one with others fully correct) NB: e.g.24 could be 2 ×23  **or**  prime numbers may be seen in a Venn diagram – if so must be correctly placed |
|  |  |  | 646 800 | 2 | A1 | or 24 × 3 × 52 × 72 × 11 oe |

| Question |  | **Working** | **Answer** | **Mark** | **Notes** | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 7 | (a) | 8500 × 0.023 (=195.5) **or**8500 × 1.023 (=8695.5) |  |  | M1 |  | M2 for 8500 × 1.0233  (M1 for 8500 × 1.023*n*) |
|  |  | ((8500 + “195.5”) × 1.023) × 1.023 |  |  | M1 | complete method |
|  |  |  | 9100 | 3 | A1 | for 9100 – 9100.1 (answer for 600(.1) gains M2A0) | |
|  | (b) | 687 700 ÷ 0.92 (=747 500) **or**687 700 ÷ 1.15 (=598 000) **or**1.15 × 0.92 (=1.058) |  |  | M1 | a correct first step | |
|  |  | 687 7000 ÷ (0.92 × 1.15) |  |  | M1 | Dep on M1 for completely correct method | |
|  |  |  | 650 000 | 3 | A1 |  | |

| Question |  | **Working** | **Answer** | **Mark** | **Notes** | |
| --- | --- | --- | --- | --- | --- | --- |
| 8 | (a) |  |  |  | M1 |  |
|  |  |  |  |  | M1 |  |
|  |  |  | 5.38 | 3 | A1 | for answer in range 5.38 – 5.385  SCB1 for a “correct” equation involving *V* with digits 65 and 35 where units have been converted eg |
|  | (b) | 630 × 1000 (=630 000) 60 × 60 (=3600)  eg  630 ÷ 60 (=10.5)  630 000 ÷ 60 (=10 500)  1000 ÷ 60 (=16.66...)  1000 ÷ (60 × 60) (=0.277...)  1 ÷ (60 × 60) (= 0.000277...) |  |  | M1 | for converting 630 km to m  **or**  1 hour to seconds  **or**  for correct operation(s) using at least 2 of the numbers 630, 1000, 60, 60 |
|  |  | oe |  |  | M1 | Fully correct method  (M2 for 630 ÷ 3.6) |
|  |  |  | 175 | 3 | A1 |  |

| Question | |  | **Working** | **Answer** | | **Mark** | | **Notes** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9 | |  | e.g. 4*x* + 5*y* = 4  4*x* – 2*y* = 18  with the operation of subtraction  4*x* + 5*y* = 4  10*x* – 5*y* = 45  With the operation of adding  *y* = 2*x* – 9 and 4*x* + 5(2*x* – 9) = 4 |  | |  | | M1 | | for correct method to eliminate one variable – multiplying one or both equations so the coefficient of *x* or *y* is the same in both with the intention to add or subtract to eliminate one variable(condone one arithmetic error) or isolating *x* or *y* in one equation and substituting into the other equation |
|  | |  |  |  | |  | | M1 | | (dep) for substitution of found variable into one equation or correct method to eliminate second variable |
|  | |  |  | *x* = 3.5 oe, *y* = −2 | | 3 | | A1 | | Dep on M1 |
| 10 |  | | 3 ÷ 2 (=1.5) or eg  or *c* = 1 |  |  | | M1 | | for correct method to find gradient – may see this on grid. For *c* = 1, could be (*L* =) *mx* + 1 oe  or for 1.5*x* + *c* | | |
|  |  | | *y* = “1.5”*x* + *c* **or** *y* = *mx* + 1  or eg *y* – 4 = *m*(*x* – 2) |  |  | | M1 | | for use of *y* = *mx* + *c* with either *m* or *c*  or for (*L* =) 1.5*x* + 1 | | |
|  |  | |  | *y* = 1.5*x* + 1 oe | 3 | | A1 | | oe eg | | |

| Question | | **Working** | **Answer** | **Mark** | **Notes** | |
| --- | --- | --- | --- | --- | --- | --- |
| 11 |  | **Basic comparisons from information:** eg The median is greater for Science/less for Maths  The IQR (or range) is higher for Science/less for Maths  The median is 2.5 marks higher for Science  The IQR (or range) is 7 marks more for Science **Comparisons in context:** eg On the whole students have higher marks in Science  The spread of results is greater for Science  Results are more consistent for Maths | Two comparisons one for IQR and one for median | 2 | B2 | For 2 comparisons in context  **or**  1 basic comparison and 1 comparison in context  (B1 for 1 or 2 basic statements or for 1 statement in context)  NB; any numbers used must be correct for the award of the mark |

| Question | | **Working** | **Answer** | **Mark** | **Notes** | |
| --- | --- | --- | --- | --- | --- | --- |
| 12 | (a) |  | 1 | 1 | B1 |  |
|  | (b) |  | 27*x*6*y*15 | 2 | B2 | If not B2 then  B1 for any two correct terms in a product |
|  | (c) | 2(*e2* – 9) **or** (2*e* – 6)(*e* + 3) **or** (*e* – 3)(2*e* + 6) |  |  | M1 |  |
|  |  |  | 2(*e* – 3)(*e* + 3) | 2 | A1 |  |
|  | (d) |  |  |  | M1 |  |
|  |  | *m*2 × 5*r* = 6*a* + *r* |  |  | M1 |  |
|  |  | 5*rm*2 – *r* = 6*a* |  |  | M1 |  |
|  |  |  |  | 4 | A1 | or for  oe  NB: to award A1 we must see  in working if alone is given as answer |

| Question | | **Working** | **Answer** | **Mark** | **Notes** | |
| --- | --- | --- | --- | --- | --- | --- |
| 13 |  | 4 × 5 + 13 × 6 + 16 × 7 + 8*x* + 6 × 9(20 + 78 + 112 + 8*x* + 54) **or** 264 + 8*x* |  |  | M1 | at least 3 products correct with intention to add |
|  |  | (4 + 13 + 16 + 6 + *x*) × 7 (=7(39 + *x*) = 273+ 7*x*) **or**(4 + 13 + 16 + 6 ) × 7(=273) oe **or** |  |  | M1 | for use of mean |
|  |  | =7 oe eg“264 + 8*x*” = “(39 + *x*)” × 7 **or** “273” – “264” |  |  | M1 |  |
|  |  |  | 9 | 4 | A1 |  |

| Question | | **Working** | **Answer** | **Mark** | **Notes** | |
| --- | --- | --- | --- | --- | --- | --- |
| 14 | (a) |  | 0.65 0.35, 0.65  0.35, 0.65 | 2 | B2oe | for all correct  If not B2 then award B1 for 0.65 in any of the 3 possible positions  NB all values may be given as fractions |
|  | (b) | 0.35 × 0.35 **or** 0.35 × 0.65 **or** 0.65 × 0.35 **or** 0.65 × 0.65 |  |  | M1 | ft from (a) |
|  |  | 0.35 × 0.35 + 0.35 × 0.65 + 0.65 × 0.35 **or** 1 – 0.65 × 0.65 |  |  | M1 | ft from (a) |
|  |  |  | 0.5775 | 3 | A1 | oe e.g. , 0.58 or 58% or better |

| Question | | **Working** | **Answer** | **Mark** | **Notes** | |
| --- | --- | --- | --- | --- | --- | --- |
| 15 | (a) | e.g. or 0.5(4*x* + 3)(2*x* – 3) oe |  |  | M1 | correct algebraic expression for area |
|  |  | eg.  or 8*x*² − 12*x* + 6*x* – 9 = 266 |  |  | M1 | for correct equation with brackets expanded |
|  |  |  | shown | 3 | A1 | for completion to given equation  dep on M2 |
|  | (b) | **or** **or**  **or** (4*x* − 25)(2*x* + 11) (=0) |  |  | M2 | If not M2  then award M1 for    Condone one sign error in substitution; allow evaluation of individual terms e.g. 36 in place of (−6)² [allow −62 or 62 in place of (−6)2, throughout allow + rather than ±]  **or**  (4*x* ± 25)(2*x* ± 11) (=0)  (if student gains M1 and shows both answers the 2nd M1 can be awarded)  ft from an incorrect 3 term quadratic equation |
|  |  |  | 6.25 oe | 3 | A1 | dep on M1 **and** 6.25 oe alone given as final answer |

| Question | | **Working** | | **Answer** | **Mark** | **Notes** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16 |  | e.g.  (=1.3...)or (=0.75) | |  |  | M1 | for a correct linear scale factor | |
|  |  | **or** oe | |  |  | M1 | for a complete method | |
|  |  |  | | 522 | 3 | A1 |  | |
| 18 |  | | 7.5 **or** 8.5 **or** 4.65 **or** 4.55 |  |  | M1 | |  |
|  |  | | 25 **or** 15 |  |  | M1 | |  |
|  |  | |  |  |  | M1 | | for  with 4.55 ≤ LB1 < 4.6 **and**  20 < UB ≤25 **and** 7.5 ≤ LB2 < 8 |
|  |  | |  | 0.26 oe | 4 | A1 | | for 0.26 from correct working |

| Question |  | **Working** | **Answer** | **Mark** | **Notes** | |
| --- | --- | --- | --- | --- | --- | --- |
| 19 |  | At least 2 of:  2.5 × 2 (=5) **or** 4 × 3 (=12) **or** 3.4 × 5 (=17) **or** 2.2 × 5 (=11) **or** (1 ×) 15 **or**  (1 ×) 10 (=10)  **or**  e.g. at least 2 of  100, 240, 340, 220, 300 or 200 |  |  | M1 | for working with area of at least 2 bars  could be using freq density × mins  **or**  use of counting squares or blocks |
|  |  | 2.5 × 2 + 4 × 3 + 3.4 × 5 + 2.2 × 5 + (1 ×) 15 **or** 5 + 12 + 17 + 11 + 15 (=60) **or** e.g.  100 + 240 + 340 + 220 + 300 (=1200) |  |  | M1 | for method to find total number of people (allow one error)  **or**  total number of squares/blocks for method used (allow one error) |
|  |  |  | oe | 3 | A1 | for  **or** % **or**  or 1 in 6 (percentage or decimal rounded or truncated to 3 or more sig figs) |

| **Question** |  | **Working** | **Answer** | **Mark** | **Notes** | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **20** |  | angle *CDB* = *x* or angle *CAB* = *x* |  |  | M1 |  | |
|  |  | angle *CBA* = 180 – 2*x* |  |  | M1 |  | |
|  |  | angle *CDA* = 180 – (180 – 2*x*) = 2*x* |  |  | M1 |  | |
|  |  |  |  |  | B1 | dep on M1 for any one appropriate circle theorem reason | |
|  |  |  | proof with reasons | 5 | A1 | for complete proof with full reasons  alternate segment theorem, angles in a triangle sum to 180o, isosceles triangle, opposite angles of a cyclic quadrilateral sum to 180o | |
|  |  | **Alternative method** |  |  |  | | |
|  |  | angle *CDB* = *x* or angle *CAB* = *x* |  |  | M1 | |  |
|  |  | angle *ACB* = *x* |  |  | M1 | |  |
|  |  | angle *ACQ =* 2*x* and angle *CDA =* 2*x* |  |  | M1 | |  |
|  |  |  |  |  | B1 | | dep on M1 for any one appropriate circle theorem reason |
|  |  |  | proof with reasons | 5 | A1 | | for complete proof with full reasons  alternate segment theorem, isosceles triangle |
|  |  | **Alternative method** |  |  |  | |  |
|  |  | angle *OCB* = 90 − *x* |  |  | M1 | |  |
|  |  | angle *BOC* = 180 – 2(90 – *x*) (=2*x*) |  |  | M1 | |  |
|  |  | angle *AOB =* 2*x* and angle *CDA =* 2*x* |  |  | M1 | |  |
|  |  |  |  |  | B1 | | dep for any one appropriate circle theorem reason |
|  |  |  | proof with reasons | 5 | A1 | | for complete proof with full reasons  angle between tangent and radius is 90o oe, angles in a triangle sum to 180o, isosceles triangle, angle at centre is twice angle at circumference oe |

| **Q20 contd** | | | **Alternative method where students assume *CDA* = 2*x* and must work to show that *BCQ* = *x*** | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  | eg angle ABC = 180 – 2*x* |  |  | M1 |  | |
|  | |  | Angle *CAB* = angle *ACB* =[180 – (180 – 2x)] ÷ 2 = *x* |  |  | M1 |  | |
|  | |  | *BCQ* = *CAB* = *x* |  |  | M1 |  | |
|  | |  |  |  |  | B1 | Dep on M1 for any one appropriate circle theorem reason | |
|  | |  |  |  |  | A1 | For complete proof with reasons  e.g. opposite angles of cyclic quadrilateral sum to 180°  angles in triangle sum to 180°  isosceles triangle  alternate segment theorem | |
| 21 |  | | **or** (gradient = )  oe |  |  | M1 | |  |
|  |  | | *m* ×  = −1 **or** (gradient of **M** =)  oe |  |  | M1 | |  |
|  |  | |  |  |  | M1  dep | | or complete method to find equation of line (3*y* = −2*x* + 28) and then substitution of *x* = −4 |
|  |  | |  | 12 | 4 | A1 | |  |

| Question |  | **Working** | **Answer** | **Mark** | **Notes** | |
| --- | --- | --- | --- | --- | --- | --- |
| 22 |  | **or**   **or**  **or** |  |  | M1 |  |
|  |  | **or**  **or** |  |  | M1 |  |
|  |  | oe **or** |  |  | M1 |  |
|  |  | e.g. oe eg |  |  | M1 |  |
|  |  | 2 ×  oe |  |  | M1 |  |
|  |  |  | 73.7 | 6 | A1 | awrt |

**4**

1

3

*A*

*B*



5

7

9

11

2

4

6

12

10

8

**6b**

B

C

A

7

5

3

7

23

11

2

5