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

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Mark Scheme (Results)

Summer 2019

Pearson Edexcel International GCSE

In Mathematics A (4MA1)

Paper 1H

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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 mark the one that leads to the answer on the answer line. If there is no answer given then mark the method that gives the lowest mark and award this mark.

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 1, 11, 12b, 15 (where the mark scheme states otherwise) the correct answer, unless clearly obtained from an incorrect method, should be taken to imply a correct method. | | | | | | |
| Question | | Working | Answer | Mark | Notes | |
| 1 |  | e.g. **and** |  | 3 | M1 | Both fractions expressed as improper fractions |
|  |  | e.g. × |  | M1 | **or** forboth fractions expressed as equivalent fractions with denominators that are a common multiple of 3 and 9 eg.  ÷  **or** |
|  |  | e.g.  **or** **or**  **or** | Shown | A1 | Dep on M2 for conclusion to  from correct working – either sight of the result of the multiplication e.g.  must be seen or correct cancelling prior to the multiplication to  NB: use of decimals scores no marks |
|  |  |  |  |  |  | **Total 3 marks** |

| 2 | (a) | 15 km/h or m/sec or 0.25 km/min or oe12 km/h or m/sec or 0.2 km/min or  oe | ‘before’ with reason | 1 | B1 | e.g. before as gradient is steeper **or** before as speed before is 15 km/h speed after is 12 km/h **or** before as she goes over 11(allow 11-12) km in ¾ hour but only goes 9 km in ¾ hour after oe  NB: any figures used for the reason must be accurate if they haven’t used ‘gradient is steeper’ oe |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) |  | line from (12:00, 24) to (12:45, 24) to (14:15, 0) | 2 | B2 | If not B2 then B1 for a line from (12:00, 24) to (12:45, 24) **or** for a line from (*t*, 24) to (*t* + 1.5, 0) **or** for a time of 1.5 hours (oe) seen |
|  | (c) | 1h 45m + 1h 30m **or** 1 + 0.75 + 1.5 **or** 3h 15m **or** 3.25h **or** 195m oe |  | 3 | M1 | ft from their graph for total time when cycling |
|  |  | (24 × 2) ÷ “3.25” oe eg (48 ÷ 195) × 60 |  | M1 | ft dep on M1 for full method |
|  |  | 14.8 | A1 | awrt 14.8 |
|  |  |  |  |  |  | **Total 6 marks** |

| 3 | (a) |  | *e*4 | 1 | B1 |  | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | (b) |  | *y*16 | 1 | B1 |  | |
|  | (c) | *x*² + 9*x* − 2*x* − 18 |  | 2 | M1 | for 3 correct terms **or**  4 correct terms ignoring signs **or**  *x*² + 7*x* + c **or** .... + 7*x* 18 | |
|  |  |  | *x*² + 7*x* 18 | A1 |  | |
|  | (d) |  | 4*cp*2(4*c*3 + 5*p*) | 2 | B2 | if not B2 then award B1 for  any correct factorisation with at least 2 factors outside the bracket eg 4*cp*(4*c*³*p* + 5*p*²) , *cp*²(16*c*³ + 20*p*), 2*p*(8*pc*4 + 10*cp*²) etc **or** the correct common factor **and** a 2 term expression with just one error | |
|  |  |  |  |  |  | | **Total 6 marks** |

| 4 | (a) |  | 9, 3, (−1), −3, (−3), −1, (3) | 2 | B2 | If not B2 then award  B1 for at least 2 correct values |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) |  |  | 2 | M1 | dep on B1 ft from (a) for at least 5 points plotted correctly |
|  |  |  | correct graph | A1 | for the correct graph (clear intention to go through all the points and which must be curved at the bottom) |
|  |  |  |  |  |  | **Total 4 marks** |

| 5 |  | 2*x* + 0.18 + 2*x* + 3*x* + 0.26 + *x* = 1 **or**  1 – (0.18 + 0.26) (= 0.56) |  | 4 | M1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | *x* = (1 – 0.18 – 0.26) ÷ (2 + 2 + 3 + 1) (=0.07) |  | M1 |  |
|  |  | eg (0.18 + 4 ×“0.07”) × 200 **or** 0.46 × 200  **or** 36 + 42 + 14 oe |  | M1 | dep on M2 and probabilities between 0 and 1  **or**  , oe with 92 seen |
|  |  |  | 92 | A1 |  |
|  |  |  |  |  |  | **Total 4 marks** |

| 6 |  | 12 × 8 × 5 (= 480) |  | 3 | M1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | “480” × 0.7 |  | M1 | Dep on M1 |
|  |  |  | 336 | A1 |  |
|  |  |  |  |  |  | **Total 3 marks** |

| 7 | (a) |  | 5 700 000 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) |  | 4 × 10-3 | 1 | B1 |  |
|  | (c) |  | 5 000 000 **or** 5 × 106 oe | 2 | B2 | If not B2 then award B1 for  320000 or 3.2 × 105 oeor  5 × 10*n* oe where *n* ≠ 6 |
|  |  |  |  |  |  | **Total 4 marks** |

| 8 |  | 0.08 × 170 000 (=13600) **or** 0.92 × 170 000 (=156400) |  | 3 | M1 | oe eg 170 000 ÷ 12.5 | M2 for 170 000 × 0.923 |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | e.g. 0.92 × (0.92 × “156400”) |  | M1 | (dep)for a complete method |
|  |  |  | 132377 | A1 | or 132376.96 | |
|  |  |  |  |  |  | (SCB2 for 170 000 × 0.924 )(=121786.(810))  (SCB1 for 170 000 × 0.24 (=40 800) **or**  170 000 ×0.76 (=129 200) **or**  170 000 × 1.08 (= 183 600) **or**  170 000 × 1.08³ (= 214151) **or** an answer of  129 200 **or** an answer of 214 151 – 214151.1(0)) | |
|  |  |  |  |  |  | **Total 3 marks** | |

| 9 |  | 0.5 × 6 × 6 (=18) |  | 5 | M1 | For area of triangle, or may use  or  oe |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | (*d* 2 =) 62 + 62 (=72) or |  | M1 |  |
|  |  | (= =8.4(85…)or 8.5) **or**  ==8.4(85...)or 8.5) oe |  | M1 |  |
|  |  | 0.5 × *π* ×  (= 9*π* or 28….) |  | M1 |  |
|  |  |  | 46.3 | A1 | for 46.2 – 46.3 |
|  |  |  |  |  |  | **Total 5 marks** |

| 10 |  | (8 =) 2 × 2 × 2 or 2³ or 23+*n* |  | 2 | M1 | For clearly writing 8 as a product of prime factors or as 2³ |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | A1 |  |
|  |  |  |  |  |  | **Total 2 marks** |

| 11 |  | 5.5 or 6.5 or 12.5 or 17.5 |  | 3 | M1 | Accept for 6.5 and  for 17.5 |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | 17.5 – 5.5 |  | M1 | for UB – LB where  15 < UB ≤ 17.5 and 5.5 ≤ LB < 6 |
|  |  |  | 12 | A1 | dep on M2 |
|  |  |  |  |  |  | **Total 3 marks** |

| 12 | (a) |  | (2*x* – 3)(*x* – 2) | 2 | B2 | or (3 – 2*x*)(2 – *x*)  (B1 for (2*x* + *a*)(*x* + *b*) where *ab* = 6 or 2*b* + *a* = −7 eg (2*x* + 3)(*x* + 2),  (2*x* – 5)(*x* – 1)), etc or for |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | 4*m* + 9 = 3(7 2*m*) |  | 4 | M1 | for removing fraction |
|  |  | 4*m* + 9 = 21 6*m* |  | M1 | for correct expansion of bracket in a correct equation |
|  |  | 4*m* + 6*m* = 21 – 9 **or** 10*m* = 12 **or**  −21 + 9 = −6*m* – 4*m* **or**  −10m = −12 |  | M1 | for a correct equation with *m* terms isolated on one side  ft their equation if first M1 awarded |
|  |  |  | oe | A1 | dep on at least M2  [SC: B2 for an answer of  *m* = 2 with working shown  (from 4*m* + 9 = 21 – 2*m* oe) **or**  *m* = − 0.2oe with working shown  (from 4*m* + 9 = 7 – 6*m* oe)] |
|  |  | **Alternative** |  |  |  |  |
|  |  |  |  | 4 | M1 | Division of each term on LHS by 3 |
|  |  | oe |  | M1 | for a correct equation with *m* terms isolated on one side  ft their equation if first M1 awarded |
|  |  | 10*m* = 3 × 4 oe |  | M1 | For removing fraction in a fully correct equation |
|  |  |  | oe | A1 | dep on at least M2 |
| 12 contd | (c) | **or** **or** |  | 2 | M1 | or b = |
|  |  |  |  | A1 |  |
|  |  |  |  |  |  | **Total 8 marks** |

| 13 | (a) |  |  | 2 | B1 | for  in correct positions. Allow decimals of 2dp or better (0.43, 0.57) |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | B1oe | for  in correct positions. |
|  | (b) |  |  | 2 | M1 | ft from (a) |
|  |  |  | oe | A1 |  |
|  | (c) | **or** |  | 3 | M1 | ft from (a) |
|  |  | or |  | M1 | ft from (b) |
|  |  |  | oe | A1 | for oe, e.g. 0.14(3589…)  from accurate working |
|  |  |  |  |  |  | **Total 7 marks** |

| 14 | (a) |  | 7, 8, 9, 10, 11 | 2 | B2 | completely correct.  (B1 for 4 or 5 correct and no more than 1 incorrect **or** for all terms seen correctly placed in a Venn diagram or for a correct description of the numbers in the set but not listed, eg 7 ≤ *x* < 12) |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) |  | eg 2, 4, 6 | 1 | B1 | for any 3 of 2, 4, 6, 8, 10 |
|  |  |  |  |  |  | **Total 3 marks** |

| 16 |  | *a* = 7 and *d* = 3  **or**  100th term is 7 + (100 – 1) × 3 (= 304) **and**  100 × (7 + “304”) ÷ 2 **or**  100th term is 3 × 100 + 4 (= 304) **and**  100 × (7 + “304”) ÷ 2 |  | 2 | M1 | for a method to find the sum -  brackets (100 – 1) must be used correctly |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 15 550 | A1 |  |
|  |  |  |  |  |  | **Total 2 marks** |

| 17 | (a) | eg  or 2 : 3 oe **or**  or 3 : 2 oe |  | 2 | M1 | for a correct scale factor |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 2160 | A1 |  |
|  | (b) | or 2³ : 3³ oe **or** or 3³ : 2³ oe or or  oe |  | 2 | M1 | For correct SF for volume  ft from linear scale factor in (a) or ft from |
|  |  |  | (**A** =) oe | A1 | oe eg |
|  |  |  |  |  |  | **Total 4 marks** |

| 18 |  | 17.82 + 26.32 – 2 × 17.8 × 26.3 × cos36 |  | 3 | M1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | e.g. 1008.5... – 757…. **or** 251(.06…) |  | M1 | for correct order of operations |
|  |  |  | 15.8 | A1 | for ans in range 15.8 – 15.9 |
|  |  |  |  |  |  | **Total 3 marks** |

| 19 |  | 15 ÷ 20 (=0.75)  48 ÷ 15 (=3.2)  21 ÷ 5 (=4.2)  16 ÷ 10 (=1.6) | correct histogram | 3 | B3 | For a fully correct histogram  [If not B3 then B2 for 3 correct frequency densities (can be implied by heights) or 3 correct bars drawn  If not B2 then B1 for 2 correctly calculated frequency densities (can be implied by heights) or 2 correct bars drawn.] |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Total 3 marks** |

| **Students can use other methods to gain the correct answer** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 20 |  | angle *ABD* = 71**or**  angle *ACD =* 71 **or**  using *O* as centre ofcircle,  angle *ADO* = 90 – 71 (=19) |  | 5 | M1 | clearly labelled or stated | |
|  |  | angle *ADB* = 71 **or**  angle *ACB***=** 71 **or**  angle *BAD* = 19 × 2 (=38) **or**  reflex angle *BOD* = 2 × 142 (=284) |  | M1 | dep clearly labelled or stated | |
|  |  | angle *BCD* = 142 | 142 | A1 | Clearly labelled or stated, from no incorrect working for their method | |
|  |  |  |  | B2 | dep on A1 for fully correct reasons for each stage of working, repeated if used more than once.  eg alternate segment theorem,  base angles in an isosceles triangle are equal,  angles in a triangle sum to 180o,  angle between tangent and radius(diameter) is 90°  congruent triangles (equal triangles) oe  opposite angles of a cyclic quadrilateral sum to 180o  angles in the same segment  angle at the centre is 2 × angle at circumference oe  equal chords subtend equal angles at the circumference  If not B2 then award B1 dep on M1 for any one correct circle theorem reason associated with angle(s) found | |
|  |  |  |  |  |  | | **Total 5 marks** |

| 21 |  | *h* = 3*r* or |  | 5 | M1 | for *h* = 3*r* **or** oe stated or used correctly |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | oe **or**  oe |  | M1 | **or** |
|  |  | + = 792*π*  oe |  | M1 | **or** |
|  |  | (*r* = ) 6 or (*h* = ) 18 |  | A1 |  |
|  |  |  | 24 | A1ft | their “6” × 4 **or**  correctly evaluated dep on M3 |
|  |  |  |  |  |  | **Total 5 marks** |

| 22 | (a) |  | correct graph (see end of mark scheme) [must go through  (60, 2), (150, 0),  (240, −2), (330, 0)] and not through (0, 0) | 2 | B2 | if not B2 then award B1 for a graph of the correct shape going through 2 or 3 of the given points or for a clear stretch of SF2 (ie a maximum point on graph at (*x*1, 2) and a minimum point at (*x*2, −2)) or a clear translation of  (ie a point on graph at (150, *y*) and a point at (330, *y*)) |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b)(i) |  | (*x* – 3)2 + 1 | 2 | B2 | (B1 for (*x* –  )² + *n* (where n ≠ 1) **or** for  (*x* – *m*)² + 1 (where m ≠ 3) **or** for  *x*2 − *ax* − *ax* + *a*2 + *b* with  2*a* = 6 or *a*2 + *b* = 10) |
|  | (b)(ii) |  | translation of | 2 | B1 | for translation |
|  |  |  | B1 | For  ft from (b)(i)  must be column vector |
|  |  |  |  |  |  | **Total 6 marks** |

| 23 |  | **or** (6, 13) |  | 5 | M1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | oe **or** 1.5 oe |  | M1 |  |
|  |  | *m* ×  = −1 oe **or** *m* = |  | M1 | for use of *m*1*m*2 = −1 |
|  |  | “13” = “”× “6” + *c* **or** *c* = 17 oe **or** |  | M1 | Or for  [NB: “13”, “6” and “ “ must come from correct working] |
|  |  |  | 3*y* + 2*x* = 51 | A1 | for 3*y* + 2*x* = 51 **or** 3*y* = −2*x* + 51 etc but must be integer coefficients |
|  |  |  |  |  |  | **Total 5 marks** |

| 24 |  | (*v* =) 3*t*2 – 6 × 2*t* + 5 (+ 0) |  | 4 | M1 | for differentiating at least 2 terms correctly |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | (*a* =) 3 × 2*t* – 12 |  | M1 | dep ft |
|  |  | 6*t* – 12 = 3 |  | M1 | dep on at least M1 for equating their acceleration in terms of *t* to 3 |
|  |  |  | 2.5 oe | A1 |  |
|  |  |  |  |  |  | **Total 4 marks** |

**Q19**

1

2

3

4

5

10

20

30

40

50

0

Height (*h* metres)

Frequency density

**q22**

1

2

3

-1

-2

-3

60

120

180

240

300

360

0

*x*

*y*

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