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

Mark Scheme (Results)

 Summer 2019

 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
	+ 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.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If there is a choice of methods shown, the method that gains the least marks should be marked.

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.

| **International GCSE Maths**  |
| --- |
| **Apart from Q2, 17, 18d, 20, & 24 (where the mark scheme states otherwise) the correct answer, unless obtained from an incorrect method, should be taken to imply a correct method** |
| Question | **Working** | **Answer** | **Mark** | **Notes** |
| 1 | (a) |  | *x* > − 3 | 1 | B1  | Accept – 3 < *x* |
|  | (b) | 4*y* – *y* ≤ 8 + 13 | *y* ≤ 7 oe | 2 | M1A1 | Arranging *y*’s on one side and the numbers on the other side.(allow 4*y* – *y* = 8 + 13 oe or 4*y* – *y* < 8 + 13 oeor 4*y* – *y* > 8 + 13 oeor 4*y* – *y* ≥ 8 + 13 oe)Allow *y* ≤ 21/3 |
|  |  |  |  |  |  | **Total 3 marks** |
|  |  |  |  |  |  |  |
| 2 |  | $\frac{17}{3}(-)\frac{11}{4}$ or $5\frac{8}{12}(-)2\frac{9}{12}$ $\frac{68}{12}-\frac{33}{12}$ or $4\frac{20}{12}-2\frac{9}{12}$$\frac{35}{12}$ = $2 \frac{11}{12}$Alt:$3 \left(+\right)(\frac{2}{3}-\frac{3}{4})$ $3 \left(+\right)(\frac{8}{12}-\frac{9}{12})$ $3-\frac{1}{12}$ = $2 \frac{11}{12}$Alt:$4\frac{5}{3}\left(-\right) 2\frac{3}{4}$ $2 \left(+\right)(\frac{5}{3}-\frac{3}{4})$ $2 \left(+\right)(\frac{20}{12}-\frac{9}{12})$ = $2 \frac{11}{12}$ |  | 3 | M1M1A1M1M1A1M1M1A1 | Sight of $\frac{17}{3}and \frac{11}{4}$ or $5\frac{8}{12} and 2\frac{9}{12}$or $\frac{68n}{12n}- \frac{33n}{12n}$Dep on M2Dep on M2Dep on M2 |
|  |  |  |  |  |  | **Total 3 marks** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 3 | (a) |  | –5, 5, 5, –5 | 2 | B2 | All 4 correct valuesIf not B2 then B1 for 2 or 3 correct values |
|  | (b) |  |  Fully correct curve | 2 | M1A1 | Plotting at least 6 points correctly from their table dep on B1 in part(a)Do not accept horizontal line at top of curve or straight line segments |
|  |  |  |  |  |  | **Total 4 marks** |
|  |  |  |  |  |  |  |
| 4 | (a) | 40 ÷ 16 × 12 oe | 30 | 2 | M1A1 | $40 x\frac{12}{16}$ oe |
|  | (b) | 525 ÷ 1002 | 0.0525 oe | 2 | M1A1 | $$\frac{525}{100^{2}}$$Accept 5.25 x 10 - 2 |
|  |  |  |  |  |  | **Total 4 marks** |
|  |  |  |  |  |  |  |
| 5 |  |  | (*x* + 4) (*x* − 9) | 2 | M1A1 | For (*x* + *a*) (*x* + *b*) where *ab* = – 36 and a and b are integersIgnore extension to roots *x* = – 4 & 9 |
|  |  |  |  |  |  | **Total 2 marks** |
|  |  |  |  |  |  |  |
| 6 |  | P(mint =) 1 – (0.35 + 0.32 + 0.12) {= 0.21}P(strawberry or mint = ) 0.32 + “0.21” | 0.53 oe | 3 | M1M1A1 | Or a correct equation summing to 1DepAllow 0.53/1 |
|  |  |  |  |  |  | **Total 3 marks** |
|  |  |  |  |  |  |  |
| 7 |  | 55 ÷ (6 + 3 + 2) {= 5}(6 x “5”) – (2 x “5”) | 20 | 3 | M1M1A1 | Or $\frac{6}{11}$ x 55 (= 30) or $\frac{2}{11}$ x 55 (= 10)Or M2 for Won = 30 and Lost = 10(can be seen in a ratio 30 : 15: 10) |
|  |  |  |  |  |  | **Total 3 marks** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 8 | (a) | 3253753211*A**B* | 7875 | 2 | M1A1 |  32 x 53 x 7 oe or correct Venn diagram |
|  | (b) | 3253753211*A**B* | 3 898 125 | 2 | M1A1 | 34 x 54 x 7 x 11 oe or correct Venn diagram |
|  |  |  |  |  |  | **Total 4 marks** |
|  |  |  |  |  |  |  |
| 9 | (a) |  | 8.4 × 105 | 1 | B1 |  |
|  | (b) | $\frac{60000000}{0.08}$ or 750000000 oe (e.g 0.75 x 109) | 7.5 × 108 | 2 | M1A1 | M1 for 60000000 or 0.08 |
|  |  |  |  |  |  | **Total 3 marks** |
|  |  |  |  |  |  |  |
| 10 |  | 150000 x 0.823  | 82705 | 3 | M2A1 | If not M2 then M1 for 1st year e.g 150000 x 0.82 (= 123000) or 150000 x 0.18 (= 27000)SC B1 for150000 x 1.18 (= 177000) or150000 x 1.183 (= 246454.8)or150000 x 0.54 (=81000) or150000 x 0.46 (= 69000)Accept 82705.2 |
|  |  |  |  |  |  | **Total 3 marks** |
|  |  |  |  |  |  |  |
| 11 |  | Gradient= (−)4 ÷ 2 oe | *y* = − 2*x* – 1 oe | 3 | M1A2 | Correct method to work out the gradient (±)accept 4 ÷ 2 oe or “*m”* = 2If not A2 then A1 for *L* = − 2*x* – 1 or − 2*x* – 1or *y* = 2*x* – 1 or *y* = – 2*x* + c |
|  |  |  |  |  |  | **Total 3 marks** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 12 |  | $sin32=\frac{BD}{3.1}$ oe$(BD=)3.1×sin32$ (= 1.6427…)$cos 42=\frac{"3.1sin32"}{AB}$ oe or $\frac{AB}{\sin(90)}$ = $\frac{"3.1 sin⁡ 32"}{\sin(48)}$ oe$AB=\frac{"3.1sin32"}{\cos(42)}$ or *AB* = $\frac{"3.1 sin⁡ 32"}{\sin(48)}$ | 2.21 | 5 | M1M1M1M1A1 | A correct calculation involving *BD*Accept 1.6 or betterDep or (*AD* =) “1.6.. x tan 42 {= 1.479}Or (*AB* =) $\sqrt{"1.479"^{2}+"1.6427"^{2}}$2.21053... (Accept 2.2 → 2.22) |
|  |  |  |  |  |  | **Total 5 marks** |
|  |  |  |  |  |  |  |
| 13 | (a) | Plotting points from table at ends of interval(40, 6), (50, 20), (60, 56), (70, 84), (80,95), (90, 100)Points joined with curve or line segments |  Correct cf diagram | 2 | M1A1 | ±1/2 sq (at least 5 points plotted correctly) Or all points plotted consistently within each interval at the correct heightsAccept cf graph which is not joined to (30,0) |
|  | (b) | Use of graph at 50 | 58 – 59 | 2 | M1A1 | Use of graph at 50 walkersNo working shown and answer is within 58 – 59 award M1A1 |
|  | (c) | 86 or 87 or 88 indicated on graph or stated100 – “86” or 100 – “87” or 100 – “88”  | $\frac{12}{100}$ oe $\frac{13}{100}$ oe $\frac{14}{100}$ | 3 | M1M1A1 | Use of their graph at 72 minutesDep e.g. 12, 13 or 14 walkers0.12 → 0.14 inc, oe |
|  |  |  |  |  |  | **Total 7 marks** |
|  |  |  |  |  |  |  |
| 14 | (a) | *x*9*y*6 | *x*9*y*6 | 2 | B1B1 | Allow B1 if (*x*3*y*2)3 or (*x*36*y*24)0.25 seen on answer line |
|  | (b) | $3^{n}=\frac{3^{x}}{3^{2y}}$  | *n* = *x* – 2*y* | 2 | M1A1 | for a correct first step e.g. 32*y* or 3−2*y*  |
|  |  |  |  |  |  | **Total 4 marks** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 15 |  | *ABD* = 98° ÷ 2 (= 49°) or *ABC* = 90°Angle at centre / middle is twice angle at circumference Angle in a semicircle / from a diameter is 90° / right angle*DBC* = (90 – 49) = 41Alt:180 – 98 (= 82°)*OAD* = 82 ÷ 2 (= 41°)Base / bottom angles in an isosceles triangle are equal*DBC* = 41°Angles in the same segment / from the same chord (*DC*) are equalAlt:*DOC* = 180 – 98 (= 82°) Angles on a straight line = 180°*DBC*  = 41° Angle at centre / middle is twice angle at circumference  | 41°41°41° | 4 | M1B1B1A1M1B1B1A1M1B1B1A1 | Correct angle stated or seen on diagramDep M1Dep M1Correct answer + no reasons = M1A1Correct angle stated or seen on diagramDep M1Dep M1 Correct answer + no reasons = M1A1Correct angle stated or seen on diagramDep M1Dep M1Correct answer + no reasons = M1A1 |
|  |  |  |  |  |  | **Total 4 marks** |
|  |  |  |  |  |  |  |
| 16 | (a) | $y=\frac{k}{x^{2}}$ condone proportion symbol in place of =$16=\frac{k}{1.5^{2}}$ or $9=\frac{k}{2^{2}}$ or $4=\frac{k}{3^{2}}$ or $2.25=\frac{k}{4^{2}}$  | $y=\frac{36}{x^{2}}$  | 3 | M1M1A1 | Setting up a correct equation “*k*” ≠ 1Using the values from the table to find the value of the constant or “*k*” = 36$\frac{36}{x^{2}}$ = M2 A0 |
|  | (b) | $x^{2}=\frac{36}{144}$ or $x=√(\frac{36}{144})$ |  |  | M1  | Substituting *y* = 144 into the correct equation and making *x*2 or *x* the subject. |
|  |  |  | 0.5 oe | 2 | A1 | cao |
|  |  |  |  |  |  | **Total 5 marks** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 17 |  | (Term *n* =) $\frac{1}{2}n\left(n+1\right)$ or(Term *n* +1 =) $\frac{1}{2}(n+1)\left(n+2\right)$  $\frac{1}{2}n\left(n+1\right)+\frac{1}{2}\left(n+1\right)\left(n+2\right)$ $\frac{1}{2}\left(n+1\right)\left(n+n+2\right)$ = $\frac{1}{2}\left(n+1\right)\left(2n+2\right)$ or$\frac{1}{2}n^{2}+\frac{1}{2}n+\frac{1}{2}n^{2}+\frac{1}{2}n+n+1$ → *n*2 + 2*n* + 1 |  $\left(n+1\right)^{2}$ shown | 4 | M1M1M1A1 | Algebraic representation of one of the two consecutive terms in sequenceAdding two consecutive termsFactorisation or multiplying out correctly to get to *n*2 + 2*n* + 1Dep on M3 |
|  |  |  |  |  |  | **Total 4 marks** |
|  |  |  |  |  |  |  |
| 18 | (a) |  | $\frac{3}{4} $ oe | 1 | B1 | $ $  |
|  | (b) | $\frac{x-5}{4\left(x-5\right)-3}$  | $\frac{x-5}{4x-23}$  | 2 | M1A1 | cao |
|  | (c) | $y=\frac{x}{4x-3}$ or $x=\frac{y}{4y-3}$ *y*(4*x* – 3) = *x* or *x*(4*y* – 3) = *y*4*xy* – 3*y* = *x* or 4*xy* – 3*x* = *y*4*xy* – *x* = 3*y* or 4*xy* – *y* = 3*x**x*(4*y* – 1) = 3*y* or *y*(4*x* – 1) = 3*x* | $\frac{3x}{4x-1}$ oe | 3 | M1M1A1 | Moving the denominator to the other side of the equationFactorising the variable on one side in a correct expression |
|  | (d) | Tangent drawn at *x* = − 0.5(G =) 18 ÷ 3 oe | 5 → 7 | 3 | M1M1A1 | Drawing a tangent at *x* = − 0.5Correct method to work out the gradient of the tangent at *x* = − 0.5 or *x* = + 0.5Dep on 1st M1**SC B1 B1 for drawing a tangent at *x* =+0.5 and gradient =** − **3 →** −**4** |
|  |  |  |  |  |  | **Total 9 marks** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 19 |  | $\frac{25}{2}π=πr^{2}×\frac{80}{360} $ *r* = 7.5*(APB* =*)* $2×π×"7.5"×\frac{80}{360}$ (= 10.471)....*(APB* =*)* 10.471.... (=10$ π$ /3)$$(AB^{2})="7.5"^{2}+"7.5"^{2}-(2×"7.5"×"7.5"×cos80)$$or $\frac{AB}{\sin(80)}$ = $\frac{"7.5"}{\sin(50)}$or (*AB* =) 2 x “7.5” x sin 40(*AB* =) 9.6418“9.6418” + “10.4719” | 20.1 | 6 | M1A1M1 ftM1ftM1ftA1 | Equation of sector equal to $\frac{25 ᴨ}{2}$ or a calculation that leads to *r* or *r*2Dep on 1st M1Accept 10.5 or betterDep on 1st M1Correct equation to find *AB* (= 9.6) or *AB*2 (= 93 or better) must use a clearly identified radius value Dep on 2nd and 3rd method marksawrt 20.1  |
|  |  |  |  |  |  | **Total 6 marks** |
|  |  |  |  |  |  |  |
| 20 |  | 3.455 or 3.465 or 6.25 or 6.35 | 7.46 | 3 | M1M1A1 | Accept  for 3.465 or  for 6.35where3.46 < UB*a*  ≤ 3.465 and 6.25 ≤ LB*b*  < 6.3Dep M2 Accept 7.46499 ... |
|  |  |  |  |  |  | **Total 3 marks** |
|  |  |  |  |  |  |  |
| 21 |  | (LSF =)$\sqrt{240÷540}$ or $\frac{2}{3}$ or $\frac{3}{2}$ or 1.5 or 3 : 2 or 2 : 3$\left(\frac{2}{3}\right)$3 x 2025 oe accept 0.0.66 or better for 2/3 | 600 | 3 | M1M1A1 | Full method leading to correct answer |
|  |  |  |  |  |  | **Total 3 marks** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 22 |  | $-2\left(x^{2}-6x\right)+5$ or $-2(x^{2}-6x -2.5)$$-2[\left(x-3\right)^{2}- 9-2.5 ]$ or $-2\left[\left(x-3\right)^{2}-9\right]+5$ $-2[\left(x-3\right)^{2}-11.5]$ or $-2\left(x-3\right)^{2}+ 18+5 $Alt:*a* + b(*x*2 + 2*cx* + *c*2)2*bc* = 12 or *a* + *bc*2 = 5 or *b* = – 22 x −2 x *c* = 12 or *c* = −3 *a* + −2 x (−3)2 = 5 or *a*  = 23 seen | $23-2\left(x-3\right)^{2}$ $23-2\left(x-3\right)^{2}$  | 4 | M1M1M1A1M1M1M1M1 | Factorisingby extracting – 2 in a correct expressionCorrect expression equivalent to 5 + 12*x* – 2*x*2 Correct expression equivalent to 5 + 12*x* – 2*x*2 **Award full marks if a, b, and c are correctly stated and** $23-2\left(x-3\right)^{2}$**is not stated anywhere.**SC B3 for $23-2\left(3-x\right)^{2}$ SC B2 for $-2\left(x-3\right)^{2}$ + constant or 23 – 2(*x* + constant)2SC B1 for – 2 (*x* + 3)2  +constantMultiplying out expression correctlyEquating coefficients or stating value of bMethod to calculate *c*Method to calculate *a*SC B3 for $23-2\left(3-x\right)^{2}$  |
|  |  |  |  |  |  | **Total 4 marks** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 23 |  | 360 = (10 x 10) + 4 x 0.5 x 10 x “*h*” oe*h* = 13*AC* = $\sqrt{13^{2}+5^{2}}$ = (13.93 or √194) orAO = $\sqrt{13^{2}-5^{2}}$ = (12) orOC = $(\sqrt{10^{2}+10^{2}})$ ÷ 2 = (7.07 or 5√2) orEC (oe) = $\sqrt{10^{2}+10^{2}}$ = (14.14 or 10√2)$tan^{-1}\left(\frac{12}{7.07}\right)$ or $cos^{-1}\left(\frac{7.07}{13.93}\right)$ or $sin^{-1}\left(\frac{12}{13.93}\right)$or $cos^{-1}$ $( \frac{13.93^{2}+ 7.07^{2}- 12^{2}}{2 x 13.93 x 7.07})$or $cos^{-1}$ $( \frac{13.93^{2}+ 14.14^{2}- 13.93}{2 x 13.93 x 14.14})$ | 59.5° |  | M1A1M2M1A1 | Finding the perpendicular height of a triangular faceFinding the accurate length of two sides relevant to finding correct angle.M2 for two sides found or M1 for one side. 1dp rounded or truncated.A correct trigonometric expression to find correct angleAccept $\tan(θ=)\left(\frac{12}{7.0}\right)$ etcAccept 59.4° – 59.7°  |
|  |  |  |  |  |  | **Total 6 marks** |

| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| **24** |  | $\frac{x-4}{x}$ × $\frac{x-5}{x-1} $= 0.73*x*2 – 83*x* + 200 (= 0) oe$\frac{83\pm \sqrt{83^{2}-(4×3×200)}}{2×3}$ or (3*x* – 8)(*x* – 25) (=0)or (*x* – 83/6)2 + 200/3 – 832/36 (=0)Alt: *y*  = yellow marbles$\frac{y}{y+4}$ × $\frac{y-1}{y+3} $= 0.73*y*2 – 59*y* − 84 (= 0) oe$\frac{59\pm \sqrt{59^{2}-(4×3×-84)}}{2×3}$ or (3*y* + 4)(*y* – 21)or (*y* – 59/6)2  − 84/3 − 592/36 (=0)*y* = 2121+4 | 2525 | 5 | M2A1M1A1M2A1M1A1 | If not M2 then M1 for either $\frac{x-4}{x}$ or $\frac{x-5}{x-1}$Rearrangement of their quadratic to the form *ax*² + *bx* + *c* (= 0)1st step in solving the correct 3 term quadraticAccept 25 only (dep on M3 if using algebra)If not M2 then M1 for either $\frac{y}{y+4}$ or $\frac{y-1}{y+3}$Rearrangement of their quadratic to the form *ay*² + *by* + *c* (= 0)1st step in solving the correct 3 term quadraticAccept 25 only (dep on M3 if using algebra) Give full marks if $\frac{21}{25}$ x $\frac{20}{24}$ = 0.7 seen and 1st M2 scored**NB: SC B1 for completing 1st step in solving incorrect 3 term quadratic** |
|  |  |  |  |  |  | **Total 5 marks** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  | **Total for Paper: 100 marks** |

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