

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

Question		Working	Answer	Mark	Notes
1.	(i)		9	1	B1
	(ii)		19	1	B1
	(iii)		27	1	B1
2.		$17 - 5 = 12$ $12 \div 2 =$ $2x + 5 = 17$ $2x = 17 - 5$	6	3	M1 $17 \div 2 (= 8.5)$ or $17 - 5 (= 12)$ M1 for correct order of operations -5 then $\div 2$ A1 cao Alternative M1 for forming the equation $2x + 5 = 17$ M1 for attempt to subtract 5 from both sides or divide both sides by 2 as the first step A1 cao NB For solutions involving trial and improvement award 3 marks (B3) for the correct answer of 6 but 0 marks for method; embedded solutions get 2 marks as long as the equation or working is complete.
3.	(a)(i)		unlikely	3	B1 cao
	(ii)		evens		B1 cao
	(iii)		impossible		B1 cao
	(b)		A,A,A,A,B,B,C,D	2	M1 for the same number of Cs and Ds OR twice as many As as Bs. A1 cao
4.			Correct line	2	B1 line drawn parallel to AB B1 line the same length as AB

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5.	(a)	$\frac{40}{100} \times 20$	8	2	M1 $\frac{40}{100} \times 20$ oe A1
	(b)	43%, 42.8%, 43.8%, 43.75%	$\frac{3}{7}$ 0.43 $\frac{7}{16}$ 43.8%	2	M1 Convert at least 2 of the 3 correctly to percentages or decimals A1 correct order. Accept written in any correct form. SC: Award B1 (1 mark only) if ordered largest to smallest
6.	(a)		$2 \times 2 = 4$	1	B1
	(b)		No with reason	1	C1 E.g. No - 6 is the lowest number
7.	(a)		$20 - t$	1	B1 for $20 - t$
	(b)		$4x + 20y$	2	B2 for $4x + 20y$ (B1 for $4x$ or $20y$)

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Question	Working	Answer	Mark	Notes																			
8.		28	4	M1 for total female passengers $200 - 92$ or 108 seen; or for total Economy passengers $200 - 44 - 60$ or 96 seen. M1 for male passengers in Economy “ 96 ” – 62 or 34 seen; or for female Premium “ 108 ” – $62 - (44 - 30)$ or 32 seen M1 for $92 - 30 - “34”$ or for $60 - “32”$ A1 cao OR Answers may appear in a two-way table with no other method seen B1 for Female total 108 or Total Economy 96 M1 for “ 96 ” – 62 or 34 seen in Male Economy; or “ 108 ” – $62 - (44 - 30)$ or 32 seen in Female Premium M1 for $92 - 30 - “34”$ or for $60 - “32”$ A1 cao																			
	<table border="1"> <thead> <tr> <th></th> <th>Bus</th> <th>Pre</th> <th>Ec</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>M</td> <td>(30)</td> <td>28</td> <td>34</td> <td>(92)</td> </tr> <tr> <td>F</td> <td>14</td> <td>32</td> <td>(62)</td> <td>108</td> </tr> <tr> <td>Total</td> <td>(44)</td> <td>(60)</td> <td>96</td> <td>(200)</td> </tr> </tbody> </table> <p>() value given</p>		Bus		Pre	Ec	Total	M	(30)	28	34	(92)	F	14	32	(62)	108	Total	(44)	(60)	96	(200)	
	Bus	Pre	Ec	Total																			
M	(30)	28	34	(92)																			
F	14	32	(62)	108																			
Total	(44)	(60)	96	(200)																			

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9.	$y = \frac{1}{2}x + 3$ <table border="1"> <tr> <td>x</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>y</td> <td>2</td> <td>2.5</td> <td>3</td> <td>3.5</td> <td>4</td> <td>4.5</td> <td>5</td> </tr> </table>	x	-2	-1	0	1	2	3	4	y	2	2.5	3	3.5	4	4.5	5	Correct line from (-2, 2) to (4, 5)	3	<p>(Table of values / calculation of values)</p> <p>M1 for at least 2 correct attempts to find points by substituting values of x.</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 $x = -2$ and $x = 4$</p> <p>(No table of values)</p> <p>M1 for at least 2 correct points with no more than 2 incorrect points plotted</p> <p>M1 for at least 2 correct points (and no incorrect points) plotted</p> <p>OR line segment of $y = \frac{1}{2}x + 3$ drawn</p> <p>A1 for correct line between $x = -2$ and $x = 4$</p> <p>(Use of $y = mx + c$)</p> <p>M1 for line drawn with gradient of $\frac{1}{2}$</p> <p>OR line drawn with a y intercept of 3</p> <p>M1 for line drawn with gradient of $\frac{1}{2}$</p> <p>AND line drawn with a y intercept of 3</p> <p>A1 for correct line between $x = -2$ and $x = 4$</p> <p>SC : B2 for correct line from $x = 0$ to $x = 4$</p>
x	-2	-1	0	1	2	3	4													
y	2	2.5	3	3.5	4	4.5	5													

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Question		Working	Answer	Mark	Notes
10.	(a)		360	2	M1 $30 \div 10 (= 3)$ or $120 \div 10 (= 12)$ or $120 + 120 + 120$ oe A1 cao
	(b)		25	2	M1 for $\frac{750}{300} (= 2.5)$ oe A1 cao
11.			160	3	M1 for $360 \div (1 + 3 + 5) (= 40)$ M1 (dep) for $5 \times '40' (= 200)$ A1 cao OR M1 for $360 \div (1 + 3 + 5) (= 40)$ M1 (dep) for $5 - 1 (= 4)$ A1 cao

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Question	Working	Answer	Mark	Notes	
12.	(a)	$5 \times 2 - 3$	7	2	M1 for 5×2 or $5 - 2$ or $5 \times 2 - 3$ A1 cao
	(b)	$(17 + 3) \div 2$	10	2	M1 for $17 + 3$ or $(17 \pm 3) \div 2$ or $\frac{17}{2} \pm 3$ A1 cao
	(c)	$2 \times m - 3$	$2m - 3$	2	M1 for $2 \times m$ or $m - 3$ or $b \times m - 3$ A1 for $2m - 3$ oe NB If additional variable is introduced as subject then ignore. If $2m - 3 = k$ where k is a number then ignore k
	(d)	$(n + 3) \div 2$	$\frac{n+3}{2}$	2	M1 for $n + 3$ or $\frac{n \pm 3}{2}$ oe or $n + 3 \div 2$ or $\frac{n}{2} \pm 3$ or for a reverse flow chart with at least one correct inverse process identified A1 for $\frac{n+3}{2}$ oe NB If additional variable is introduced as subject then ignore. If $\frac{n+3}{2} = k$ where k is a number then ignore k

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Question	Working	Answer	Mark	Notes
13.	$4 + 3 + 3 = 10$ $33 + 42 + 6 = 81$ $81 - 60 = 21$ $10 + 1 = 11$ OR $4:33 = 273 \text{ secs}$ $3:42 = 222 \text{ secs}$ $3.06 = 186 \text{ secs}$ $273 + 222 + 186 = 684$ $15:00 - 11:21$ or $900 - 684$	3 minutes 39 seconds	4	M1 for attempting to add minutes or seconds or 684 or 1081 or 1121 seen M1 for a conversion at any stage using 60 (indep) e.g. $4 \times 60 + 33$, or 10 minutes 81 seconds or $81 \div 60$ M1 for attempting to subtract "total time" from 15 minutes $1500 - 1121$ or $15.00 - 1081$ or $900 - 684$ A1 cao.

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Question		Working	Answer	Mark	Notes
14.	(a)	$28 \times 0.50 + 32 \times 0.72 +$ $50 \times 1.04 + 18 \times 1.51$ $14.00 + 23.04 + 52 +$ 27.18	£ 116.22	3	M1 at least one fx where the fs are correct M1 $\sum fx$ where the fs are correct A1 cao
	(b)	$32 \times (50 - 40) +$ $40 \times (72 - 59) +$ $68 \times (104 - 85) +$ $34 \times (151 - 123)$ $320 + 520 + 1292 + 952$ $= 3084$ OR $32 \times 50 +$ $40 \times 72 +$ $68 \times 104 +$ $34 \times 151 -$ $(32 \times 40 + 40 \times 59 +$ $68 \times 85 + 34 \times 123)$	£30.84	4	M1 attempts to find differences in costs M1 $\sum f \times \text{diff}$ A1 cao C1 Correct conclusion for their working, placed in a sentence and supported by their calculations provided at least one M1 awarded OR M1 $\sum fx$ for first class and second class M1 attempts to find difference between two totals A1 cao C1 Correct conclusion for their working, placed in a sentence and supported by their calculations provided at least one M1 awarded

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Question		Working	Answer	Mark	Notes
15.	(a)		-1, 0, 1, 2, 3	2	B2 for all 5 values and no extras (ignore repeats) (B1 for 4 correct values and no extras or all 5 correct values and one incorrect value)
	(b)	$x + x + 9 < 60$ $2x < 51$ $x < 25.5$	25	3	M1 for $x + x + 9$ oe A2 cao (A1 for 25.5) OR M1 for $60 \div 2 (=30)$ and $9 \div 2 (=4.5)$ A2 cao (A1 for 25.5) OR M1 for $60 - 9 (=51)$ and “51” $\div 2 (=25.5)$ A2 cao (A1 for 25.5) OR M1 for at least 2 trials with correct totals A2 cao (A1 for correct trial of 25 and 26)
16.		1, 4, 7, 10, 13 8, 6, 4, 2, 0	Explanation	2	M1 for listing at least 3 terms of both sequences C1 for Yes and explanation from fully correct working that 4 is in both sequences; numbers in A are increasing; numbers in B are decreasing

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17.			5.32	3	M1 $\sin 43^\circ$ used M1 $7.8 \sin 43^\circ$ OR M1 for $7.8 \cos 43^\circ$ (5.704...) and $7.8^2 - 5.704^2$ (28.298) M1 for $\sqrt{28.298}$ OR M1 for correct statement of Sine Rule eg $\frac{7.8}{\sin 90^\circ} = \frac{x}{\sin 43^\circ}$ M1 for correct expression for x e.g. $x = \frac{7.8 \sin 43^\circ}{\sin 90^\circ}$ A1 for awrt 5.32 (5.319587...)
18.	(a)	$21 \times 90 = 1890$ $\sqrt{1890}$	43	2	M1 for $\sqrt{21 \times 90}$ or 1890 seen A1 for an answer in the range 43 – 43.5
	(b)	$50 = \sqrt{21 \times d}$ $2500 = 21d$ $d = 2500 \div 21$	119	3	M1 for $50 = \sqrt{21 \times d}$ oe or 50^2 M1 for $21d = 50^2$ oe A1 for an answer in the range 119 – 119.05

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19.	$\frac{2}{5} = 40\%$ $40\% + 15\% = 55\%$ 27 is 45% or $\frac{9}{20}$ $27 \div 9 \times 8$	24	5	M1 for 40% or $2 \div 5 \times 100$ oe M1 for “40%” + 15% (= 55%) M1 for equating 100% – “55%” with 27 yellow counters M1 for $27 \div “45” \times 40$ oe A1 cao OR M1 for $\frac{15}{100}$ oe M1 for correct attempt to find common denominator to add $\frac{15}{100}$ and $\frac{2}{5}$ (= $\frac{55}{100}$) M1 for equating $1 - “\frac{55}{100}”$ with 27 yellow counters M1 for $27 \div “45” \times 100$ oe A1 cao OR M1 for 0.15 or 0.4 M1 (dep) for ‘0.15 + ‘0.4’ (= 0.55) M1 for equating $1 - ‘0.55’$ with 27 yellow counters M1 for $27 \div 0.45$ A1 cao

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20.	$9 + 6 + 9 + 6 = 30$ $30 \div 0.5$ OR $9 \div 0.5 = 18$ $6 \div 0.5 = 12$ $18 + 12 + 18 + 12$ OR $8 \div 0.5 = 16$ $6 \div 0.5 = 12$ $16 + 12 + 16 + 12 + 4$ OR $9 \times 7 - 6 \times 8 = 15$ $0.5 \times 0.5 = 0.25$ $15 \div 0.25$	60	3	M1 $9 + 6 + 9 + 6$ or $8 + 7 + 8 + 7 (= 30)$ M1 '30' $\div 0.5$ A1 cao OR M1 $9 \div 0.5 (= 18)$ and $6 \div 0.5 (= 12)$ M1 '18' + '12' + '18' + '12' A1 cao OR M1 $8 \div 0.5 (= 16)$ and $6 \div 0.5 (= 12)$ M1 '16' + '12' + '16' + '12' + 4 A1 cao OR M1 for $9 \times 7 - 6 \times 8 (= 15)$ M1 for '15' \div '0.5' A1 cao
21.	One bearing line at 260° ($\pm 2^\circ$) or one 9.6 cm line ($\pm 2\text{mm}$) from A	Intersection of 2 lines in boundary of overlay	2	M1 A1 Condone omission of <i>D</i> label Correct position of <i>D</i> within tolerance without any lines scores M1A1.

National performance data from Results Plus

Qu No	Spec	Paper	Session	Qu	Topic	Max score	Mean % all	ALL	C	D	E	F	G
1	NEW QUESTION				Prime, square numbers	3	No data available						
2	1380	2F	1203	Q06	Derive expressions	3	92	2.77	2.97	2.93	2.87	2.64	1.87
3	5AM2	2F	1411	Q06	Probability	5	78	3.90	4.19	4.10	3.76	3.46	3.00
4	5MM2	2F	1206	Q08	Parallel lines	2	84	1.68	1.91	1.85	1.73	1.53	1.29
5	4MA0(R)	2F	1405	Q10	Percentages	4	81	3.23	3.72	3.03	3.00	2.50	1.43
6	NEW QUESTION				Properties of numbers	2	No data available						
7	2MB0	1F	1511	Q12	Write an expression	3	38	1.14	1.73	1.19	1.00	0.66	0.00
8	2MB0	1F	1511	Q16	Two-way tables	4	74	2.95	4.00	3.34	1.92	1.17	0.00
9	2MB0	2F	1511	Q21	Straight line graphs	3	49	1.46	2.43	1.46	1.54	0.38	0.00
10	1MA0	2F	1411	Q20	Ratio	4	83	3.31	3.82	3.59	3.25	2.76	2.11
11	5MM2	2F	1406	Q25	Ratio	3	44	1.33	2.50	2.10	1.06	0.48	0.10
12	5MM2	2F	1111	Q11	Substitution into expressions	8	64	5.10	6.48	5.52	4.61	4.02	3.49
13	5AM2	2F	1111	Q05	Time calculations	4	45	1.80	2.86	2.65	1.79	1.41	0.54
14	5AM2	2F	1106	Q15	Money calculations	7	34	2.41	5.00	4.50	2.76	1.50	0.33
15	5MM2	2F	1211	Q24	Solve inequalities	5	33	1.63	2.97	2.30	1.80	0.84	0.22
16	2MB0	2H	1511	Q6	Sequences	2	17	0.34	0.35	0.30	0.00		
17	4MA0	1F	1401	Q15	Trigonometry	3	45	1.34	2.22	1.15	0.42	0.17	0.00
18	5AM2	2H	1306	Q07	Compound measures	5	76	3.78	2.90	1.74	0.44		
19	5MM2	2F	1106	Q17	Fractions, percentages, decimals	5	14	0.71	2.15	0.88	0.52	0.23	0.08
20	5AM1	1F	1406	Q15	Perimeter and area	3	21	0.63	1.28	0.64	0.28	0.15	0.04
21	4MA0	1H	1405	Q06	Bearings	2	62	1.24	0.56	0.28	0.07		
						80							