

1MA1 Practice papers Set 2: Paper 3F (Regular) mark scheme – Version 1.0				
Question	Working	Answer	Mark	Notes
1.		5 hundredths	1	B1
2.		5y	1	B1
3.		680 000	1	B1
4.		1, 2, 4, 5, 8, 10, 20, 40	2	B2 All correct with no extras (B1 at least 4 correct factors)
5.	$36 \times 4 (= 144)$ $176 + 103 + 144 (= 423)$ $15 \times 28 = 420$ Or $'423' \div 28 = 15.107\dots$	No with correct working	4	M1 for $36 \times 4 (=144)$ M1 for $176 + 103 + '144' (= 423)$ M1 for $28 \times 15$ C1 (dep on at least M2 awarded) for 420 <b>and</b> 423 and 'No she won't have enough' <b>Or</b> M1 for $36 \times 4 (=144)$ M1 for $176 + 103 + '144' (=423)$ M1 for $423 \div 28$ C1 (dep on at least M2 awarded) for 15.10 <b>or</b> 15.11 <b>or</b> 15.107... and 'No she won't have enough'

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6.	(a)	$\times$ at $\frac{1}{2}$	1	B1 for cross at $\frac{1}{2}$
	(b)	$\times$ at 0	1	B1 for cross at 0
	(c)	$\times$ near $\frac{1}{4}$	1	B1 for cross near $\frac{1}{4}$
7.	(a)	Info plotted at (6.1, 32)	1	B1 for a correct plot $\pm 2$ mm
	(b)	Positive	1	B1 for positive (correlation)
	(c)	6.6 to 7.6	2	M1 for a single straight line segment with positive gradient that could be used as a line of best fit or an indication on the diagram from 40 on the umbrella axis  A1 for an answer in the range 6.6 to 7.6 inclusive
8.	(a)	Correct reflection	2	M1 for a correct reflection in any line  A1 for a correct reflection in the y axis
	(b)	Correct enlargement	2	M1 for enlarging 2 adjacent sides correctly or correct enlargement using incorrect scale factor ( $\neq 1$ )  A1 cao

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9.		25	2	M1 for $(65 - 15) \div 2$ , $2x \pm 15 = 65$ (or equivalent), at least three pairs of numbers $a, b$ where $a + 15 = b$ OR $a + b = 65$  A1 cao
10.		mistake identified	C1	C1, e.g. added 6 instead of subtracting 6
11.	(a) $1.25 \times 620$	775	2	M1 for $1.25 \times 620$ (or equivalent)  A1 cao
	(b) $50 \div 1.25 = 40$ $42 - 40$  or $42 \times 1.25 = 52.5$ $52.5 - 50 = 2.50$	2	3	M1 for $50 \div 1.25 (= 40)$ (or equivalent)  M1 (dep) for $42 - "40"$ or $"40" - 42$  A1 cao for £2  OR  M1 for $42 \times 1.25 (= 52.5)$ oe  M1 (dep) for $"52.5" - 50$ or $50 - "52.5"$  A1 cao for £2

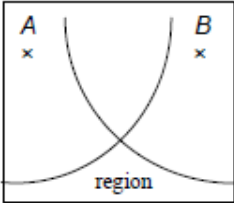
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Question	Working	Answer	Mark	Notes	
12.	(a)	150 ÷ 3  OR 3, 6, 9, 12, 15, (...)	50	2	M1 for 150 ÷ 3 or at least the first 5 multiples of 3 which may come from addition or subtraction  A1 cao
	(b)		7	2	M1 for 150 ÷ 20 or 7.5 seen or multiples of 20 up to 140 or up to 160 or subtracting 20s down to 10 or -10  A1 cao
	(c)	3 × 20 = 60 150 ÷ 60  <b>OR</b> 20, 40, <u>60</u> , 80, 100, <u>120</u> , 140 3, 6, ..., <u>60</u> , ..., <u>120</u> , ...	2	2	M1 for 20 × 3 or 60 seen or 150 ÷ 60 (or equivalent)  A1 cao  <b>OR</b>  M1 for listing 20 times table with 60 or 120 identified or listing 3 times table with 60 or 120 or 180 identified  A1 cao

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Question	Working	Answer	Mark	Notes
13.		Tuesday and Friday	3	<p>M1 for <math>179 \div 12</math> or <math>162 \div 12</math> or <math>170 \div 12</math> or <math>143 \div 12</math></p> <p>A1 for 14.9(166...) or 15 and 13.5 or 14 and 14.1(66...) or 15 and 11.9(16...) or 12</p> <p>C1 (dep M1) ft for comparison of their results for all the days with the number of teachers available leading to a correct statement</p> <p><b>Or</b></p> <p>M1 for <math>179 \div 15</math> or <math>162 \div 13</math> or <math>170 \div 14</math> or <math>143 \div 12</math></p> <p>A1 for 11.9(3...) or 12 and 12.4(6...) or 13 and 12.1(4...) or 13 and 11.9(1...) or 12</p> <p>C1 (dep M1) ft for comparison of their results for all the days with 12 leading to a correct statement</p> <p><b>Or</b></p> <p>M1 for <math>15 \times 12</math> or <math>13 \times 12</math> or <math>14 \times 12</math> or <math>12 \times 12</math></p> <p>A1 for 180 and 156 and 168 and 144</p> <p>C1 (dep M1) ft for comparison of their results for all the days with the number of students taking part leading to a correct statement</p>

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14.	$120 \div 0.3$  <b>Or</b>  $30\% = 120$ $\frac{120}{30} \times 100$  <b>Or</b>  $10\% = 40$ $10 \times 40 = 400$  <b>Or</b>  $10\% = 40,$ $120 + 120 + 120 + 40$	400	3	M2 for $120 \div 0.3$ or $\frac{120}{30} \times 100$ or $10\% = 40$ and $10 \times 40$ or $120 + 120 + 120 + 40$  (M1 for $30\% = 120$ or $10\% = 40$ (or equivalent))  A1 cao
15.	$\frac{15}{2} - \frac{14}{3} = \frac{45a}{6a} - \frac{28a}{6a}$	shown	3	M1 Complete improper fractions  M1 correct fractions with common denominator a multiple of 6  A1 dep on M2. Improper fraction required, e.g. $\frac{17}{6}, \frac{34}{12}$

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16.			3	<p>M1 for an arc drawn, centre <math>A</math> or <math>B</math>, radius 5 cm</p> <p>M1 for two intersecting correct arcs drawn</p> <p>A1 for identifying the correct region</p> <p>SC B2 for two hand drawn arcs within tolerance and region identified</p> <p>SC B1 for two hand drawn arcs within tolerance only</p>
17.		153	3	<p>M1 <math>\pi \times 9.8</math> (= 30.(7916...)) or <math>\pi \times 4.9</math> (= 15.(3938..))</p> <p>M1 <math>15.25 \times 4</math> (= 61) or <math>30.5 \times 2</math> (= 61)</p> <p>M1 (dep on first M1) for a correct method to find the total length of all lines</p> <p>A1 for answer in the range 152 – 153</p>

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18.	<table border="1" data-bbox="388 349 693 430"> <tr> <td><math>x</math></td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td><math>y</math></td> <td>-5</td> <td>-2</td> <td>1</td> <td>4</td> <td>7</td> </tr> </table>	$x$	-1	0	1	2	3	$y$	-5	-2	1	4	7	Straight line from $(-1, -5)$ to $(3, 7)$	3	<p><b>(Table of values)</b></p> <p>M1 for at least 2 correct attempts to find points by substituting values of <math>x</math>.</p> <p>M1 ft for plotting at least 2 of their points (any points plotted from their table must be correctly plotted)</p> <p>A1 for correct line between <math>-1</math> and <math>3</math></p> <p><b>(No table of values)</b></p> <p>M2 for at least 2 correct points (and no incorrect points) plotted</p> <p><b>OR</b> line segment of <math>y = 3x - 2</math> drawn (ignore any additional incorrect segments)</p> <p>(M1 for at least 3 correct points plotted with no more than 2 incorrect points)</p> <p>A1 for correct line between <math>-1</math> and <math>3</math></p> <p><b>(Use of <math>y = mx + c</math>)</b></p> <p>M2 for line segment of <math>y = 3x - 2</math> drawn (ignore any additional incorrect segments)</p> <p>(M1 for line drawn with gradient of 3 OR line drawn with a <math>y</math> intercept of <math>-2</math> and a positive gradient)</p> <p>A1 for correct line between <math>-1</math> and <math>3</math></p>
$x$	-1	0	1	2	3											
$y$	-5	-2	1	4	7											



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19.		16	4	<p>M1 for <math>x</math> for Cathy and <math>x + 5</math> for Abbie or <math>2(x + 5)</math> (or equivalent) for Bhavna</p> <p>M1 for forming an inequality by totalling their ages e.g. <math>x + x + 5 + 2(x + 5) &lt; 30</math> (condone equality)</p> <p>M1 (dep on M2) for complete correct method to solve their inequality (or equality) or for <math>4x &lt; 15</math> or <math>x &lt; 3.75</math> seen</p> <p>A1 for 16 or 17 from <math>2x + 10 &lt; 17.5</math>, with working seen</p> <p><b>OR</b></p> <p>M1 for <math>2x</math> for Bhavna and <math>x</math> for Abbie or <math>x - 5</math> for Cathy</p> <p>M1 for forming an inequality by totalling their ages e.g. <math>x + x + 5 + 2(x + 5) &lt; 30</math> (condone equality)</p> <p>M1 (dep on M2) for complete correct method to solve their inequality (or equality) or for <math>4x &lt; 35</math> or <math>x &lt; 8</math> seen</p> <p>A1 for 16 or 17 from <math>2x + 10 &lt; 17.5</math>, with working seen</p> <p><b>SC:</b> B2 for an answer of 16 or 17 from trial and improvement without the correct totals</p>

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Question	Working	Answer	Mark	Notes															
20.	<table border="1"> <thead> <tr> <th>Bird</th> <th>Freq</th> <th>Ang</th> </tr> </thead> <tbody> <tr> <td>Magpie</td> <td>15</td> <td>75</td> </tr> <tr> <td>Thrush</td> <td>10</td> <td>50</td> </tr> <tr> <td>Starling</td> <td>20</td> <td>100</td> </tr> <tr> <td>Sparrow</td> <td>27</td> <td>135</td> </tr> </tbody> </table> <p>Angles:  <math>\frac{15}{72} \times 360, \frac{10}{72} \times 360,</math>  <math>\frac{20}{72} \times 360, \frac{27}{72} \times 360</math></p> <p>OR</p> <p><math>360 \div 72 = 5</math>  <math>5 \times 15 = 75</math>                      etc</p>	Bird	Freq	Ang	Magpie	15	75	Thrush	10	50	Starling	20	100	Sparrow	27	135	Correct pie chart	3	<p>M1 for any one of <math>\frac{15}{'72'} \times 360, \frac{10}{'72'} \times 360, \frac{20}{'72'} \times 360,</math>  <math>\frac{27}{'72'} \times 360</math> (or equivalent)</p> <p>('72' must clearly come from adding frequencies)</p> <p>A1 for 75 seen from correct working <b>or</b>                      50 seen <b>or</b> 100 seen <b>or</b> 135 seen <b>or</b>                      one sector of angle 50° or 100° or 135° labelled correctly with                      bird's name <b>or</b> all sectors correctly drawn</p> <p>A1 for correct pie chart fully labelled with birds' names</p> <p><b>OR</b></p> <p>M1 for <math>\frac{'75'}{15} \times 10</math> <b>or</b> <math>\frac{'75'}{15} \times 20</math> <b>or</b> <math>\frac{'75'}{15} \times 27</math></p> <p>('75' should be in the range 73 – 77)</p> <p>A1 for 50 seen <b>or</b> 100 seen <b>or</b> 135 seen <b>or</b>                      one sector of angle 50° or 100° or 135° labelled correctly with                      bird's name <b>or</b> all sectors correctly drawn</p> <p>A1 for correct pie chart fully labelled with birds' names</p>
Bird	Freq	Ang																	
Magpie	15	75																	
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21.	12 are red. $\frac{1}{3}$ are red $12 \times 3 =$  2 blue for 1 red 24 blue for 12 red $24 + 12 =$	36	3	M1 for $P(\text{red}) = \frac{1}{3}$  M1 for $\frac{1}{3} \times 36 = 12$ red or $12 \times 3$  A1 for 36 cao  OR  M1 for 2 blue for 1 red  M1 for 24 blue for 12 red or $24 + 12$  A1 for 36 cao

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22.	$180 \times 365 = 65700$ $65700 \div 1000 = 65.7$ $65.7 \times 91.22 = 5993.154$ $5993.154 \div 100 + 28.20 = 88.13...$ <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>D</th> <th>U</th> <th>C</th> <th>T</th> </tr> </thead> <tbody> <tr> <td>366</td> <td>65880</td> <td>6010</td> <td>88.30</td> </tr> <tr> <td>365</td> <td>65700</td> <td>5993</td> <td>88.13</td> </tr> <tr> <td></td> <td>65000</td> <td>5929</td> <td>87.49</td> </tr> <tr> <td></td> <td>66000</td> <td>6020</td> <td>88.40</td> </tr> <tr> <td>364</td> <td>65520</td> <td>5976</td> <td>87.96</td> </tr> <tr> <td>360</td> <td>64800</td> <td>5911</td> <td>87.31</td> </tr> <tr> <td><del>336</del></td> <td><del>60480</del></td> <td>5517</td> <td>83.37</td> </tr> </tbody> </table>	D	U	C	T	366	65880	6010	88.30	365	65700	5993	88.13		65000	5929	87.49		66000	6020	88.40	364	65520	5976	87.96	360	64800	5911	87.31	<del>336</del>	<del>60480</del>	5517	83.37	Decision  (should have a water meter installed)	5	<p><b>Per year</b></p> M1 for $180 \times '365'$ (= 65700) M1 for $'65700' \div 1000$ (= 65.7 or 65 or 66) M1 for $'65.7' \times 91.22$ (= 5993...) A1 for answer in range (£)87 to (£)89 C1 (dep on at least M1) for conclusion following from working seen
D	U	C	T																																	
366	65880	6010	88.30																																	
365	65700	5993	88.13																																	
	65000	5929	87.49																																	
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360	64800	5911	87.31																																	
<del>336</del>	<del>60480</del>	5517	83.37																																	
				<p><b>OR (per day)</b></p> M1 for $107 \div '365'$ (= 0.293...) M1 for $180 \div 1000 \times 91.22$ (= 16.4196) M1 for $28.2 \div '365' + '0.164196'$ (units must be consistent) A1 for 29 – 30(p) and 24 – 24.3(p) (or equivalent) C1 (dep on at least M1) for conclusion following from working seen																																
				<p><b>OR</b></p> M1 for $(107 - 28.20) \div 0.9122$ (= 86.384..) M1 for $'86.384..' \times 1000$ (= 86384.5...) M1 for $'365' \times 180$ (= 65700) A1 for 65700 and 86384.5... C1 (dep on at least M1) for conclusion following from working seen																																
				<p>NB : Allow 365 or 366 or <math>52 \times 7</math> (=364) or <math>12 \times 30</math> (=360) or <math>365\frac{1}{4}</math> for number of days</p>																																

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Question	Working	Answer	Mark	Notes
23.	(a)	$7n - 4$	2	B2 for $7n - 4$  (B1 for $7n + d$ where $d$ is an integer)
	(b)	explanation	2	M1 for ' $7n - 4$ ' = 150  <b>or</b> any other valid method, e.g. counting on 7s (to get 150)  A1 for a complete explanation e.g. the 22nd term is 150 or $n = 22$ from solution of equation or a clear demonstration based on 22 or complete sequence
24.	(a)	76	3	M1 for $89\% = 68$  M1 for $68 \div 0.89$ (or equivalent)  A1 for $76 - 76.41$
	(b)	11.8	2	M1 for $(68 - 60) \div 68 \times 100$ (or equivalent)  A1 for $11.7 - 12$
25.		No with reason	1	C1 for No and e.g. the area of B will be $22 = 4$ times greater than the area of A, or may use values to give a counter example.
26.		-2, 5	2	M1 $(x + 2)(x - 5)$  A1

## National performance data from Results Plus

Source of questions						Mean score of students achieving grade:								
Qu No	Spec	Paper	Session	Qu	Topic	Max score	Mean % all	ALL	C	D	E	F	G	
1				NEW	Place value	1								No data available
2				NEW	Simplifying expressions	1								No data available
3				NEW	Rounding	1								No data available
4				NEW	Factors and multiples	2								No data available
5	5AM1	1F	1306	Q16	Money calculations	4	88	3.52	3.85	3.68	3.60	2.97	2.62	
6	5AM2	2F	1406	Q10	Probability scale	3	85	2.54	2.84	2.63	2.44	2.36	2.06	
7	1380	2F	1006	Q20	Scatter diagrams	4	73	2.93	3.68	3.33	2.83	2.19	1.32	
8	1380	2F	1203	Q19	Transformations	4	57	2.26	3.28	2.65	1.95	1.37	0.97	
9	5AM2	2F	1411	Q04	Integers	2	46	0.91	1.57	1.00	0.80	0.13	0.50	
10				NEW	Solving linear equations	1								No data available
11	1380	2H	1006	Q03	Conversions	5	84	4.22	3.86	3.03	2.19			
12	5AM1	1H	1206	Q01	Fractions	6	83	4.98	4.46	3.99	3.57			
13	1MA0	2F	1406	Q24	Estimation	3	43	1.28	2.16	1.82	1.47	1.00	0.56	
14	5MM2	2H	1206	Q10	Percentages	3	81	2.44	2.14	1.59	0.89			
15	4MA0(R)	1F	1501	Q19	Fractions	3	53	1.59	2.09	1.46	0.00	0.75	0.50	
16	5AM2	2H	1206	Q07	Loci	3	78	2.35	1.83	0.70	0.22			
17	5AM2	2H	1311	Q07	Area of a circle	4	74	2.95	2.38	1.52	1.00			
18	1MA0	2F	1206	Q21	Graphs of linear equations	3	25	0.74	1.74	0.94	0.35	0.09	0.02	
19	5AM2	2F	1506	Q24	Solve inequalities	4	28	1.11	2.26	1.22	0.44	0.16	0.00	
20	1MA0	2H	1211	Q04	Pie charts	3	59	1.77	1.68	1.11	0.80			
21	5AM2	2F	1211	Q22	Probability	3	28	0.83	1.66	0.78	0.36	0.39	0.16	
22	1MA0	2H	1206	Q15	Compound measures	5	61	3.03	2.57	1.11	0.26			
23	1MA0	2H	1311	Q08	Number sequences	4	58	2.30	2.03	1.28	0.82			
24	1MA0	2H	1511	Q14	Percentages	5	14	0.69	0.84	0.38	0.13			
25				NEW	Algebraic proof	1								No data available
26				NEW	Solving quadratic equations	2								No data available

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