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**MATHEMATICS****1112/01**

Paper 1

**April 2019**

MARK SCHEME

Maximum Mark: 50

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## Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Markers were instructed to award marks. It does not indicate the details of the discussions that took place at an Markers' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the End of Series Report.

Cambridge will not enter into discussions about these mark schemes.

## Mark scheme annotations and abbreviations

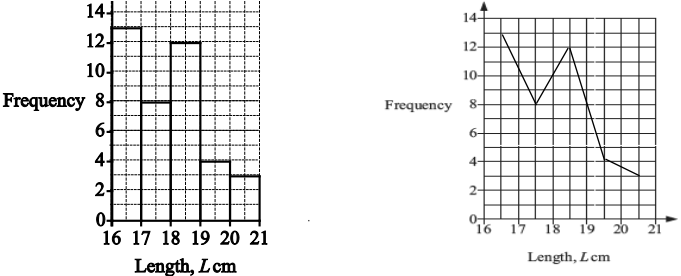
<b>M1</b>	method mark
<b>A1</b>	accuracy mark
<b>B1</b>	independent mark
<b>FT</b>	follow through after error
dep	dependent
oe	or equivalent
cao	correct answer only
isw	ignore subsequent working
soi	seen or implied

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This document consists of 7 printed pages and 1 blank page.

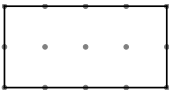
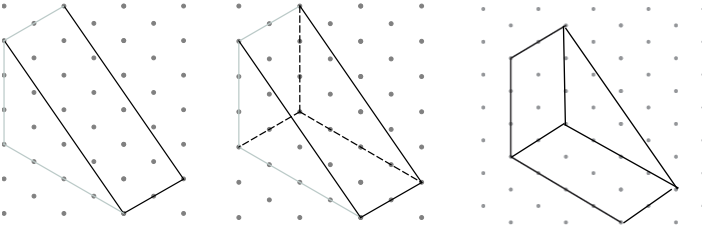
Question	Answer	Mark	Further Information
1	$(y =) 5$	1	
2	7	1	
3	1.5 (l)	1	Allow 1.5(00) allow $1\frac{1}{2}$ Do not accept 1500 m l
4	375 (g)	1	
5	$\frac{3}{10}$ oe	1	Allow equivalents e.g. 0.3, $\frac{6}{20}$ , $\frac{12}{40}$ as final answer
6	39 (54) 96 123 (297) 418	1	Accept any unambiguous indication. Both correct.
7	$x \rightarrow x^4 - 2$ $x \rightarrow 4(x - 2)$ ( $x \rightarrow 4x - 2$ ) $x \rightarrow 2 - 4x$	1	Accept any unambiguous indication.
8	3.81	1	
9	12 (days)	1	
10	840 (cm <sup>3</sup> )	2	
	$7 \times 4 \times 3 \times 10$ oe or sight of 280 or 84 or 120 or 210	M1	
11	Ticks Rice B <b>and</b> gives 150 <b>and</b> 125	2	Do <b>not</b> award any marks for choice of rice B without a correct explanation. Accept correct explanation if no box is ticked. <ul style="list-style-type: none"> <li>With rice B, you get 150g extra, but with rice A you only get 125g extra.</li> </ul>
	150 or 125 seen  or  625 and 900 seen	B1	

Question	Answer	Mark	Further Information
12	Ticks Lily <b>and</b> gives correct supporting work e.g. <ul style="list-style-type: none"> <li><math>11^2 = 121</math> or <math>\sqrt{121}</math> is 11</li> <li>121 is closer (to 120 than 100)</li> </ul>	1	Do <b>not</b> award any marks for choice of Lily without a correct explanation. Accept correct explanation if no box is ticked, provided the decision of Lily being closer is clear.
13	61 (and) 67	1	Must have just these two.
14	Coin C ticked	1	Allow any unambiguous indication.
15	÷ × × ÷	2	
	3 correct signs	B1	
16	36(°)	1	
17(a)	2 (hours) 18 (minutes)	1	
17(b)	12:36 (pm)	2	
	sight of 15:10, 15:30, 15:58 or 15:06 <b>or</b> 12:36 not as final answer	B1	e.g. circled on table
18(a)	$\frac{7}{11}$ cao	1	
18(b)	$\frac{5}{49}$ cao	1	Do <b>not</b> accept $\frac{5}{7^2}$

<p><b>19(a)</b></p>	<p>A fully correct frequency diagram:</p>  <p>The left diagram is a bar chart with the x-axis labeled 'Length, L cm' (values 16, 17, 18, 19, 20, 21) and the y-axis labeled 'Frequency' (values 0, 2, 4, 6, 8, 10, 12, 14). The bars have heights of 13, 8, 12, 4, and 3 respectively. The right diagram is a frequency polygon with the same axes. The points are plotted at midpoints (16.5, 17.5, 18.5, 19.5, 20.5) with heights of 13, 8, 12, 4, and 3. The lines connect these points and touch the x-axis at the midpoints.</p>	<p><b>2</b></p>	<p>The frequency diagram must be fully correct for 2 marks, i.e. bars must touch and have the correct widths and heights.</p> <p>Accept frequency polygon with values plotted at the midpoints, ignore vertical lines and allow joining or not joining to axes.</p>
	<p>The diagram contains only one error.</p>	<p>M1</p>	<p>Examples of one error are:</p> <ul style="list-style-type: none"> <li>• having gaps between bars provided bars touch midpoints,</li> <li>• drawing 5 lines rather than 5 bars provided lines are at midpoints,</li> <li>• drawing just midpoints and not joining up (and no other lines),</li> <li>• one incorrect bar height or one incorrect point on the frequency polygon,</li> <li>• consistently using start (or end) of class intervals for a frequency polygon</li> </ul>
<p><b>19(b)</b></p>	<p>Ticks 'Rajiv is not correct' <b>and</b> gives a correct reason, e.g.</p> <ul style="list-style-type: none"> <li>• It is in <math>17 \leq L &lt; 18</math></li> <li>• More than half the values are less than 18 (cm).</li> <li>• Less than half the values are 18 (cm) or more.</li> </ul>	<p><b>1</b></p>	<p>Accept reference to either the 20<sup>th</sup> or 21<sup>st</sup> or 20.5<sup>th</sup> value being the median.          Do not accept e.g. 21 values are less than 18, unless there is some indication that it should be half the values.          Do not accept any reference to the interval with the 'median frequency'.          Do <b>not</b> award any marks for choice of correct without a correct explanation.          Accept correct explanation if no box is ticked e.g. Rajiv is not correct because it is in <math>17 \leq L &lt; 18</math></p>
<p><b>20</b></p>	<p>282</p>	<p><b>1</b></p>	

Question	Answer	Mark	Further Information								
21	<table style="border: none;"> <tr> <td style="padding-right: 20px;">Primary</td> <td>Secondary</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table>	Primary	Secondary	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Allow any unambiguous indication.
Primary	Secondary										
<input checked="" type="checkbox"/>	<input type="checkbox"/>										
<input type="checkbox"/>	<input checked="" type="checkbox"/>										
<input type="checkbox"/>	<input checked="" type="checkbox"/>										
22	(\$) 15	1									
23(a)	35	1									
23(b)	13 or answer to (a) – $7 \times -5$ and answer to (b) is $6 - -7$	1	Provided not spoilt by evaluating incorrectly.								
24(a)	$5(x - 1) = 2(x + 8)$ or $5x - 5 = 2x + 16$	1	isw after seeing correct answer.								
24(b)	30 (cm)	2	<u>If answer in part (a) is incorrect</u> Award 2 FT for correctly solving <i>their (a)</i> (as long as <i>their (a)</i> is linear) <b>and</b> correctly substituting <i>their x</i> to find the length of one of the lines.								
	$x = 7$ or correctly finding the length of the line using <i>their 7</i> or correctly solving <i>their (a)</i> (as long as <i>their (a)</i> is linear)	B1	Condone an answer of 7 for B1.								
25	(3, 10)	2									
	One correct coordinate	B1									

Question	Answer	Mark	Further Information																																																	
<b>26</b>	$\frac{17}{36}$	<b>3</b>	Provided 6 and 8 are not incorrect.																																																	
	A complete correct sample space diagram  <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td><b>+</b></td><td><b>1</b></td><td><b>2</b></td><td><b>4</b></td><td><b>6</b></td><td>6</td><td>8</td></tr> <tr><td><b>1</b></td><td>2</td><td>3</td><td>5</td><td>7</td><td>7</td><td>9</td></tr> <tr><td><b>2</b></td><td>3</td><td>4</td><td>6</td><td>8</td><td>8</td><td>10</td></tr> <tr><td><b>4</b></td><td>5</td><td>6</td><td>8</td><td>10</td><td>10</td><td>12</td></tr> <tr><td><b>6</b></td><td>7</td><td>8</td><td>10</td><td>12</td><td>12</td><td>14</td></tr> <tr><td>6</td><td>7</td><td>8</td><td>10</td><td>12</td><td>12</td><td>14</td></tr> <tr><td>8</td><td>9</td><td>10</td><td>12</td><td>14</td><td>14</td><td>16</td></tr> </table> <p><b>or</b>                      a complete sample space diagram, with 6 and 8 correct but other errors <b>and</b> with correct follow through for probability</p>	<b>+</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>6</b>	6	8	<b>1</b>	2	3	5	7	7	9	<b>2</b>	3	4	6	8	8	10	<b>4</b>	5	6	8	10	10	12	<b>6</b>	7	8	10	12	12	14	6	7	8	10	12	12	14	8	9	10	12	14	14	16	B2	
	<b>+</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>6</b>	6	8																																													
<b>1</b>	2	3	5	7	7	9																																														
<b>2</b>	3	4	6	8	8	10																																														
<b>4</b>	5	6	8	10	10	12																																														
<b>6</b>	7	8	10	12	12	14																																														
6	7	8	10	12	12	14																																														
8	9	10	12	14	14	16																																														
Identifying <b>6 and 8</b> (the two missing numbers from the spinner) <b>or</b> a complete correct sample space diagram using <i>their</i> values (ignoring grey boxes) <b>or</b> $\frac{\text{The number of their values over 9}}{36}$ from a complete diagram	B1	Note: may be on spinner or in top row or in first column of table.																																																		
<b>27</b>	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Positive gradient <math>y = 4x + 1</math> <math>y = 3x - 5</math></td> <td>Zero gradient <math>y = -1</math></td> <td>Negative gradient <math>y = -6x</math> <math>x + y = 11</math></td> </tr> </table>	Positive gradient $y = 4x + 1$ $y = 3x - 5$	Zero gradient $y = -1$	Negative gradient $y = -6x$ $x + y = 11$	<b>2</b>	Allow correct equivalent rearranged equations.																																														
	Positive gradient $y = 4x + 1$ $y = 3x - 5$	Zero gradient $y = -1$	Negative gradient $y = -6x$ $x + y = 11$																																																	
2 correctly placed equations	B1																																																			
<b>28(a)</b>	$p = 56(^{\circ})$ $q = 20(^{\circ})$	<b>2</b>																																																		
	One correct value	B1																																																		

Question	Answer	Mark	Further Information
<b>28(b)</b>	Ticks Not correct <b>and</b> gives a correct reason, e.g. <ul style="list-style-type: none"> <li>• in a kite, two angles are equal</li> <li>• a kite has one pair of equal angles</li> <li>• (BCDE) doesn't have any equal angles</li> <li>• a kite has a line of symmetry</li> <li>• a kite is symmetrical</li> <li>• (BCDE) doesn't have any lines of symmetry</li> <li>• (BCDE) doesn't have two pairs of equal sides.</li> </ul>	<b>1</b>	Do <b>not</b> accept a reason based measured sides or a reason based on one pair of sides.  Others answers are acceptable e.g. <ul style="list-style-type: none"> <li>• 132 doesn't equal 118</li> <li>• Angles E and C are not the same</li> </ul> But do not allow <ul style="list-style-type: none"> <li>• E and C are not the same</li> </ul>
<b>29(a)</b>		<b>2</b>	Allow any orientation of a 4 cm by 2 cm rectangle. Do not allow internal lines.
	A rectangle with one dimension correct with no internal lines <b>or</b> a 2 cm by 4 cm rectangle ignoring internal lines.	B1	
<b>29(b)</b>	 <p>or with some or all hidden lines shown</p>	<b>1</b>	
<b>30</b>	$\frac{11}{12}$	<b>2</b>	
	$\frac{7}{6}$ oe (finding the difference) <b>or</b> $\frac{11}{6}$ oe (finding the sum) <b>or</b> a value equivalent to $\frac{11}{12}$	B1	e.g. $\frac{5.5}{6}$

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