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**MATHEMATICS**

**1112/02**

Paper 2

**October 2018**

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**

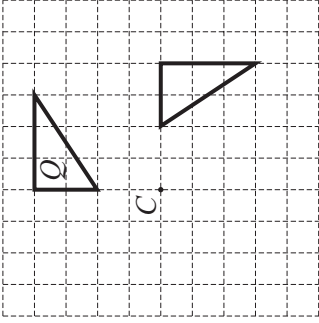
<b>M1</b>	method mark
<b>A1</b>	accuracy mark
<b>B1</b>	independent mark
<b>FT</b>	follow through after error
dep	dependent
oe	or equivalent
cao	correct answer only
isw	ignore subsequent working
soi	seen or implied

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This document consists of **9** printed pages.

Question	Answer	Marks	Further Information
1	32.01	1	
2	(\$)74	2	
	$\frac{103.60}{56} \times 40$ or 1.85 or 0.71(...) or $\frac{5}{7}$	M1	
3	2 (°C)	2	
	For either 18 or 20 seen <b>or</b> For a mark on the graph at 17:30	B1	
4(a)	2	1	
4(b)	10	1	
5	Millilitres or ml Kilograms or kg Kilometres or km	2	Allow any unambiguous indication of the correct answer.
	2 correct	B1	
6	11 <b>and</b> 13	1	In either order.
7	20	1	Ignore any units given.

Question	Answer	Marks	Further Information
8(a)	$\frac{2}{6}$ or $\frac{1}{3}$ or 0.33(...) or 33(.3...)%	1	
8(b)	$\frac{45}{120}$ or an equivalent fraction e.g. $\frac{3}{8}$ , $\frac{9}{24}$ or 0.375 or 37.5%	1	
9	Point E marked on the grid at (2, 1)	1	Allow any unambiguous indication of the correct answer.
10	Ticks Women <b>and</b> correct figure for comparison, e.g. <ul style="list-style-type: none"> <li>• (31 out of 80) = 38(.75%)</li> <li>• (41% of 80) = 32(.8)</li> </ul>	2	Note other correct methods are acceptable.  or 0.38(..) or 39(%) or 0.39 or 33
	correct method for comparison, e.g. $\frac{31}{80}$ or $31 \div 80$ <b>or</b> $0.41 \times 80$ oe	M1	Note other correct methods are acceptable or 38(.75%) or 0.38(...) or 39(%) or 0.39 implied by 32.8 or 33

Question	Answer	Marks	Further Information
11(a)	$2(3x + 5) + 2(x + 2)$ isw	1	Allow any equivalents e.g. $8x + 14$ , $6x + 10 + 2x + 4$ , $2(4x + 7)$
11(b)	23	3	
	Correctly solving <i>their</i> linear equation from (a)	M2	Implied by $x = 6$
	Forming a correct equation e.g. $2(3x + 5) + 2(x + 2) = 62$ oe or $3 \times \text{their } 6 + 5$	M1	Allow <i>their</i> expression in (a) = 62 $6x + 10 + 2x + 4 = 62$ $8x + 14 = 62$ , $2(4x + 7) = 62$
12		1	
13	24 (%)	2	
	$\frac{744 - 600}{600}$ or $\frac{144}{600}$ or 0.24 or $\frac{744}{600}$ or 1.24 or 124(%)	M1	

Question	Answer	Marks	Further Information
14	<div style="display: flex; flex-wrap: wrap; gap: 10px;"> <div style="border: 1px solid black; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;"><input type="checkbox"/></div> <div style="border: 1px solid black; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;"><input checked="" type="checkbox"/></div> <div style="border: 1px solid black; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;"><input type="checkbox"/></div> <div style="border: 1px solid black; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;"><input checked="" type="checkbox"/></div> <div style="border: 1px solid black; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;"><input type="checkbox"/></div> <div style="border: 1px solid black; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;"><input checked="" type="checkbox"/></div> <div style="border: 1px solid black; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;"><input type="checkbox"/></div> <div style="border: 1px solid black; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;"><input checked="" type="checkbox"/></div> </div>	2	Allow any unambiguous indication of the correct answer.
15	<p>2 correct answers.</p> <p>140(.088...) (pounds)</p> <p><math>\frac{63.6}{45.4} \times 100</math> oe or 1.4.... or 0.454 or 0.71... or 2.2... seen</p>	B1	Award 2 marks for answers rounding to 140 correct to the nearest whole number
16	<p>Saturday <b>and</b> a correct reason relating to the <b>mean</b> or <b>average</b>, e.g. It has the largest mean/ average value.</p>	M1	Do not accept Saturday has the smallest range, by itself.

Question	Answer	Marks	Further Information
17	<p>Algebraic method seen leading to  <math>(x =) 7</math>  <math>(y =) 3</math></p> <p>An algebraic method leading to either  <math>x = 7</math> or <math>y = 3</math></p> <p>An attempt at eliminating either <math>x</math> or <math>y</math>  e.g.</p> <ul style="list-style-type: none"> <li>• correct substitution and evaluation from incorrect first value implied by two values satisfying one of the original equations.</li> <li>• making the coefficients of <math>x</math> or <math>y</math> equal followed by an appropriate consistent subtraction or addition across <u>all</u> 3 terms</li> <li>• re-arranging one of the equations to make one variable the subject and then substituting their arrangement into the other equation,  e.g. <math>x + 2(24 - 3x) = 13</math> or <math>3(13 - 2y) + y = 24</math></li> </ul>	3	<p>Do not accept trial and improvement as a method.</p> <p>M2</p> <p>M1</p> <p>With no more than one arithmetic error.  Can be implied by <math>5y = 15</math> or <math>5x = 35</math></p> <p>With no errors.</p>

Question	Answer	Marks	Further Information
18	(8, 10)	3	
	(8, k) or (k, 10) for D or for finding coordinates of C, i.e. (6, 6)	B2	
	(6, k) or (k, 6) for C or for sight of $\frac{x_1 + x_2}{2}$ or with correct numbers or $\frac{3}{4} \times (10 - 2)$ or $\frac{3}{4} \times (14 - -2)$	M1	e.g. $\frac{2+10}{2}, \frac{-2+14}{2}$ Do not allow $\frac{x_1 - x_2}{2}$
19(a)	$3n + 11$	2	Mark the final answer for 2 marks. Allow equivalent unsimplified, e.g. $14 + 3n - 3, 14 + 3(n - 1)$ Do not accept: $n = 3n + 11$
19(b)	$(\pm) 3n \pm k$ seen or correct expression seen then spoilt	B1	Allow for just $3n$
	$\frac{1}{3}, \frac{2}{5}, \frac{3}{7}$	2	In correct order. Accept equivalent fractions or decimal equivalents for 2 marks or for B1: $\frac{1}{3} = 0.33(33\dots), \frac{2}{5} = 0.4, \frac{3}{7} = 0.42(857\dots)$ or 0.43
	Any one term correct.	B1	Regardless of order

Question	Answer	Marks	Further Information
<b>20</b>	$\frac{3x+1}{8}$ Correct fractions with a common denominator e.g. $\frac{2x}{8} + \frac{x+1}{8}$	<b>2</b>	M1 implied by correct unsimplified answer e.g. M1 for $\frac{8x}{32} + \frac{4(x+1)}{32}$ , $\frac{12x+4}{32}$
<b>21</b>	A <b>complete</b> trial and improvement method leading to the answer $x = 8.6$ Must include all three marking points below. Any correct trial of a number between 8 and 9 A correct trial of $x$ where $8.6 < x \leq 8.65$ 8.6 in answer space.	<b>3</b>	Ignore the final column in the table when marking.  For both M1 marks to be awarded, one appropriate trial to at least 1 decimal place and one appropriate trial to at least 2 decimal places must be seen, e.g. trial at 8.6 and trial at 8.65
<b>22</b>	72 (cm) <b>and</b> 53 (°)	<b>1</b>	Both correct for the mark.



Question	Answer	Marks	Further Information
23	Shirt A and gives correct supporting ratios, e.g. 1.8(57...):1 and 1.5:1	2	Allow fractions $\frac{13}{7}$ :1 and $\frac{3}{2}$ :1 Allow rounded e.g. 1.9:1 and 1.5:1
	Any of <ul style="list-style-type: none"> <li>• 1.8(57...) or <math>\frac{13}{7}</math></li> <li>• 1.5 or <math>\frac{3}{2}</math></li> </ul>		
24	8 (hours)	1	
25	-2	1	
26	1500 (kg)	2	
	150 000 (m <sup>2</sup> ) seen or for a correct method e.g. $15 \times 10\,000 \times \frac{10}{1000}$ oe or for follow through of incorrect area conversion multiplied by 0.01 correctly.		