

IMA1 Practice papers Set 4: Paper 2F (Regular) mark scheme – Version 1.0

Question		Working	Answer	Mark	Notes
1.			$15ab$	1	B1 cao
2.			142	2	M1 for $720 - (110 + 92 + 158 + 85 + 133)$ or $720 - 578$ A1 for 142 cao
3.		(D, A) (J, A) (W, A) (D, M) (J, M) (W, M)	list of 6 combinations	2	B2 for six correct and distinct pairs (B1 for at least 3 pairs and no incorrect pairs or all correct pairs with repeats)
4.	(i)		40	1	B1
	(ii)		(0).4	1	B1ft (if $0 < \% < 100$), i.e. allow ft if their % from (i) is between 0 and 100
5.	(a)(i)		unlikely	1	B1 cao
	(a)(ii)		impossible	1	B1 cao
	(b)		3 marked red 2 marked white	2	B1 for 3 red sectors written in B1 for number of white sectors $>$ number of blue sectors

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6.		96	4	M1 for a method to find 36% of 400 (= 144) M1 for a method to find $\frac{2}{5}$ of 400 (= 160) M1 (dep on M2) for 400 – “144” – “160” A1 cao
7.		25	2	M1 for $10 \div 40$ (= 0.25) or $10 \times 100 \div 40$ A1 cao
8.	(a)	9 to 9.1	1	B1
	(b)	11.8	1	B1
	(c)	1.4	1	B1
9.		e.g. 10, 12, 5, 2	3	M1 for at least 2 factors of 60 clearly identified M1 for $20 < \text{sum of '4 distinct natural numbers'} < 35$ A1 cao

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10.		57°	4	M1 for a method to find angle BCD , e.g. $180 - 75 (= 105)$ M1 for a complete method to find x A1 for $x = 57$ with supporting working C1 (dep on M1) for “sum of the <u>angles</u> in a <u>quadrilateral</u> is <u>360(°)</u> ” or equivalent quadrilateral theory. [Condone omission of other reasons]	
11.	(a)		0	1	B1 cao
	(b)	$(8 + 4 + 5 + 5 + 3 + 2 + 1) \div 10$	2.8	2	M1 $(8 + 4 + 5 + 5 + 3 + 2 + 1) \div 10$ A1 cao
12.	(a)		7	2	M1 for -15 and $\div 5.4$ A1 cao
	(b)		$C = 5.4y + 15$	2	C1 for $5.4y + 15$ or $C =$ linear expression in y C1 for $C = 5.4y + 15$ (oe)

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13.	(a)			2	B2 conversion graph (line) drawn between 4.4 pounds and 15.4 pounds (B1 for plotting at least 2 points from the table)
	(b)		4.4 – 4.6	1	B1 for 4.4 – 4.6 or ft graph (dep on single straight line)
	(c)		14.2 – 14.4	1	B1 for 14.2 – 14.4 or ft graph (dep on single straight line)
14.		9.39×10 $24.30 \times 3 + 9.39$ $93.90 - 82.29$	£11.61	5	M1 for a correct method to find the most expensive way to buy the 10 cartridges (= 93.90) M1 for a correct method to find the least expensive way to buy the 10 cartridges (= 82.29) M1 (dep on M1 scored) for a correct method to find the difference between their least and their most expensive way, provided that both totals are for the cost of exactly 10 cartridges A1 for 11.61 B1 (indep) for correct units

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15.	(a)		1.06	3	M1 for $6.99 \div 3 (= 2.33)$ or $3r + 6t = 13.35$ M1 for $\frac{1}{2} (4.45 - "2.33")$ or $6t = "13.35" - 6.99$ A1 cao
	(b)		Henri 7.15 Ray 4.29	3	M1 for $11.44 \div (5 + 3) (=1.43)$ M1 for $"1.43" \times 5 (= 7.15)$ or $"1.43" \times 3 (= 4.29)$ A1 for Henri and 7.15 and Ray and 4.29
16.		500×1.2 (oe) = 600 $600 \div 12 =$	50	4	M2 for $500 \times 1.2 (= 600)$ (oe) (M1 for $500 \times 0.2 (= 100)$ (oe) M1 for $600 \div 12$ or $100 \div 12$ or $1.2 \div 12$ or $500 \div 12$ A1 cao
17.		$18.6^2 - 7.2^2 (= 294.12)$ $\sqrt{294.12}$ or $\sqrt{(18.6^2 - 7.2^2)}$	17.1	3	M1 for squaring and subtracting M1 (dep) for square root A1 for answer in the range 17.1 – 17.15

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18.	$2(x + x + 10) = 40$ $4x + 20 = 40$ $4x = 20$ $x = 5$	5	4	M1 for algebraic method to set up Amy and Beth's ages as x and $x + 10$ M1 for setting up the equation $2(x + x + 10) = 40$ oe M1 for $4x + 20 = 40$ A1 cao
19.	<p>5A $= 150 + 150 + 150 + 150 + 150$ $= 35p \times 5 = \text{£}1.75$</p> <p>2C + A $= 300 + 300 + 150$ $= \text{£}1.60 + 35p = \text{£}1.95$</p> <p>3B + A $= 200 + 200 + 200 + 150$ $= 45p \times 3 + 35p = \text{£}1.70$</p> <p>3A + C $= 150 + 150 + 150 + 300$ $= 35p \times 3 + 80p = \text{£}1.85$</p>	£1.70	4	M1 for attempt to find at least 2 different combinations of weights (can be implied by costs) with at least one correct that add to 750g M1 for identifying and attempting to calculate the costs of two out of the four possibilities from 5A or 2C + A or 3B + A or 3A + C oe (can be implied by the costs) A1 for at least 3 costs correct from £1.75, £1.95, £1.70, £1.85 ignore units) C1 ft (dep on M1) for £1.70 (or 170p) identified as lowest cost from all four possible combinations

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20.	e.g. $4a + 3b = 250$ $3a + 4b = 240$ $(\times 3) \quad 12a + 9b = 750$ $(\times 4) \quad 12a + 16b = 960$ Subtract $7b = 210$ so $b = 30$ Substitute $4a + 90 = 250$ $4a = 250 - 90 = 160$	(i) 40 (ii) 30	5	B1 for correct equations expressed in terms of two variables (oe) M1 for correct process to eliminate either variable (condone one arithmetic error) A1 for either (£)0.4 or (£)0.3 (oe) M1 (dep on first M1) for correct substitution of their found variable A1 cao for both (i) 40 and (ii) 30
21.	(a)	3, 6, 9	1	B1 condone {3, 6, 9}
	(b)	{2, 3, 4, 6, 8, 9, 10}	1	B1 condone omission of brackets
	(c)	{6}	1	B1 condone omission of brackets
	(d)	3, 9	2	B2 cao (B1 for one of 3, 9 with no incorrect numbers or 3, 6, 9)
22.	$7200 \div 0.75$ $75\% = 7200$ $1\% = 7200 \div 75 = 96$ $100\% = 96 \times 100$	9600	3	M2 for $7200 \div (1 - 0.25)$ A1 for 9600 A1 for 9600

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23.	(a)		Liz explanation	1	B1 Liz because she carried out most trials
	(b)	$12 + 34 + 57 = 103$ $40 + 100 + 300$ $103 \div 40$	0.23 or $\frac{103}{440}$	2	M1 $(12 + 34 + 57)/b$ where $b > 103$ or $a/(12 + 28 + 34 + 66 + 57 + 243)$ where $a < 440$ A1 0.23 or $0.234(09..)$ or $\frac{103}{440}$ (oe)

National performance data from Results Plus

Original source of questions					Topic	Max score	Mean score of students achieving grade:					
Qn	Spec	Paper	Session YMM	Qn			ALL	C	D	E	F	G
1	NEW				Simplifying terms	1	No data available					
2	5MM2	2F	1106	Q09	Interior and exterior angles	2	1.69	1.98	1.87	1.90	1.73	1.18
3	1MA0	2F	1406	Q06	Sample space diagrams	2	1.79	1.97	1.95	1.91	1.85	1.71
4	4MA0	2F	1401	Q02	Percentages	2	1.86	1.94	1.91	1.81	1.52	1.31
5	5AM2	2F	1506	Q02	Probability scale	4	3.53	3.93	3.78	3.55	3.09	2.53
6	5MM2	2F	1506	Q15	Fractions	4	2.39	3.73	3.35	2.39	1.04	0.45
7	NEW				Scale	2	No data available					
8	4MA0	2F	1401	Q09	Line graphs of real situations	3	2.32	2.72	2.37	1.98	1.39	1.31
9	1MA0	2F	1206	Q16	Factors, multiples, primes	3	1.94	2.69	2.37	1.93	1.31	0.74
10	5MM2	2F	1506	Q14	Angles	4	1.69	3.43	2.66	1.17	0.27	0.01
11	1387	2F	711	Q14	Mean; median, mode	3						
12	NEW				Using formulae	4	No data available					
13	5AM2	2F	1411	Q05	Conversion graphs	4	2.49	3.15	2.92	2.10	1.47	1.25
14	1MA0	2F	1303	Q11	Ratio	5	2.87	3.78	3.23	2.69	1.96	1.18
15	5AM2	2H	1506	Q03	Ratio	6	5.80	5.77	5.28	2.69		
16	5AM1	1H	1106	Q01	Simple interest	4	3.23	2.54	2.00	1.00		
17	4MA0	2H	1405	Q08	Pythagoras in 2D	3	2.66	1.86	0.75	0.15		
18	5AM1	1F	1411	Q24	Derive expressions	4	1.66	2.45	2.06	1.10	1.27	0.14
19	5AM2	2F	1211	Q17	Ratio	4	1.94	2.39	2.36	1.69	1.24	0.74
20	5AM1	1H	1211	Q13	Simultaneous equations	5	3.58	2.92	0.67	0.00		
21	4MA0(R)	2F	1501	Q24	Sets	5	2.09	2.67	1.31	1.00	1.00	
22	5AM1	1H	1211	Q10	Reverse percentages	3	1.62	0.76	0.60	0.00		
23	5AM2	2F	1106	Q19	Probability	3	0.39	0.34	0.72	0.50	0.00	0.25
						80						