

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
  - eeo – 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
<b>1</b> (a)(i)		52 or 90	1	B1
(a)(ii)		25	1	B1
(a)(iii)		52	1	B1
(a)(iv)		<b>6 and 52</b>	1	B1
(b)		84	1	B1 Accept – 84
				<b>Total 5 marks</b>

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

<b>3</b> (a)		Monday	1	B1
(b)		Thursday	1	B1
(c)	$\frac{18}{3} \times 2.5$ or $6 \times 2.5$ 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
				<b>Total 4 marks</b>

<b>4</b>	(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
					<b>Total 4 marks</b>

<b>5</b>	(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 $0.4 \times 30$		2	M1  A1 (an answer $\frac{12}{30}$ of gains M1 only)
					<b>Total 4 marks</b>

<b>6</b>	(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		2	M1
			7		A1 cao
					<b>Total 6 marks</b>

<b>7</b>	(a)		1, 2, 4, 5, 10, 20	2	B2 B1 for 3 or more correct factors, with at most one error <b>or</b> 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)	$\frac{15}{100} \times 80$		2	M1 $\frac{15}{100} \times 80$ oe or completely correct method.
			12		A1 $80 \pm 12$ gets M1 only
					<b>Total 7 marks</b>

<b>8</b>	(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 $\frac{18}{5} \times 37.5$ oe	60	2	M1 ft their answer in (a) or a completely correct method. A1 ft $(7.5 \times (a))$ or 55 – 65 from a completely correct method seen.
					<b>Total 4 marks</b>



<p><b>9</b> (a)</p>	<p>Eg 0.72/3..., 0.77..., 0.79, 0.8, 0.84</p> $\frac{8}{11} = 0.7272\dots$ $\frac{7}{9} = 0.777\dots$ $\frac{4}{5} = 0.8$	$\frac{8}{11}, \frac{7}{9}, 0.79, \frac{4}{5}, 84\%$	<p>3</p>	<p><b>B3</b> Accept correct decimal/percentage equivalents in ascending order</p> <p>If not B3 then award B2 for:</p> <ul style="list-style-type: none"> <li>• 4 numbers in the correct order or</li> <li>• <math>\frac{8}{11}</math> and <math>\frac{7}{9}</math> and <math>\frac{4}{5}</math> correctly converted to decimals or %'s (at least 2 SF rounded or truncated for <math>\frac{8}{11}</math> &amp; <math>\frac{7}{9}</math>) or</li> <li>• all five numbers in correct descending order.</li> </ul> <p>If not B2 then B1 for</p> <ul style="list-style-type: none"> <li>• 3 numbers in the correct order provided it is not the original list</li> <li>• 2 fractions from <math>\frac{8}{11}, \frac{7}{9}, \frac{4}{5}</math> correctly converted to decimals or %'s (at least 2 SF rounded or truncated)</li> </ul>
<p>(b)</p>		<p>243</p>	<p>1</p>	<p>B1</p>
<p>(c)</p>		<p>4.41</p>	<p>1</p>	<p>B1</p>
<p>(d)</p>		<p>2.6</p>	<p>1</p>	<p>B1 Accept <math>\frac{13}{5}</math> oe</p>
				<p><b>Total 6 marks</b></p>

<b>10</b>	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. $8 \times 11$ or 88 or $0.5 \times 4 \times 6$ or 12 or $8 \times 7$ or 56 or $\frac{4}{2} \times (8 + 14)$ or 44 or $11 \times 14$ 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 $11 \times 14$ or $154 - \frac{6}{2} \times (7 + 11)$ (=154-54)			M1	for complete method
				A1	
		100		<b>Total 4 marks</b>	

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

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

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

14	$180 - (40 + 30)$	$110^\circ$ <u>angles in a triangle total <math>180^\circ</math></u> <u>or corresponding angles</u>	3	M1 Completely correct method seen (no isw) A1 SCB1 if M0 scored, for AED stated or labelled as $110^\circ$ B1 At least one correct reason used
				<b>Total 3 marks</b>

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 $-29 = 5m$		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
		<i>Alternative for (c)</i>			
	(c)	$\frac{-5m}{4} = 8 - \frac{3}{4}$ or $\frac{5m}{4} = \frac{3}{4} - 8$ $-5m = (8 - \frac{3}{4}) \times 4$ or $5m = (\frac{3}{4} - 8) \times 4$		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
					<b>Total 5 marks</b>

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

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

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

<b>19</b>	$\frac{24.5}{7} \times 2 (=7)$ or $\frac{24.5}{7} \times 6 (=21)$ or $\frac{24.5}{7} \times 8 (=28)$	52.5	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 $\frac{24.5}{7} \times (7 + 6 + 2)$ ]
				A1
				<b>Total 3 marks</b>

<b>20</b>	(a)	$\frac{12}{100} \times 30$ or $0.12 \times 30$ or 3.6  30 – "3.6"	26.4(0)	3	M1	M2 for $\frac{88}{100} \times 30$ oe
					M1dep A1	
	(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 $75 \pm 9$ calculated, M2 only)
<b>Total 6 marks</b>						

<b>21</b>	(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 $6 \times 20$ 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
					<b>Total 4 marks</b>

<b>22</b>	(a)	$x^2 + 2x$ or $2x + x^2$ or $x^2 + x^2$	$x^2 + 2x$	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
					<b>Total 5 marks</b>



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
				<b>Total 3 marks</b>

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' - $2 \times$ '18'			M1
				A1 dep on M1
<i>Alternative</i>				
	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
				<b>Total 4 marks</b>

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