Mark Scheme (Results)

January 2016

Pearson Edexcel International GCSE
Mathematics A (4MA0)
Paper 2F

Pearson Edexcel Certificate
Mathematics A (KMA0)
Paper 2F

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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
  - awrt –answer which rounds to

- **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, 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 of the question CANNOT be awarded in another.

Apart from Questions 15(c) and 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	(a)(i)		52 or 90	1	B1
	(a)(ii)		25	1	B1
	(a)(iii)		52	1	B1
	(a)(iv)		6 **and** 52	1	B1
	(b)		84	1	B1 Accept – 84
					Total 5 marks

2	(a)(i)		120	1	B1 Accept 118 – 122
	(a)(ii)		obtuse	1	B1
	(b)		isosceles	1	B1
					Total 3 marks

3	(a)		Monday	1	B1
	(b)		Thursday	1	B1
	(c)	$\frac{18}{3} \times 2.5$ or 6×2.5 or $\frac{18}{3}$ or 6	15	2	M1 Finding 1 rectangle = 6 (books) or $\frac{18}{3}$ or a correct calculation to find the number of books sold on Friday A1
					Total 4 marks

4	(a)		Both lines of symmetry	2	B2 B1 for one correct line. – 1 for each incorrect additional line(s).
	(b)		2	1	B1 cao
	(c)		16	1	B1 cao
					Total 4 marks

5	(a)		0	1	B1 accept 0.0, 0% 0/6 but not words
	(b)		$\frac{4}{6}$	1	B1 Accept $\frac{2}{3}$ oe Or 0.66, 0.67,66%, 67% or better
	(c)	$\frac{2}{5} \times 30$ or 0.4×30	12	2	M1 A1 (an answer $\frac{12}{30}$ of gains M1 only)
					Total 4 marks

6	(a)		cone	1	B1
	(b)(i)		prism	1	B1
	(b)(ii)		9	1	B1
	(b)(iii)		6	1	B1
	(c)	$\frac{280}{4 \times 10}$ oe	7	2	M1 A1 cao
					Total 6 marks

7	(a)		1, 2, 4, 5, 10, 20	2	B2 B1 for 3 or more correct factors, with at most one error **or** 2 correct factors with no errors. Ignore repeats, may be given as products. If no answer on answer line, award B1 for a completely correct factor tree
	(b)		– 10, – 6, – 4, 3, 7	1	B1
	(c)(i)		2	1	B1
	(c)(ii)		5	1	B1
	(d)	$\frac{15}{100} \times 80$	12	2	M1 $\frac{15}{100} \times 80$ oe or completely correct method. A1 80 $\pm$12 gets M1 only
					Total 7 marks

8	(a)		8	1	B1 cao
	(b)		8.8(0)	1	B1 Accept 8.7(0)-8.9(0) inclusive
	(c)	'8' $\times \frac{37.5}{5}$ or $\frac{'8'}{5} \times 37.5$ oe	60	2	M1 ft their answer in (a) or a completely correct method. A1 ft (7.5 × (a)) or 55 – 65 from a completely correct method seen.
					Total 4 marks

9	(a)	Eg 0.72/3..., 0.77..., 0.79, 0.8, 0.84 $\frac{8}{11} = 0.7272\ldots$ $\frac{7}{9} = 0.777\ldots$ $\frac{4}{5} = 0.8$	$\frac{8}{11}, \frac{7}{9}, 0.79, \frac{4}{5}, 84\%$	3	B3 Accept correct decimal/percentage equivalents in ascending order If not B3 then award B2 for: • 4 numbers in the correct order or • $\frac{8}{11}$ and $\frac{7}{9}$ and $\frac{4}{5}$ correctly converted to decimals or %'s (at least 2 SF rounded or truncated for $\frac{8}{11}$ & $\frac{7}{9}$) or • all five numbers in correct descending order. If not B2 then B1 for • 3 numbers in the correct order provided it is not the original list • 2 fractions from $\frac{8}{11}, \frac{7}{9}, \frac{4}{5}$ correctly converted to decimals or %'s (at least 2 SF rounded or truncated)
	(b)		243	1	B1
	(c)		4.41	1	B1
	(d)		2.6	1	B1 Accept $\frac{13}{5}$ oe
					Total 6 marks

10	Splits shape appropriately eg rectangle + triangle or rectangle + trapezium or 'completing the rectangle'		4	B1	If lines not present on diagram then can be implied by correct method for at least 2 areas (areas must not overlap or be contradictory)
	eg. 8×11 or 88 or $0.5 \times 4 \times 6$ or 12 or 8×7 or 56 or $\frac{4}{2} \times (8 + 14)$ or 44 or 11×14 or 154 or $\frac{6}{2} \times (7 + 11)$ or 54			M1	for area of one rectangle, triangle or trapezium from the diagram
	eg. $8 \times 11 + 0.5 \times 4 \times 6$ (=88+12) or $8 \times 7 + \frac{4}{2} \times (8 + 14)$ (=56+44) or 11×14 or $154 - \frac{6}{2} \times (7 + 11)$ (=154−54)			M1	for complete method
		100		A1	
					Total 4 marks

11	(a)	Numbers in order 1, 2, 3, 3, 5, 5	3	2	M1 A1	Ascending or descending, condone 1 omission. Or an answer of 3,3
	(b)	8×4 or 32 or $1 + 9$ or $10 - 1$ "32" – (3 + 1 + 5 + 5 + 2 +3)(=13) or (3 + 1 + 5 + 5 + 2 +3) + "10"(=29)	3 and 10	3	M1 M1 A1	 A correct method to find the total of the 2 missing numbers If M0 scored then SCB1 for an answer of **two numbers** with a sum of 13 or **two numbers** that give a range of 9 for the 8 cards
						Total 5 marks

12	2 hrs 30 mins	9 hours 50 minutes	2	M1 A1	2 hrs 30 mins (accept 2.30 hrs or 2.5 hrs but not 2.3 hrs or 2.50 hrs) **or** an answer which includes 9 (hrs) or 50 (mins)
					Total 2 marks

13	8.6 × 2 or 17.2 or 30.4 – 8.6 × 2 or 13.2 (30.4 – "17.2") ÷ 3 (=13.2 ÷ 3)	4.40	3	M1 M1 A1	Price of adults tickets or total amount for 3 child tickets Full method to find price of child ticket Accept 4.4 ($\frac{22}{5}$ is M2A0) SCB1 for 7.26\7 given as answer
					Total 3 marks

14	180 – (40 + 30)	110° angles in a triangle total 180° or corresponding angles	3	M1 A1 B1	Completely correct method seen (no isw) SCB1 if M0 scored, for AED stated or labelled as 110° At least one correct reason used
					Total 3 marks

15	(a)		39	1	B1
	(b)		$\frac{11}{4}$	1	B1 Accept $2\frac{3}{4}$, 2.75
	(c)	$3 - 5m = 8 \times 4$ or $3 - 5m = 32$ $-5m =$ '32' $- 3$ or $3 -$ '32' $= 5m$ $-5m = 29$ or $-29 = 5m$	-5.8	3	M1 Multiplying both sides by 4 as a correct first step in a correct equation M1 For isolating 5m or $-5m$ in a correct equation A1 oe eg $\frac{-29}{5}$ dependent on at least M1
		Alternative for (c)			
	(c)	$\frac{-5m}{4} = 8 - \frac{3}{4}$ or $\frac{5m}{4} = \frac{3}{4} - 8$ $-5m = (8 - \frac{3}{4}) \times 4$ or $5m = \left(\frac{3}{4} - 8\right) \times 4$	-5.8	3	M1 For using quarters (or a multiple of 4) and isolating the term in m in a correct equation M1 For isolating $5m$ or $-5m$ in a correct equation A1 oe eg $\frac{-29}{5}$ dependent on at least M1
					Total 5 marks

16	(a)	2.14... ÷ 4.4	0.4874(456952)	2	M1 for 2.14.... or 4.4 or $\frac{\sqrt{115}}{22}$ A1 Accept if first four sig figs correct
	(b)		0.487	1	B1 ft if (a) > 3 sig figs
					Total 3 marks

17	(a)		(9, 6)	1	B1
	(b)		80.5 – 84.5	1	B1
	(c)			1	B1 (4,1) marked on diagram
	(d)	0.5 × (1 + 6) or 0.5 × (4 + 9)	(3.5, 6.5)	2	M1 for a correct method to find one coordinate or for 1 coordinate given correctly or for (6.5, 3.5) A1 cao
					Total 5 marks

18	$3 \times (-5)^2 + 4 \times -5$ or $3\times-5\times-5+4\times-5$ **or** $3\times(-5)^2 - 20$ **or** 75	55	2	M1 for correct substitution, brackets essential for $(-5)^2$ A1
				Total 2 marks

19	$\frac{24.5}{7} \times 2$ (=7) or $\frac{24.5}{7} \times 6$ (=21) or $\frac{24.5}{7} \times 8$(=28)		3	M1
	$\frac{24.5}{7} \times 2 + \frac{24.5}{7} \times 6 + 24.5$ (=7 + 21 + 24.5)			M1 fully correct method [M2 for $\frac{24.5}{7} \times (7 + 6 + 2)$]
		52.5		A1
				Total 3 marks

20	(a)	$\frac{12}{100} \times 30$ or 0.12 × 30 or 3.6 30 – "3.6"	26.4(0)	3	M1 M1dep A1	M2 for $\frac{88}{100} \times 30$ oe
	(b)	$\frac{9}{0.12}$ or $\frac{9}{12} \times 100$ oe	75	3	M2 M1 for $\frac{9}{12}$ or 9 = 12% or 9 = $\frac{12}{100}$ oe A1 (NB: if 75 ± 9 calculated, M2 only)	
					Total 6 marks	

21	(a)	$1 - (0.2 + 0.05 + 0.15)$ or $1 - 0.4$	0.6	2	M1 A1 oe
	(b)	$6 + 6 \times 4 + 6 \times 3 + 6 \times 12$ (=6 + 24 + 18 + 72) or 6×20 or $\frac{6}{0.05}$	120	2	M1ft $6 + 6 \times 4 + 6 \times 3 + \frac{'0.6'}{0.05} \times 6$ (allow M1 for 3 correct products out of 4) A1
					Total 4 marks

22	(a)	$x^2 + 2x$ or $2x + x^2$ or $x2 + x^2$	$x^2 + 2x$	1	B1
	(b)	$-2t + 4$	$-2t + 4$	2	B2 B1 for $-2t$ or 4
	(c)	$4x > 3 + 7$ or $4x > 10$	$x > 2.5$	2	M1 for $4x > 3 + 7$ **or** $4x > 10$ **or** $4x = 3+7$ **or** $4x = 10$ **or** $x = 2.5$ **or** $x < 2.5$ **or** an answer of 2.5 following $x > 2.5$ in working A1 allow $x > \frac{10}{4}$ oe must have correct inequality sign
					Total 5 marks

23	Eg. $4x = 14$ or $4y = -2$ or $-4y = 2$ or $5(3 - y) + y = 17$ or $5x + 3 - x = 17$ or $x + 17 - 5x = 3$	$x = 3.5$, $y = -0.5$	3	M1 for correctly eliminating 1 variable A1 oe A1 oe dep on M1
				Total 3 marks

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24	$180 - \frac{360}{10}$ or $\frac{(10-2)\times 180}{10}$ or 144 oe	108	4	M1	Unless inconsistently labelled
	$\frac{180 - '144'}{2}$ or 18			M1	Or M2 for 144 – (180 – 144)
	'144' – 2 × '18'			M1	
				A1	dep on M1
	Alternative				
	Pentagon approach – drawing in a pentagon or a statement recognising that the required angle is one of a regular pentagon	108	4	M1	May be implied by further work
	$180 - \frac{360}{5}$ or $\frac{(5-2)\times 180}{5}$			M2	(M1 for exterior angle of pentagon as long as not seen as interior angle or given as answer)
				A1	dep on M1
					Total 4 marks

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