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

**Mark Scheme (Results)**

Summer 2017

Pearson Edexcel GCSE (9 – 1)

In Mathematics (1MA1)

Higher (Calculator) Paper 3H



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**General marking guidance**

These notes offer general guidance, but the specific notes for examiners appertaining to individual questions take precedence.

**1** All candidates must receive the same treatment. Examiners must mark the last candidate in exactly the same way as they mark the first.

Where some judgement is required, mark schemes will provide the principles by which marks will be awarded; exemplification/indicative content will not be exhaustive. When examiners are in doubt regarding the application of the mark scheme to a candidate’s response, the response should be sent to review.

**2** All the marks on the mark scheme are designed to be awarded; mark schemes should be applied positively. Examiners should also be prepared to award zero marks if the candidate’s response is not worthy of credit according to the mark scheme. If there is a wrong answer (or no 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.

**Questions where working is not required**: In general, the correct answer should be given full marks.

**Questions that specifically require working**: In general, candidates who do not show working on this type of question will get no marks – full details will be given in the mark scheme for each individual question.

**3 Crossed out work**

This should be marked **unless** the candidate has replaced it with an alternative response.

**4 Choice of method**

If there is a choice of methods shown, mark the method that leads to the answer given on the answer line.

If no answer appears on the answer line, mark both methods **then award the lower number of marks.**

**5** **Incorrect method**

If it is clear from the working that the “correct” answer has been obtained from incorrect working, award 0 marks. Send the response to review for your Team Leader to check.

**6** **Follow through marks**

Follow through marks which involve a single stage calculation can be awarded without working as you can check the answer, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

**7** **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 or its context. (e.g. an incorrectly cancelled fraction when the unsimplified fraction would gain full marks).

 It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect (e.g. incorrect algebraic simplification).

**8** **Probability**

Probability answers must be given as a fraction, percentage or decimal. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

**9** **Linear equations**

Unless indicated otherwise in the mark scheme, full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously identified in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded (embedded answers).

**10 Range of answers**

Unless otherwise stated, when an answer is given as a range (e.g. 3.5 – 4.2) then this is inclusive of the end points (e.g. 3.5, 4.2) and all numbers within the range.

|  |
| --- |
| **Guidance on the use of abbreviations within this mark scheme** |
| **M** method mark awarded for a correct method or partial method**P** process mark awarded for a correct process as part of a problem solving question**A** accuracy mark (awarded after a correct method or process; if no method or process is seen then full marks for the question are implied but see individual mark schemes for more details)**C** communication mark**B** unconditional accuracy mark (no method needed)**oe** or equivalent**cao** correct answer only**ft** follow through (when appropriate as per mark scheme)**sc** special case**dep** dependent (on a previous mark)**indep** independent**awrt** answer which rounds to**isw** ignore subsequent working |

| **Paper 1MA1: 3H** |
| --- |
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 1 | (a) |  | Venn Diagram | B1 | for labels on diagram |
|  |  | *A* *B* 3, 9,21, 27  |  | M1 | for just 15 in the intersection |
|  |  | 15 5, 25 |  | M1 | for just 5 and 25 in only set B or just 3, 9, 21 and 27 in only set A or just 1, 7, 11, 13, 17, 19, 23, 29 in  |
|  |  | 1,7,11,13,17,19,23,29  |  | C1 | for all numbers correctly placed in the Venn DiagramIgnore all entries except the region you are marking for each method mark  |
|  | (b) |  |  | P1 | ft for  where *a* ≥ “7” or  where *b* ≤ “15” |
|  |  |  |  | A1 | ft oe |
| 2 |  |  |   | M1 | for a method to eliminate one variable (condone one arithmetic error) |
|  |  |  | *y* = −2 | M1 | (dep) for substituting found value in one of the equations or appropriate method after starting again (condone one arithmetic error) |
|  |  |  |  | A1 |  oe and *y* = −2 |
| 3 | (a) |  | 12 | B1 | cao |
|  | (b) |  | Explanation | C1 | No with statement about not being mutually exclusive events eg a person could be in both categories |

| **Paper 1MA1: 3H** |
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| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 4 |  |  | 68 | P1 | for a process to find the number of vanilla cakes, eg 420 × 2 ÷ 7 oe (= 120)  |
|  |  |  |  | P1 | for a process to find the number of banana cakes, eg 420 × 0.35 oe (= 147) |
|  |  |  |  | P1 | (dep P1) for a full process to find the number of lemon/chocolate cakes eg 420 – (vanilla cakes) – (banana cakes) (= 153) |
|  |  |  |  | P1 | (dep on previous P1) for a process to find the number of lemon cakes eg “153” ÷ 9 × 4 oe (= 68) |
|  |  |  |  | A1 | caoOR  |
|  |  |  |  | P1 | for writing two proportions in the same format |
|  |  |  |  | P1 | for combining the proportions of vanilla and banana cakeseg 2/7 + 7/20 (= 89/140) |
|  |  |  |  | P1 | (dep P1) for a full process to find the proportion or number of lemon/chocolate cakes eg 1 – “89/140” (= 51/140) |
|  |  |  |  | P1 | (dep on previous P1) for a process to find the number of lemon cakes eg “51/140” × 420 ÷ 9 × 4 (= 68) |
|  |  |  |  | A1 | cao |
| 5 |  |  | Shows polygon is a hexagon | M1 | for a complete method to find the interior or exterior angle of the dodecagon eg , oe (= 150), 360 ÷ 12 (=30) |
|  |  |  |  | M1 | for a complete method to find the interior angle of polygon **P** eg at *B* or *C*: 360 – “150” – 90 (= 120) or “30” + 90 (= 120) **or** for a complete method to find the interior or exterior angle of the hexagon eg , oe (= 120), 360 ÷ 6 (= 60) |
|  |  |  |  | A1 | for 30 and 120 **or** 30 and 60 **or** 120 and 150 **or** 60 and 150 |
|  |  |  |  | C1 | complete solution, fully supported by accurate figures |

| **Paper 1MA1: 3H** |
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| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 6 |  |  | 1.01 | P1 | fruit syrup 15 × 1.4 (= 21) or water 280 × 0.99 (= 277.2) or apple juice 25 × 1.05 (= 26.25) |
|  |  |  |  | P1 | (dep P1) for complete process to find the total mass e.g. “277.2” + “26.25” + “21” (= 324.45) or a weighted densityeg 15 × 1.4 ÷ 320 (= 0.065625) or 280 × 0.99 ÷ 320 (= 0.86625) or 25 × 1.05 ÷ 320 (= 0.08203125) |
|  |  |  |  | P1 | (dep P2) for complete process to find the density eg “324.45” ÷ 320 (=1.01..) or “0.065625” + “0.86625” + “0.08203125” (= 1.0139..) |
|  |  |  |  | A1 | 1.01 to 1.014  |
| 7 |  |  | 5.86 | M1 | for sin 23 = $\frac{AB}{15}$NB Allow any alternative equivalent method to form an equation in *AB* |
|  |  |  |  | A1 | 5.8 to 5.9 |
| 8 |  |  | 5.59 | M1 | For use of *πr*² = 49, where *r* is the radius or *r* = 3.9(49…) or diameter = 7.8(9865…) |
|  |  |  |  | M1 | For use of Pythagoras to set up an equation in *x*² e.g. *x*2 + *x*2 = (*d*)2 or *x*2 = *r*² + *r*² | For use of trigonometry to set up an equation in *x* eg sin 45 = *x* ÷ *d* |
|  |  |  |  | M1 | (dep on M2) Rearrange to (*x*2 =) 2× “3.949..” 2  | Rearrange to (*x*=) “7.898..” × sin 45 oe  |
|  |  |  |  | A1 | 5.5 to 5.6 |
| 9 | (a) |  | 180 | M1 | for evidence of using the LQ (150) and UQ (330) eg 330 − 150 |
|  |  |  |  | A1 | cao |
|  | (b) | 60,180,300,350,650 |  | B2(B1) | for fully correct box plotfor showing a box and at least 3 correctly plotted values |
|  | (c) | Medians 250 and 300 | Statement | C1 | for a correct comparative statement relevant to the questione.g. Yes because the female students have a greater median than the male students |

| **Paper 1MA1: 3H** |
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| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 10 |  |  | 6 (%) | P1P1A1 | for *y*5 oe or 8029.35 ÷ 6000for a process to find 1+*x* e.g. $\sqrt[5]{(8029.35÷6000)}$ or 1.06 or 1.0599..5.99 to 6 |
| 11 |  |  | No(supported) | P1C1 | Process to find number of rose trees e.g. 215 ÷17 (=12.647...) or show number of choices with 12 and 13 eg 17 × 12 = 204 and 17 × 13 = 221No with interpretation that 12.6.. is not a whole number or a whole number of plants must be bought or number of plants would have to be between 12 and 13 which is not possible |
| 12 |  |  | 3 : 4 : 11 | P1 | Makes a start e.g. by using multipliers e.g. 1 + 5 = 6 and 7 + 11 = 18 and 6 × 3 = 18 or *AB*:*BD* = 3:15 or *x*=3*y* (appropriate x and *y* shown) or $\frac{1}{6}$ = $\frac{3}{18}$ |
|  |  |  |  | P1 | Complete process to find ratios e.g. (7 + 11) ÷ (1 + 5) = 3 and 1 × “3” : 7 − (“3” × 1) : 11  |
|  |  |  |  | A1 | oe |
| 13 |  |  | *y* ≥ −2, *y* ≥ *x*  | M1 | *y =*  −2 indicated; accept any inequality for “=” |
|  |  |  | and *y* ≤ 0.5*x +* 1 | M1 | *y* = *x* oe indicated; accept any inequality for “=” |
|  |  |  |  | M1 | *y* = 0.5*x +*1 oe indicated; accept any inequality for “=” |
|  |  |  |  | A1 | *y* ≥ −2, *y* ≥ *x* and *y* ≤ 0.5*x +* 1 |
| 14 | (a) |  | $$\frac{x+4}{2x+3}$$ | M1 | Factorising the denominator $\left(2x\pm 3\right)(x\pm 4)$ or 2$\left(x\pm 1\frac{1}{2}\right)(x\pm 4)$ |
|  |  |  |  | M1 | Factorising the numerator $\left(x-4\right)\left(x+4\right)$  |
|  |  |  |  | A1 | oe |
|  | (b) |  |   | M1 | A correct step towards solution e.g. expanding brackets to get 15*t* – 30*v* or multiply both sides by *v*  |
|  |  |  |  | M1 | For a method to rearrange the formula to isolate terms in *v* eg $vw+30v=15t$ |
|  |  |  |  | A1 |  oe |
| 15 |  |  | 2.63 | P1 | for setting up the expression $\frac{1}{2}\left(x+3\right)\left(2x-1\right)\sin(45)$ (may be seen in an equation) |
|  |  |  |  | P1 | (dep) for expanding the brackets in the expression or for the equation  $\frac{1}{2}\left(x+3\right)\left(2x-1\right)\sin(45)$ =6$\sqrt{2}$ oe |
|  |  |  |  | P1 | (dep) for the process to set up the equation and rearrange to the form $ax²+bx+c=d$ e.g. to 2*x*2 + 5*x* – 27 = 0 or 24 = 2*x*2 + 5*x* – 3  |
|  |  |  |  | P1 | (dep) for substitution into the quadratic formula e.g.  |
|  |  |  |  | A1 | for 2.63(10436…) |
| 16 | (a) |  | *x*1=-2.64 | M1 | for substitution of −2.5 into the equation (to get  *x*1= $-$2.64) |
|  |  |  | *x*2= -2.57392 | M1 | for substitution of “*x*1= $-$2.64” and “*x*2= $-$2.57392” to give*x*2 and *x*3 |
|  |  |  | *x*3=-2.603767255 | A1 | for *x*1= $-$2.64 oe, *x*2= $-$2.57(392) and *x*3= $-$2.6(03767255)Condone *x*3= $-$2.61 if *x*2= $-$2.57 is used in the substitution |
|  | (b) |  | Statements | C1 | Connection between equation and iterative form in (a) e.g. rearrangement |
|  |  |  |  | C1 |  Statement e.g. iteration is an estimation of a solution |
| 17 | (a) |  | No | P1 | for 265 or 275 or 274.999... or 107.5 or 112.5 or 112.4999... |
|  |  |  | (supported) | P1 | process to find $\frac{d}{t}$ where 270< *d* ≤ 275 and 107.5≤ *t* < 110 oe |
|  |  |  |  | P1 | for process to work in consistent units of time eg $\frac{d}{t}$ $×$ 60 or *t* ÷ 60 where 265≤ *d* ≤ 275 and 107.5≤ *t* < 110 oe or 160 $÷$ 60 (= 2.666..) |
|  |  |  |  | C1 | Conclusion supported with correct figure(s) given eg No and 153(.488..) or No and 2.66 to 2.7 and 2.5(581..) from correct working |
|  | (b) |  | Statement | C1 | e.g. Less distance in the same time so (max) speed would drop |

| **Paper 1MA1: 3H** |
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| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 18 |  | Note *DOC*=*DOA,*  | 21.6 | P1 | Recognises that *OAD* or *OCD* is 90° or right angle |
|  |  | *ADO*=*CDO* |  | P1 | for using trigonometry to set up an equation in *DOA* or *ADO* eg Cos *DOA* =  |
|  |  |  |  | P1 | for using inverse trigonometry to find *DOA* or *ADO* eg *DOA* = Cos-1  (= 56.25…) |
|  |  |  |  | P1 | for a complete process to find arc length *ABC* or *AC*eg $\frac{360-2×"56.25.."}{360}$ ×2×π×5 (=21.598..) or $\frac{2×"56.25.."}{360}$ ×2×π×5 (=9.8174..) |
|  |  |  |  | A1 | for answer in the range 21.5 to 21.65 |
| 19 |  |  | $$x<-2, x>\frac{1}{2}$$ | M1 | for a first step to solve the quadratic e.g. factorisation: $\left(2x+4\right)(x-\frac{1}{2})$ or $\left(2x-1\right)(x+2)$ or using the formula $\frac{-3\pm \sqrt{3^{2}-4×2×(-2)}}{2×2}$  |
|  |  |  |  | A1 | for −2 and $\frac{1}{2}$ |
|  |  |  |  | A1 |  |
| 20 | (a) |  | (0,1) | B1 | (0,1) |
|  | (b) |  | Circle radius 4 Centre (3,0) and(−1,0) and (7,0) labelled | M1 | For centre (3,0) implied by drawing or label  or a circle of radius 4  or intersections on the *x*-axis at −1or 7 implied by drawing or labels |
|  |   |  |  | M1 | for 2 of centre (3,0) implied by drawing or label intersections on the *x*-axis at −1 and 7 implied by drawing or labelcircle drawn with radius 4  |
|  |  |  |  | A1 | for a fully correct answer |
|  |  |  |  |  |  |  |

**Modifications to the mark scheme for Modified Large Print (MLP) papers.**

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:

Angles: ±5º

Measurements of length: ±5 mm

| **PAPER: 1MA1\_3H** |
| --- |
| **Question** | **Modification** | **Mark scheme notes** |
| 1 |  | Diagram enlarged. Braille only: will label the circles ‘Set A’ and ‘Set B’ and will label all the places which need to be answered (i) to (iv). | Standard mark scheme accept for Braille award C2 for a fully correct diagram. |
| 5 |  | Diagram enlarged. | Standard mark scheme |
| 7 |  | Diagrams enlarged. The smaller triangle on the right has been rotated so it is facing the opposite triangle. Braille only: will give information about the triangles in written form. | Standard mark scheme |
| 9 | (a) | Diagram enlarged. Points on the Male box plot changed to: 0, 100, 200, 300 and 800.Horizontal axis label has been moved to the left of the horizontal axis. Label ‘Female students’ added to the left of the grid below ‘Male students’. Axis has been cut so the horizontal axis finishes at 900. | Amend mark scheme to read:M1 “for evidence of taking & using readings at LQ and UQ eg 300 – 100”A1 for 200 [as the answer to (a)]Median 200, IQR 200 |

| **PAPER: 1MA1\_3H** |
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| **Question** | **Modification** | **Mark scheme notes** |
| 9 | (b) | Numbers on the table changed to: 50, 150, 300, 350 and 650.Wording changed to: ‘On the grid for Question 9, draw a box plot for the information in the table. Draw this below the box plot for the Male students.’ | Standard mark schemeMedian 300, IQR 200 |
| 13 |  | Diagram enlarged. Shading changed to dotty shading. | Standard mark scheme |
| 15 |  | Diagram enlarged. Angle size moved outside of the angle arc and the arc has been made smaller.MLP only: *x* changed to *y*.  | Standard mark scheme except using *y* instead of *x*. |
| 18 |  | Diagram enlarged. | Standard mark scheme |
| 20 | (b) | A blank set of *x* and *y* axes have been provided. | Standard mark scheme |

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