
MATHEMATICS

1112/02

Paper 2

October 2017

MARK SCHEME

Maximum Mark: 50

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 a Markers' meeting before marking began, which would have considered the acceptability of alternative answers.

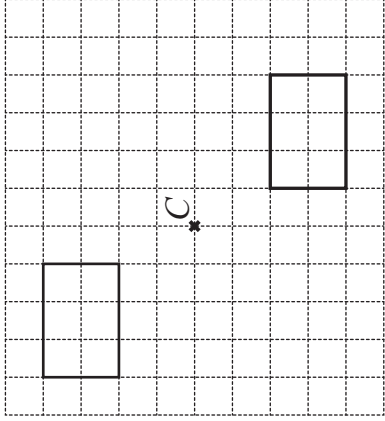
Mark schemes should be read in conjunction with the question paper and the End of Series report. Cambridge will not enter into discussions about these mark schemes.

This document consists of **14** printed pages.

Mark scheme annotations and abbreviations

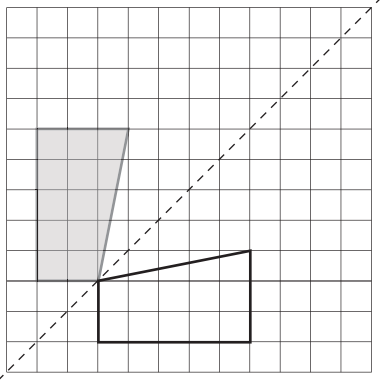
M1	method mark
A1	accuracy mark
B1	independent mark
FT	follow through after error
dep	dependent
oe	or equivalent
cao	correct answer only
isw	ignore subsequent working
soi	seen or implied

Question	Answer	Marks	Further Information
1(a)	18000	1	
1(b)	2.1	1	Do not accept 2.10...
Question	Answer	Marks	Further Information
2	125 (cm ³)	1	
Question	Answer	Marks	Further Information
3	1.775 (kg)	1	
Question	Answer	Marks	Further Information
4(a)	(a =) 45	1	
4(b)	(b =) 80	1	
4(c)	(c =) 55	1	Allow follow through of 180 – their (a) – their (b) or 135 – their (b) or 100 – their (a)
Question	Answer	Marks	Further Information
5	(remainder =) 5	1	Award 1 mark if 493 r 5 is seen as long as the remainder is indicated.

Question	Answer	Marks	Further Information
6	<p>Ticks Blessy and gives a correct reason, e.g.</p> <ul style="list-style-type: none"> Ahmed's results are all close to what you would expect but Blessy's results aren't. You would expect all the frequencies to be close to 20 Blessy has too many 1's / not enough 6's The frequencies for Blessy's scores are very varied. 	1	<p>Allow 'The range of Blessy's frequency is higher'.</p> <p>Do not accept: 'Blessy has a higher frequency.'</p>
Question	Answer	Marks	Further Information
7		1	
Question	Answer	Marks	Further Information
8(a)	0.8125 0.71875	1	Both must be correct for the award of 1 mark.
8(b)	Any decimal between 0.71875 and 0.8125	1	Allow a follow though for a decimal between <i>their</i> two answers in part (a).

Question	Answer	Marks	Further Information																				
9(a)	2	1																					
9(b)	$26 - 3n$ oe	2	Allow equivalent answers, e.g.: $23 + (n - 1) (-3)$ $23 - 3(n - 1)$ Do not accept: $n = 26 - 3n$ $23 + (n - 1) - 3$																				
	$(\pm) 3n$ seen	B1																					
Question	Answer	Marks	Further Information																				
10	<table border="1"> <thead> <tr> <th>Bag A</th> <th>Bag B</th> </tr> </thead> <tbody> <tr> <td>Blue</td> <td>Green</td> </tr> <tr> <td>Yellow</td> <td>Green</td> </tr> <tr> <td>Red</td> <td>Green</td> </tr> <tr> <td>Blue</td> <td>White</td> </tr> <tr> <td>Yellow</td> <td>White</td> </tr> <tr> <td>Red</td> <td>White</td> </tr> <tr> <td>Blue</td> <td>Red</td> </tr> <tr> <td>Yellow</td> <td>Red</td> </tr> <tr> <td>Red</td> <td>Red</td> </tr> </tbody> </table>	Bag A	Bag B	Blue	Green	Yellow	Green	Red	Green	Blue	White	Yellow	White	Red	White	Blue	Red	Yellow	Red	Red	Red	1	All four must be correct for the award of the mark.
Bag A	Bag B																						
Blue	Green																						
Yellow	Green																						
Red	Green																						
Blue	White																						
Yellow	White																						
Red	White																						
Blue	Red																						
Yellow	Red																						
Red	Red																						

Question	Answer	Marks	Further Information
11	<p>Ticks Petronas Twin Towers and gives a correct explanation, e.g. Petronas Twin Towers = 440 – 460 m inclusive whereas GRES 2 = 412 – 428 m inclusive</p> <p>One height is found correctly or the scale for both buildings is used correctly from an incorrect measurement.</p>	2	<p>Accept answers such as: Petronas Twin Towers = 450 m Using a scale 1 cm : 40 m, this would be drawn 11.25 cm tall, but the GRES-2 drawing is only 10.5 cm tall.</p>
12	10:00 and 11:00	1	
13	<p>(\$)28.5(0)</p> <p>$\frac{38}{3.2}$ or $\frac{2.4}{3.2}$</p>	2	<p>Implied by 11.875 or 0.75</p>

Question	Answer	Marks	Further Information
14	 <p data-bbox="691 958 826 1765">3 correct vertices or a shape of the correct size and orientation but positioned incorrectly on the grid.</p>	2	
15	<p data-bbox="938 1709 970 1753">20</p> <p data-bbox="1010 1574 1082 1753">$\frac{240}{360}$ or $\frac{2}{3}$ oe</p> <p data-bbox="1090 1709 1187 1753">or 80 (tickets) or 100 (tickets)</p>	2	Do not accept $200 - 120 = 80$

Question	Answer	Marks	Further Information
16	1.18 oe	2	Accept 1.2
	Correct method for finding the total number of instruments, i.e: $(0 \times 14) + 1 \times 19 + 2 \times 11 + 3 \times 6$ or $(0) + 19 + 22 + 18$ or 59	M1	
Question	Answer	Marks	Further Information
17(a)	Chen: 50.5 and Aiko: 48 correctly placed in table.	2	
	50.5 or 48	B1	
17(b)	29 (minutes)	2	
	A correct method, e.g.: $1300 \div 45$	M1	Implied by answer of 28.8(.....) minutes or 28.9 minutes.
Question	Answer	Marks	Further Information
18	6	1	

Question	Answer	Marks	Further Information												
19	<p>A workable table with each of these features:</p> <ul style="list-style-type: none"> A row or column for at least tea, coffee and hot chocolate. Allow none/other/total. A row or column for recording responses, e.g.: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th></th> <th>Tally</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>Tea</td> <td></td> <td></td> </tr> <tr> <td>Coffee</td> <td></td> <td></td> </tr> <tr> <td>Hot chocolate</td> <td></td> <td></td> </tr> </tbody> </table> <p>Including a row or column for each type of hot drink. or for having a column (or row) for recording responses. or for including both features plus extraneous information, e.g. name</p>		Tally	Frequency	Tea			Coffee			Hot chocolate			2	<p>Award B1 only if additional columns are used.</p> <p>All columns/rows must be labelled for the award of 2 marks.</p> <p>Do not accept bar charts.</p>
	Tally	Frequency													
Tea															
Coffee															
Hot chocolate															
		B1													
Question	Answer	Marks	Further Information												
20(a)	$-4 \leq x < 2$ $-4 < x \leq 2$ $-4 \leq x \leq 2$	1													
20(b)	$y > 9$ or $9 < y$	1	Do not accept: $y = 9$ or $y \leq 9$ or $y \geq 9$												

Question	Answer	Marks	Further Information
21	190 (m ²)	4	
	188.(....) or $32\pi + 88$ or 189	B3	
	$\frac{\pi \times 8^2}{2}$ their answer for area + 88 their area correctly given to 2sf rounded from a more accurate answer that must be shown.	M1 M1 B1	Implied by 100.(....) or 32π Implied by $k \times \pi + 88$ $\pi = 3.1$ or better, or $= \frac{22}{7}$
Question	Answer	Marks	Further Information
22	3 (hours)	2	
	Sight of any of <ul style="list-style-type: none"> • 3600 (millilitres) • 0.02 (litres) • 180 (minutes) • 1200 (ml per hour) • 1.2 (litres per hour) 	B1	

Question	Answer	Marks	Further Information																														
23	A complete trial and improvement method leading to the answer ($x =$) 3.6	3	<p>The three marking points listed as M1, M1 and B1 must be included for the award of 3 marks. For example:</p> <table border="1" data-bbox="392 450 1023 819"> <thead> <tr> <th data-bbox="392 707 528 819">x</th> <th data-bbox="392 450 528 707">$x^3 - 2x$ (Accept rounded or truncated answers)</th> </tr> </thead> <tbody> <tr><td data-bbox="528 707 560 819">3.1</td><td data-bbox="528 450 560 707">23.591</td></tr> <tr><td data-bbox="560 707 592 819">3.2</td><td data-bbox="560 450 592 707">26.368</td></tr> <tr><td data-bbox="592 707 624 819">3.3</td><td data-bbox="592 450 624 707">29.337</td></tr> <tr><td data-bbox="624 707 655 819">3.4</td><td data-bbox="624 450 655 707">32.504</td></tr> <tr><td data-bbox="655 707 687 819">3.5</td><td data-bbox="655 450 687 707">35.875</td></tr> <tr><td data-bbox="687 707 719 819">3.6</td><td data-bbox="687 450 719 707">39.456</td></tr> <tr><td data-bbox="719 707 751 819">3.61</td><td data-bbox="719 450 751 707">39.825881</td></tr> <tr><td data-bbox="751 707 783 819">3.62</td><td data-bbox="751 450 783 707">40.197928</td></tr> <tr><td data-bbox="783 707 815 819">3.63</td><td data-bbox="783 450 815 707">40.572145</td></tr> <tr><td data-bbox="815 707 847 819">3.64</td><td data-bbox="815 450 847 707">40.948544</td></tr> <tr><td data-bbox="847 707 879 819">3.65</td><td data-bbox="847 450 879 707">41.327125</td></tr> <tr><td data-bbox="879 707 911 819">3.7</td><td data-bbox="879 450 911 707">43.253</td></tr> <tr><td data-bbox="911 707 943 819">3.8</td><td data-bbox="911 450 943 707">47.272</td></tr> <tr><td data-bbox="943 707 975 819">3.9</td><td data-bbox="943 450 975 707">51.519</td></tr> </tbody> </table>	x	$x^3 - 2x$ (Accept rounded or truncated answers)	3.1	23.591	3.2	26.368	3.3	29.337	3.4	32.504	3.5	35.875	3.6	39.456	3.61	39.825881	3.62	40.197928	3.63	40.572145	3.64	40.948544	3.65	41.327125	3.7	43.253	3.8	47.272	3.9	51.519
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	<p>Any correct trial of a number between 3 and 4 A correct trial of x where $3.62 \leq x \leq 3.65$ 3.6 in answer space.</p>	<p>M1 M1 B1</p>	<p>For both M1 marks to be awarded, one appropriate trial to 1 decimal place and one appropriate trial to 2 decimal places must be seen, e.g. trial at 3.6 and trial at 3.65</p>																														

Question	Answer	Marks	Further Information
24	27.77...(%) Accept 28, 27.8(0), 27.78, and $27\frac{7}{9}$ oe $\left(\frac{45 - 32.5}{45}\right)$ $100 - \left(\frac{32.5}{0.45}\right)$ or $1 - \left(\frac{32.5}{0.45}\right)$	2	Award only one of M1 or B1
		M1	Implied by 0.27(77 ...) or 0.28 or $\frac{5}{18}$
	$\frac{32.5}{45}$	B1	Implied by 0.72.... or 72(...)% or $\frac{13}{18}$

Question	Answer	Marks	Further Information									
25	<p>Spain circled and 0.32 oe and 0.36 oe seen</p> <p>a valid argument involving percentages or ratios or fractions e.g. NZ women = $39 \div 121 = 0.32$ or better and Spain = $126 \div 350 = 0.36$ or NZ men = $82 \div 121 = 0.68$ or better and Spain = $224 \div 350 = 0.64$ or NZ ratio of men to women = 2.1 : 1 and Spain 1.8 : 1 or NZ has 2.1 men for every woman and Spain 1.8 or NZ 0.48 women to each man and in Spain 0.56 or NZ has more than 2 men per woman and Spain has less than 2 men per woman or 13650:15246 oe or any equivalent statement.</p>	2	<p>2 marks are awarded for a clear explanation and identification of Spain.</p> <p>Ensure consistent use of columns e.g.</p> $\frac{82}{121} \text{ and } \frac{224}{350}$ <table style="margin-left: 40px;"> <tr> <td></td> <td style="text-align: center;">Men</td> <td style="text-align: center;">Women</td> </tr> <tr> <td style="text-align: right;">NZ</td> <td style="text-align: center;">$\frac{28700}{42350}$</td> <td style="text-align: center;">$\frac{13650}{42350}$</td> </tr> <tr> <td style="text-align: right;">Spain</td> <td style="text-align: center;">$\frac{27104}{42350}$</td> <td style="text-align: center;">$\frac{15246}{42350}$</td> </tr> </table> <p>NZ = $121 \times 3 = 363$ and $39 \times 3 = 117$ Spain = 350 and 126</p>		Men	Women	NZ	$\frac{28700}{42350}$	$\frac{13650}{42350}$	Spain	$\frac{27104}{42350}$	$\frac{15246}{42350}$
	Men	Women										
NZ	$\frac{28700}{42350}$	$\frac{13650}{42350}$										
Spain	$\frac{27104}{42350}$	$\frac{15246}{42350}$										
	<p>calculating any one of</p> <ul style="list-style-type: none"> • 0.32 or 32% • 0.36 or 36% • 0.68 or 68% • 0.64 or 64% • 2.1 or 1.8 or 0.48 or 0.56 • 13650 or 15246 seen 	M1										

Question	Answer	Marks	Further Information
26	35 to 40	1	