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**MATHEMATICS****1112/02**

Paper 2

**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 8 printed pages.

Question	Answer	Mark	Further Information
1(a)	77 (°F)	1	
1(b)	$^{\circ}\text{F} \longrightarrow \boxed{-32} \longrightarrow \boxed{\div 1.8} \longrightarrow ^{\circ}\text{C}$	1	Allow any equivalent e.g. $\times \frac{5}{9}$ for $\div 1.8$
2	45	1	
3	$\frac{1}{15} \quad \frac{5}{15} \quad \frac{1}{2} \quad \left(\frac{3}{4}\right)$	1	Allow any unambiguous indication.
4(a)	249 000 cao	1	
4(b)	52.7 cao (square kilometres)	1	
5		2	
	The orientation of the image is correct but it is in the incorrect position <b>or</b> 3 or 4 of the 5 vertices are in the correct position.	B1	
6(a)	$x = 4$ $y = 4x$ $y = 4$ $x + y = 4$	1	Accept any unambiguous indication.
6(b)		1	Line must extend at least as far as (0, 2) and (6, 2).

Question	Answer	Mark	Further Information
7(a)	An answer between 6.4 (metres) and 7.2 (metres) inclusive	1	
7(b)	Rectangle measuring 1.5 cm by 2 cm ( $\pm 2$ mm)	1	This can be positioned anywhere
8(a)	2.25 (km)	2	
	sight of 2250 or 0.025 or $90 \times 25 \div 1000$ or a correct conversion of <i>their</i> m to km	B1	e.g. $90 \div 25 = 3.6$ with answer 0.0036
8(b)	72	2	
	$\frac{90}{1+4}$ or $\frac{90}{5}$ or 18 (number of lengths in one share) or for 1800 (m) or for 1.8 (km) (total distance Carlos swims on his front)	B1	
9(a)	$y = 2x + 1$ $y = 0.5x - 2$ $y = 5 - x$ $x + y = 1$	1	Both equations must be indicated for the mark. Allow any unambiguous indication.
9(b)	$x = -2$ $y = -3$	1	$x$ and $y$ must both be correct for the mark.
10(a)	(S =) $\frac{\pi ab}{2}$ oe final answer	1	Note in parts (a) and (b) allow 3.14, 22/7 for $\pi$ Possible expressions for S are $\frac{1}{2}\pi ab$ and $\pi ab \div 2$ , allow e.g. $1.57ab$ The order of the multiplicands can vary.
10(b)	252 to 253 (cm <sup>3</sup> )	2	Accept answer in terms of pi, e.g. $80.4\pi$ , $\frac{10051\pi}{125}$
	$\pi \times 7.6 \times 9.2^2 \div 8$ oe	M1	

11(a)	56.06... or 56.1 and Too big	1	
11(b)	(x =) 5.7 cao	1	
12(a)	$b > m$ $b \geq m$ $b < m$ $b \leq m$	1	Accept any unambiguous indication.
12(b)	$a < \frac{1}{2} b$	1	Or equivalent, e.g. $2a < b$ , $b > 2a$ , $\frac{1}{2} b > a$
13	52.9...(%) or 53 (%)	2	Allow $52 \frac{16}{17} \%$ but not $\frac{900}{17} \%$
	45 seen	B1	
	$\frac{10+15+20}{85} \times 100$ or $\frac{k}{85}$ correctly converted to a percentage.	M1	<b>Only</b> if B1 not awarded.  To a minimum of 2sf

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14		2	
	<p>A triangle of correct size and orientation but in the wrong position  <b>or</b>  for 2 correct vertices plotted  <b>or</b>  a correct enlargement using centre C but with SF 2 or 4.</p>	B1	
15(a)	Point plotted at (1.8, 9.5)	1	
15(b)	Answer between 8 (seconds) and 10 (seconds) inclusive.	1	
16	77 (cm)      780 (mm)      7.6 (m)      0.075 (km)	2	Accept lengths written in different units.
	<p>Three values in the correct order  <b>or</b>  reverse order.</p>	B1	

17	Ticks “Chen earned a bonus” and gives correct supporting value, e.g. <ul style="list-style-type: none"> <li>sight of 2.859... (km/l)</li> <li>sight of 98.0357... (litres)</li> <li>sight of 274.5 (km) <b>and</b> 268.8 (km)</li> </ul>	2	Allow rounded or truncated values to at least 2 sf but do not allow 2.8 alone without the calculation. If no box ticked allow 2 marks if decision is clear in the working and there is a correct supporting value.
	sight of any of <ul style="list-style-type: none"> <li><math>61 \times 4.5</math> or 274.5</li> <li><math>96 \times 2.8</math> or 268.8</li> <li><math>61 \times 4.5 \div 96</math> or 2.859...</li> <li><math>4.5 \times 61 \div 2.8</math> or 98.0357...</li> </ul>	B1	Allow rounded or truncated values to at least 2 sf but do not allow 2.8 alone without the calculation.
18	True    False <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	1	
19	One of $a = 1$ <b>or</b> $a = 2$ <b>or</b> $a = 3$ <b>or</b> $a = 4$ $b = 9$ $b = 8$ $b = 7$ $b = 6$	2	
	A correct relationship connecting $a$ and $b$ , e.g. <ul style="list-style-type: none"> <li><math>a + b = 10</math></li> <li><math>\frac{1}{2}(a + b) \times 6 = 30</math></li> <li><math>3(a + b) = 30</math></li> <li><math>6b - \frac{6(b - a)}{2} = 30</math></li> <li><math>6a + \frac{6(b - a)}{2} = 30</math></li> </ul>	M1	Relationship can be implied by two positive answers that add to 10.  Do not allow 10 and 0 for $a$ and $b$ .  $a$ and $b$ can be numerical for the M1 mark e.g. $\frac{1}{2}(7 + 3) \times 6 = 30$

<b>20</b>	(Film) <b>B and</b> correct working. The working should enable a comparison of the films to be made, e.g. sight of <ul style="list-style-type: none"> <li>• (1 :) 1.727... <b>and</b> (1 :) 1.4</li> <li>• 0.578... (: 1) <b>and</b> 0.714... (: 1)</li> <li>• 0.366...<b>and</b> 0.416...</li> <li>• 0.633... <b>and</b> 0.583...</li> <li>• 22/60 <b>and</b> 25/60</li> <li>• 55:95 <b>and</b> 55:77</li> <li>• 77:133 <b>and</b> 95:133</li> </ul>	<b>2</b>	Accept equivalent fractions and percentages.  Other values are possible.  Allow figures rounded or truncated to an appropriate number of significant figures in order to compare.
	Sight of any one acceptable value.	M1	Accept equivalent fractions and percentages .
<b>21</b>	25 (%)	<b>3</b>	
	A correct method, e.g. <ul style="list-style-type: none"> <li>• <math>\frac{40}{160}(\times 100)</math></li> <li>• <math>\frac{0.4 \times 8^2 (= 25.6)}{8 \times 1.6 \times 8 (= 102.4)}(\times 100)</math></li> </ul> <b>or</b> for 12.8 or 102.4 <b>and</b> $0.4 \times 8^2$ or 25.6	M2	
	Sight of any of: <ul style="list-style-type: none"> <li>• 160% (= 1.6)</li> <li>• 12.8 <b>or</b> 102.4 <b>or</b> <math>0.4 \times 8^2</math> <b>or</b> 25.6</li> </ul>	B1	Only if M2 <b>not</b> awarded.
<b>22</b>	4200 cm <sup>3</sup> 54 000 mm <sup>3</sup> 45 litres <u>52 000 ml</u>	<b>1</b>	Accept any unambiguous indication.

<b>23</b>	Ticks no <b>and</b> correct reason with supporting values involving all three age groups, e.g. <ul style="list-style-type: none"> <li>percentages that can remember are 80%, 70% and 65% (and these decrease with age)</li> <li>percentages that cannot remember are 20%, 30% and 35% (and these increase with age)</li> <li>26 out of 40 is the same as 13 out of 20 and this is lower than 16 and 14</li> </ul>	<b>2</b>	Accept an answer that combines two age groups e.g. compares people under 30 and people over 30 using 30 and 26 (can remember) or 10 and 14 (can't remember).
	Two correct comparative fractions, decimals or percentages <b>or</b> Three comparable figures e.g. <ul style="list-style-type: none"> <li>20, 13 and 7 (halving bottom row)</li> <li>16, 14 and 13 or 4, 6 and 7 (halving bottom row)</li> <li>32, 28 and 26 or 8, 12 and 14 (doubling top two rows)</li> </ul> <b>or</b> A correct comparative statement between age groups	B1	Other multiples may be possible Also may be shown in the table.
<b>24</b>	6400	<b>3</b>	
	$\frac{120}{3}$ <b>and</b> $\frac{30}{3}$ <b>and</b> $\frac{50}{3}$ truncated <b>or</b> 40 <b>and</b> 10 <b>and</b> 16	M2	May be seen on diagram.  Do not allow $\frac{180\,000}{27}$ for 2 marks
	Conversion of 1.2m into 120 (cm) <b>or</b> Correct truncation of $\frac{50}{3}$	B1	Implied by 40 or 180 000 or 6666 to 6667  Implied by 16
<b>25</b>	3.5 <b>and</b> -3.5	<b>1</b>	Either order. Allow $\frac{7}{2}$ <b>and</b> $-\frac{7}{2}$ .