

**1MA1 Practice papers Set 2: Paper 3F (Regular) mark scheme – Version 1.0**

Question	Working	Answer	Mark	Notes
<b>1.</b>		5 hundredths	1	B1
<b>2.</b>		5y	1	B1
<b>3.</b>		680 000	1	B1
<b>4.</b>		1, 2, 4, 5, 8, 10, 20, 40	2	B2 All correct with no extras (B1 at least 4 correct factors)
<b>5.</b>	$36 \times 4 (= 144)$ $176 + 103 + 144 (= 423)$ $15 \times 28 = 420$ 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' Or 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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<b>6.</b>	(a)		× at $\frac{1}{2}$	1	B1 for cross at $\frac{1}{2}$
	(b)		× at 0	1	B1 for cross at 0
	(c)		× near $\frac{1}{4}$	1	B1 for cross near $\frac{1}{4}$
<b>7.</b>	(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
<b>8.</b>	(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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<b>9.</b>		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
<b>10.</b>		mistake identified	C1	C1, e.g. added 6 instead of subtracting 6
<b>11.</b>	(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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<b>12.</b>	(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

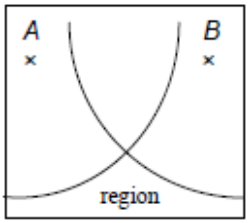
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Question		Working	Answer	Mark	Notes
<b>13.</b>			Tuesday and Friday	3	<p>M1 for <math>179 \div 12</math> or <math>162 \div 12</math> or <math>170 \div 12</math> or <math>143 \div 12</math></p> <p>A1 for 14.9(166...) or 15 and 13.5 or 14 and 14.1(66...) 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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<b>14.</b>	$120 \div 0.3$  <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
<b>15.</b>	$\frac{15}{2} - \frac{14}{3} = \frac{45a}{6a} - \frac{28a}{6a}$	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 <i>A</i> or <i>B</i>, 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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Question	Working	Answer	Mark	Notes												
18.	<table border="1" data-bbox="414 311 739 391"> <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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<b>19.</b>			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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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 $\frac{1}{3} \times 36 = 12 \text{ red}$ 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.	$180 \times 365 = 65700$  $65700 \div 1000 = 65.7$  $65.7 \times 91.22 = 5993.154$  $5993.154 \div 100 + 28.20 = 88.13\dots$  <table border="1" style="margin-left: auto; margin-right: auto;"> <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> <p>M1 for <math>180 \times '365'</math> (= 65700)                      M1 for <math>'65700' \div 1000</math> (= 65.7 or 65 or 66)                      M1 for <math>'65.7' \times 91.22</math> (= 5993...)                      A1 for answer in range (£)87 to (£)89                      C1 (dep on at least M1) for conclusion following from working seen</p> <p><b>OR (per day)</b></p> <p>M1 for <math>107 \div '365'</math> (= 0.293...)                      M1 for <math>180 \div 1000 \times 91.22</math> (= 16.4196)                      M1 for <math>28.2 \div '365' + '0.164196'</math> (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> <p><b>OR</b></p> <p>M1 for <math>(107 - 28.20) \div 0.9122</math> (= 86.384..)                      M1 for <math>'86.384..' \times 1000</math> (= 86384.5...)                      M1 for <math>'365' \times 180</math> (= 65700)                      A1 for 65700 and 86384.5...                      C1 (dep on at least M1) for conclusion following from working seen</p> <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>
D	U	C	T																																	
366	65880	6010	88.30																																	
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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	
						<b>80</b>							