

1MA1 Practice Tests Set 1: Paper 2H (Regular) mark scheme – Version 1.0

Question		Working	Answer	Mark	Notes
1			488	3	M1 $600 \times 67.1 (= 40260)$ or $67.1 \div 82.5 (= 0.813\dots)$ M1 (dep) “40260” $\div 82.5$ or “0.813..” $\times 600$ A1 cao SC: B2 for 712
2		12, 24, 36, 48, 60, 72, 8, 16, 24, 32, 40, 48, 56, 64, 72,...	25.80	5	M1 for listing at least 3 multiples of each of 12 and 8 or 24 in two lists of multiples or from factor trees M1 (dep) for attempt to find a common multiple of 12 and 8 above 60 (= 72) M1 (dep M2) for method to find the number of boxes and the number of packs $72 \div 12 (= 6)$ and $72 \div 8 (= 9)$ M1 for finding the total cost by multiplying numbers by cost and adding eg “6” $\times 2.50 +$ “9” $\times 1.20$ A1 for 25.8(0)
3		$62 + 92 = 117$ $\sqrt{117} =$	10.8	3	M1 for $62 + 92$ M1 for $\sqrt{(36 + 81)}$ or $\sqrt{117}$ A1 for 10.8 – 10.82
4	(a) (b)		Negative 117–123	1 2	B1 cao M1 for a line of best fit drawn between (9,130) and (9, 140) and between (13,100) and (13,110) inclusive A1 for 117 – 123
5		$x + 4x > 2(x + 48)$ $5x > 2x + 96$ $3x > 96$	33	5	B1 for $x + 48$ (or $2x + 96$ oe) and $4x$ M1 for $x + 4x > 2(x + 48)$ oe M1 for subtracting $2x$ from both sides

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Question	Working	Answer	Mark	Notes																														
	$x > 32$ OR <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>S</th> <th>N</th> <th>C</th> <th>S+ C</th> <th>2N</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>58</td> <td>40</td> <td>50</td> <td>116</td> </tr> <tr> <td>20</td> <td>68</td> <td>80</td> <td>100</td> <td>136</td> </tr> <tr> <td>30</td> <td>78</td> <td>120</td> <td>140</td> <td>156</td> </tr> <tr> <td>32</td> <td>80</td> <td>128</td> <td>160</td> <td>160</td> </tr> <tr> <td>33</td> <td>81</td> <td>132</td> <td>165</td> <td>166</td> </tr> </tbody> </table>	S	N	C	S+ C	2N	10	58	40	50	116	20	68	80	100	136	30	78	120	140	156	32	80	128	160	160	33	81	132	165	166			A1 for $3x > 96$ oe A1 cao for 33 OR Trial and Improvement B1 for 1 correct trial of S, N and C M1 for an improved correct trial of S, N and C M1 for a correct trial of 32 M1 for a correct trial of 33 A1 (dep on M2) for 33 cao NB: Accept other letters instead of x NB: an answer of 32 without working scores 0 marks
S	N	C	S+ C	2N																														
10	58	40	50	116																														
20	68	80	100	136																														
30	78	120	140	156																														
32	80	128	160	160																														
33	81	132	165	166																														
6	$4x + 4x + 3x + 4 + 3x + 4$ $= 14x + 8$ $5x + 5x + x - 3 + 7x - 3$ $= 18x - 6$ $18x - 6 = 14x + 8$ $4x = 14$ $x = 14/4 = 3.5$ oe	$x = 3.5$ $L = 14.5$ $W = 14$	6	M1 $4x + 4x + 3x + 4 + 3x + 4$ ($= 14x + 8$) M1 $5x + 5x + x - 3 + 7x - 3$ ($= 18x - 6$) M1 equating e.g. $18x - 6 = 14x + 8$ ($4x = 14$) A1 $x = 14/4 = 3.5$ oe A1 for 14.5 or “3.5” \times 3+4 ft A1 for 14 or “3.5” \times 4 ft																														

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		Area of trapezium = Length is $3x + 4 =$ $3 \times 3.5 + 4 =$ Width is $4x = 4 \times 3.5 =$			
7	(a) *(b)		0.22,0.78,0.74,0.26 No As $0.454 < 0.5$	2 4	B1 for 0.78,0.22 correctly placed B1 for 0.26,0.74 correctly placed M1 for $0.55 \times "0.22"$ or $0.45 \times "0.74"$ oe M1 for $0.55 \times "0.22" + 0.45 \times "0.74"$ oe A1 for 0.454 oe C1 (dep on M1) for conclusive statement based on their answer compared to 50%
8		$2y - - y = 3 - 6$ or $x + 2x = 3 + 12$	$x = 5, y = -1$	3	M1 for a complete method to eliminate one variable (condone one arithmetic error) A1 $x = 5$ A1 $y = -1$ NB: Candidates showing no working score 0 marks

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Question	Working	Answer	Mark	Notes
9		28% or $\frac{14}{50}$	4	<p>M1 for $100 - 30 (= 70)$ or $1 - \frac{3}{10 \left(= \frac{7}{10} \right)}$</p> <p>M1 for “70” $\div (3 + 2) (= 14)$ or $\frac{7}{10} \div (3 + 2) \left(= \frac{7}{50} \right)$</p> <p>M1 for “14” $\times 2$ or $\frac{7}{50} \times 2$</p> <p>A1 for 28% or $\frac{14}{50}$ oe</p> <p>OR</p> <p>M1 for a correct method to find $(100 - 30)\%$ of any actual sum of money</p> <p>M1 for “350” $\div (3 + 2) (= 70)$</p> <p>M1 for “70” $\times 2$</p> <p>A1 for 28% or $\frac{14}{50}$ oe</p> <p>OR</p> <p>M1 for starting with two numbers in ratio 3:2, e.g. 21 and 14</p> <p>M1 for equating sum of their numbers to $100 - 30 (= 70\%)$, e.g. ‘21’ + ‘14’ $(= 35)$</p> <p>M1 for scaling sum of their numbers to 100%, e.g. ‘35’ $\div 70 \times 100 (= 50)$</p>

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					A1 for 28% or $\frac{14}{50}$ oe SC: award B3 for oe answers expressed in an incorrect form e.g. $\frac{2.8}{10}$
10		5, 13, 29, 53, 85, 125	(85)	2	M1 for correct evaluation of at least 3 odd cases or sequence of 5, (8), 13, (20), 29... seen or the expression with $n = 9$ or 11 or 19 or 21 or ... substituted but not evaluated A1 for 85 or 125 or 365 or 445 or ... identified
11	(a)		104.5°	3	M1 for substitution into the cosine rule e.g. $3.6^2 = 1.8^2 + 2.7^2 - 2 \times 1.8 \times 2.7 \times \cos A$ M1 for $\cos A = \left(\frac{1.8^2 + 2.7^2 - 3.6^2}{2 \times 1.8 \times 2.7} \right)$ $\left[= \left(\frac{3.24 + 7.29 - 12.96}{9.72} \right) = (-0.25) \right]$ A1 for 104.47.....
	(b)		2.4	2	M1 (ft) for $\frac{1}{2} \times 1.8 \times 2.7 \times \sin(a)$ A1 for an answer in the range 2.3 to 2.4 or ft from their (a) if supported by correct working.

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*12	d : UB = 190.5 (190.49..) LB = 189.5 f : UB = 25.75 (25.749..) LB = 25.65	7.4 because the LB and UB agree to that number of figures	5	B1 for one correct bound of d B1 for one correct bound of f M1 for a correct method to find the upper bound of c , e.g. “190.5” ÷ “25.65” (= 7.4269....) or for a correct method to find the lower bound of c , e.g. “189.5” ÷ “25.75” (= 7.359....) A1 for 7.42(69...) and 7.35(92...) C1 (dep on M1) for a statement that both LB and UB round to “7.4” to one decimal place oe NB an answer of 7.39(2996...) or 7.4 without working or from $190 \div 25.7$ scores no marks
13	$\text{Volume of A} = \frac{140}{0.7}$ $= 200$ $\text{Volume of B} = \frac{128}{1.6} = 80$ $\text{Mass of C} = 140 + 128$ $= 268$ $\text{Density of C} = \frac{268}{280}$	0.957	4	M1 for finding the volume of either liquid A or B or the mass of liquid C M1 for a complete method to find the volume AND mass of liquid C M1 (dep M2) for “total mass” ÷ “total volume” A1 for 0.957 to 0.96

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14	(a)	11	1	B1 cao
	(b)	$\frac{x-5}{2}$	2	M1 for a correct first stage: subtract 5 from both sides or divide all terms by 2 NB Accept f(x) in place of y A1 $\frac{x-5}{2}$ (oe)
	(c)	- 16	1	B1 cao
	(d)	$4x^2 + 20x$	5	M1
	(i)	$4x^2 + 10x + 10x + 25$ oe		B1 for correct expansion of $(2x + 5)^2$ A1 $4x^2 + 20x$ or a correct fully or partially factorised expression
(ii)		$x = 0, x = - 5$		M1 $4x(x+5) (= 0)$ or $x(4x + 20) (= 0)$ or $2x(2x + 10) (= 0)$ $\frac{-20 \pm \sqrt{20^2 - 4 \times 4 \times 0}}{2 \times 4}$ or $x(x + 5) (=0)$ or for, e.g. A1 for both solutions

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15	$\frac{5}{20} \times \frac{7}{19} + \frac{5}{20} \times \frac{8}{19} +$ $\frac{7}{20} \times \frac{5}{19} + \frac{7}{20} \times \frac{8}{19} +$ $\frac{8}{20} \times \frac{5}{19} + \frac{8}{20} \times \frac{7}{19}$ OR $\left(\frac{5}{20} \times \frac{15}{19} + \frac{7}{20} \times \frac{13}{19} + \frac{8}{20} \times \frac{12}{19} \right)$ OR 1 – $\left(\frac{5}{20} \times \frac{4}{19} + \frac{7}{20} \times \frac{6}{19} + \frac{8}{20} \times \frac{7}{19} \right)$		4	M1 for at least one product of the form $\frac{a}{20} \times \frac{b}{19}$ M1 for identifying all products (condone 2 errors in 6 products, 1 error in 3 products) Either $\frac{5}{20} \times \frac{7}{19}, \frac{5}{20} \times \frac{8}{19}, \frac{7}{20} \times \frac{5}{19}, \frac{7}{20} \times \frac{8}{19}, \frac{8}{20} \times \frac{5}{19}, \frac{8}{20} \times \frac{7}{19}$ OR $\left(\frac{5}{20} \times \frac{15}{19}, \frac{7}{20} \times \frac{13}{19}, \frac{8}{20} \times \frac{12}{19} \right)$ OR $\left(\frac{5}{20} \times \frac{4}{19}, \frac{7}{20} \times \frac{6}{19}, \frac{8}{20} \times \frac{7}{19} \right)$ M1 (dep) for $\left(\frac{5}{20} \times \frac{7}{19} + \frac{5}{20} \times \frac{8}{19} + \frac{7}{20} \times \frac{5}{19} + \frac{7}{20} \times \frac{8}{19} + \frac{8}{20} \times \frac{5}{19} + \frac{8}{20} \times \frac{7}{19} \right)$ oe OR $\left(\frac{5}{20} \times \frac{15}{19} + \frac{7}{20} \times \frac{13}{19} + \frac{8}{20} \times \frac{12}{19} \right)$ oe OR $1 - \left(\frac{5}{20} \times \frac{4}{19} + \frac{7}{20} \times \frac{6}{19} + \frac{8}{20} \times \frac{7}{19} \right)$ oe A1 for $\frac{131}{190}$ oe or 0.68947... correct to at least 2 decimal places or answer that rounds to 0.69

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					NB : If decimals used for products then must be correct to at least 2 decimal places With replacement M0 M1 for identifying all products (condone 2 errors in 6 products, 1 error in 3 products) M1 (dep) A0 for $\frac{269}{400}$ oe or 0.655 (NB: $\frac{269}{400}$ oe or 0.655 implies M2) Partial replacement SC: B2 for $\frac{141}{200}$ oe or 0.705 or $\frac{121}{190}$ oe or 0.6368... correct to at least 2 decimal places
16		$P = k/x^2$ $6 = k/5^2$ ($k = 150$) $P = \frac{150}{8^2}$	2.34	3	M1 for $P = k/x^2$ or $P \propto k/x^2$ M1 for $6 = k/5^2$ or ($k =$) 150 seen or $6 \times 5^2 = P \times 8^2$ A1 2.34
17		$3^2 \times 180$	1620	2	M1 for using a scale factor of 3^2 (= 9) A1 cao

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18	e.g. $1 \times 7.6 + 3 \times 9.4 +$ $2 \times 5.6 + 6 \times 1.4 = 55.4$ $55.4 \div 2 = 27.7$ $27.7 - 7.6 = 20.1$ $20.1 \div 9.4 = 2.138\dots$ Median = $55 + 2.138\dots$ $\times 2.5 = 60.345\dots$	60.3	4	M1 for attempt to find the area of one bar M1 for attempt to find total area $\div 2$ (condone one error) M1 for correct attempt to locate median in second bar (condone one arithmetic error) A1 for 60.3(4...)
19		(-15, 0)	4	M1 method to find gradient of tangent, e.g. $-1 \div -\frac{6}{3} (= \frac{1}{2})$ M1 for method to find equation of tangent with $m = \frac{1}{2}$ M1 for method to find x-axis intercept of tangent A1 cao

National performance data from Results Plus

Source of questions						Mean score of students achieving grade:								
Qu	Spec	Paper	Session	Qu	Topic	Max score	Mean % all	ALL	A*	A	B	C	D	E
1	4MA0(R)	2F	1501	Q17	Proportions	2.30	3	77				2.67	2.08	1.33
2	1MA0	2H	1406	Q14	HCF and LCM	3.68	5	74	4.65	4.27	3.97	3.58	2.77	1.58
3	5MM2	2F	1211	Q26	Pythagoras in 2D	1.00	3	33				2.90	1.88	0.52
4	1380	2F	911	Q27	Scatter diagrams	1.66	3	55				2.47	1.86	1.21
5	5AM2	2H	1306	Q14	Solve inequalities	2.71	5	54	4.43	3.48	2.78	1.72	0.79	0.06
6	5AM1	1H	1106	Q14	Solve linear equations	3.24	6	54	5.84	5.19	3.02	1.17	1.00	1.00
7	5AM2	2H	1411	Q15	Probability tree diagrams	3.22	6	54	5.78	5.25	4.29	2.36	1.00	0.00
8	4MA0(R)	2F	1501	Q20	Solving simultaneous equations	0.72	3	24				0.94	0.62	0.00
9	1MA0	2H	1306	Q07	Ratio	1.58	4	40	3.75	3.07	2.08	1.01	0.33	0.09
10	2540	2H	811	Q05	Number sequences	0.74	2	37	1.81	1.56	1.05	0.45	0.12	0.09
11	5MM2	2H	1506	Q21	Sine and cosine rule	1.59	5	32	4.38	2.58	0.80	0.16	0.05	0.10
12	5AM2	2H	1406	Q18	Bounds	1.57	5	31	3.53	2.65	1.45	0.44	0.10	0.00
13	1MA0	2H	1506	Q16	Compound measures	0.86	4	22	2.54	1.44	0.82	0.55	0.40	0.28
14	4MA0	1H	1401	Q20	Functions	4.76	9	53	7.89	5.68	3.42	1.41	0.47	0.25
15	1380	2H	906	Q26	Conditional probability	0.84	4	21	3.06	1.75	0.41	0.04	0.00	0.00
16	5MM2	2H	1111	Q23	Direct and indirect proportion	0.60	3	20	2.72	1.37	0.25	0.07	0.00	0.00
17	1MA0	2H	1506	Q21	Ratio	0.21	2	11	0.93	0.47	0.21	0.06	0.01	0.00
18	5AM1	1H	1311	Q21	Histograms and grouped data	0.42	4	11	2.04	0.67	0.23	0.12	0.00	0.00
19				NEW			4				No data available			
							80							