Paper: 1MA1/2H				
Question	Working	Answer	Mark	Notes
4 **Q1**		$\dfrac{1}{11}$	P1	for starting the process, eg by writing down a correct ratio or using a given number of cubes for one relationship, eg 2B 1Y or B:Y = 2:1 or 4G 1B or G:B = 4:1 or 8G, 1Y or G:Y = 8:1 oe or yellow = 2, blue = 4, or states 2:1:8 oe in any order (can be algebraic)
			P1	for complete process to find possible number of each colour or equivalent ratio, eg 8G 2B 1Y or G:B:Y = 8:2:1 oe or yellow = 2, blue = 4, green = 16 oe (can be algebraic)
			A1	$\dfrac{1}{11}$ oe

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Paper: 1MA1/2H				
Question	Working	Answer	Mark	Notes
21 (a)		$\dfrac{1}{55}$	M1	for $\dfrac{4}{12} \times \dfrac{3}{11} \times \dfrac{2}{10}$
			A1	for $\dfrac{1}{55}$ oe
(b)		Conclusion (supported)	C1	starts correct argument, eg by calculating a relevant probability, eg $\dfrac{5}{15} \times \dfrac{4}{14} \times \dfrac{3}{13}$
			C1	statement of "more likely" from eg comparison of probabilities, ft answer to (a) eg $\dfrac{1}{55}$ (= 0.018…) and $\dfrac{2}{91}$ (= 0.021…or 0.022)

Q2

Paper: 1MA1/3H				
Question	**Working**	**Answer**	**Mark**	**Notes**
8 (a) (b) **Q3**		Mel (supported) $\frac{2}{9}$	B1 M1 A1	Mel with reference to greatest number of throws selects overall total and multiplies P(point up)×P(point down) eg $\frac{50}{150} \times \frac{100}{150}$ oe (accept $\frac{14}{45} \times \frac{31}{45}$ or $\frac{27}{80} \times \frac{53}{80}$ or $\frac{9}{25} \times \frac{16}{25}$) for $\frac{2}{9}$ oe

Paper: 1MA1/3H				
Question	Working	Answer	Mark	Notes
10 (a)		0.05	B1	for 0.05 oe
(b)		20	C1	for stating that at least 20 required
Q4		Reason	C1	for reason eg explains that number of each colour must be a whole number or that there must be (at least) 1 red counter or shows that $0.05 = \dfrac{1}{20}$

Paper: 1MA1/3H				
Question	**Working**	**Answer**	**Mark**	**Notes**
12		48	M1	for 0.25×0.6 (= 0.15) or 0.75×0.4 (= 0.3)
Q5			M1	for 0.25×0.6 (= 0.15) and 0.75×0.4 (= 0.3) or for 24 ÷ "0.15" (= 160)
			A1	cao

Paper: 1MA1/1H				
Question	**Working**	**Answer**	**Mark**	**Notes**
Q6 17		$\dfrac{28}{72}$	P1	for $\dfrac{6}{8}$ or $\dfrac{2}{8}$ or $\dfrac{7}{8}$ or $\dfrac{1}{8}$ oe seen on diagram or in a calculation
			P1	for $\dfrac{7}{9}\times\dfrac{2}{8}$ or $\dfrac{2}{9}\times\dfrac{7}{8}$ or $\dfrac{14}{72}$ oe $\qquad\bigg\vert\qquad$ for $\dfrac{7}{9}\times\dfrac{6}{8}$ or $\dfrac{2}{9}\times\dfrac{1}{8}$ or $\dfrac{42}{72}$ or $\dfrac{2}{72}$ or $\dfrac{44}{72}$ oe
			P1	for $\dfrac{7}{9}\times\dfrac{2}{8}+\dfrac{2}{9}\times\dfrac{7}{8}$ $\qquad\bigg\vert\qquad$ for $1-(\dfrac{7}{9}\times\dfrac{6}{8}+\dfrac{2}{9}\times\dfrac{1}{8})$ or $1-("\dfrac{42}{72}"+"\dfrac{2}{72}")$ or $"\dfrac{14}{72}"+"\dfrac{14}{72}"$oe $\qquad\bigg\vert\qquad$ or $1-"\dfrac{44}{72}"$ oe
			A1	oe SC B1 for $\dfrac{14}{81}$ B2 for $\dfrac{28}{81}$

Paper: 1MA1/2H				
Question	Working	Answer	Mark	Notes
1

Q7 | | 98 | P1 | for process to find P(1), eg. $1 - 0.17 - 0.18 - 0.09 - 0.15 - 0.1$ (= 0.31) or for a process to find P(1 or 3), eg. $1 - 0.17 - 0.09 - 0.15 - 0.1$ (= 0.49) |
| | | | P1 | for process to find the number of 3s eg. 0.18×200 (=36)
or process to find the number of 1s, e.g. P(1) $\times$ 200 (= 62),
or process to find the number of (1 or 3)s, eg [P(1) + 0.18] $\times$ 200
or for process to find any expected frequency using any probability $\times$ 200
eg. 0.17×200 |
| | | | A1 | cao

OR |
			P1	for process to find P(2 or 4 or 5 or 6), eg. $0.17 + 0.09 + 0.15 + 0.1$ (= 0.51)
			P1	for process to find the number of (2 or 4 or 5 or 6)s, eg. "0.51" $\times$ 200 (= 102)
			A1	cao

Paper: 1MA1/2H				
Question	**Working**	**Answer**	**Mark**	**Notes**
12 (a)		comment	C1	for comment e.g. incorrect denominator for the 2nd student or probabilities for 2nd student do not add up to 1
Q8 (b)		No (supported)	C1	for "no" with supporting evidence, e.g. probabilities should be multiplied together or 0.4×0.25

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
16 **Q9**	0.12	P1	for process to start eg $(1 - 0.2) \div (3 + 17)$ $(= 0.04)$ **or** $(3 + 17) \div (1 - 0.2)$ oe $(= 25)$ **or** $(100 - 20) \div (3 + 17)$ $(= 4)$ **or** 3×4 $(= 12)$ and 17×4 $(= 68)$	Just $1 - 0.2 = 0.8$ is **not** sufficient for P1 May be seen in a ratio
		P1	full process to find the required probability eg $3 \times$ "0.04" **or** $\frac{3}{20} \times (1 - 0.2)$ oe **or** $3 \div$ "25" or $3 \times$ "4" $\div 100$	
		A1	oe	0.12 using incorrect probability notation gets P2

Paper: 1MA1/2H

Question	Answer	Mark	Mark scheme	Additional guidance
8 **Q10**	$\dfrac{3}{22}$	P1	for a process to find a first value eg male/Britain = 32 – 11 (=21) **or** Italy/total = 60 – (32+12) (=16) **or** female/total = 60 – 38 (=22)	<table><tr><td></td><td>Br</td><td>Sp</td><td>It</td><td>Tot</td></tr><tr><td>M</td><td>**21**</td><td>**9**</td><td>8</td><td>38</td></tr><tr><td>F</td><td>11</td><td>**3**</td><td>**8**</td><td>**22**</td></tr><tr><td>Tot</td><td>32</td><td>12</td><td>**16**</td><td>60</td></tr></table>
		P1	for process to find a secondary value, eg male/Spain = 38 – ("21" + 8) (=9) **or** female/Italy = "16" – 8 (=8)	May be seen in a frequency tree Values attributed to a category or from method seen
		P1	complete process to find female/Spain, eg 12 – "9" **or** "22" – (11 + "8") (=3)	
		A1	oe accept 0.136 to 0.14	
			SC B3 for $\frac{3}{60}$	

Paper: 1MA1/2H					
Question	Answer	Mark	Mark scheme		Additional guidance
15 (a)	0.55, 0.67, 0.33, 0.35, 0.65	B1	for 0.55 in correct position		Can be seen as fractions or percentages
		B1	for the branches for the second game correct		
(b) **Q11**	0.341	M1	for one correct product, eg 0.45 × "0.33" (=0.1485) **or** "0.55" × "0.35" (=0.1925) **or** 0.45 × "0.67" (=0.3015) **or** "0.55" × "0.65" (=0.3575)		Follow through acceptable for method marks from their tree in part (a) providing probabilities are less than 1. Accept fractional equivalents
		M1	for correct method eg (0.45 × "0.33") + ("0.55" × "0.35") **or** 1 − (0.45 × "0.67") − ("0.55" × "0.65")		
		A1	answer in range 0.34 – 0.341 oe		

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
4	Probabilities should sum to 1	C1	for stating that the probabilities should total 1 eg 0.25 should be 0.35	
Q12	0.35 and 0.65 reversed	C1	for recognising that the 0.35 and 0.65 in the first branches for the 2nd throw should be reversed eg, "for the second throw, the probability it lands on 4 should be 0.65"	Can be shown on the diagram

Paper: 1MA1/3H

Question	Answer	Mark	Mark scheme	Additional guidance
6 (a)	8	P1	for process to find sum of unknown probabilities, eg $1 - 0.45 - 0.25$ (= 0.3) **OR** to find the total number of counters in the bag, eg $\frac{18}{0.45}$ (= 40) **OR** to find the number of yellow counters, eg $\frac{0.25}{0.45} \times 18$ (= 10)	Award mark for any two probabilities given that sum to 0.3 eg given in the table.
Q13		P1	for process to find P(red) = 0.2 oe **or** P(white) = 0.1 oe **OR** for process to find the total number of red and white counters, eg "40" – 18 – "10" (=12) **OR** for process to derive an equation in x, eg $2x + x = 1 - 0.45 - 0.25$ or $2x + x = $ "0.3" or $x = 0.1$	Award P2 for P(red) or P(white) (could be shown in table) Equations could be given as written statements or working but must be fully equivalent.
		P1	for a complete process to find the number of red counters, eg $\frac{2 \times 0.1}{0.45} \times 18$ or $\frac{2}{3} \times$ "12" or $0.2 \times$ "40" or $\frac{0.2}{0.025}$	
		A1	cao	
(b)	Explanation	C1	for explanation eg 0.5 multiplied by an odd number will never be a whole number, for half of a number to be an integer that number must be even, you can't have half a marble	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
20 **Q14**	$\dfrac{6}{490}$	P1	for start to process information, eg draws Venn diagram and shows at least 1 unknown amount, eg 5 speak German and Spanish but not French	See Venn Diagram at end of mark scheme – rectangle not needed

		P1	for process to find at least 3 unknown amounts from,
			eg 5 speak German and Spanish but not French
			        3 speak French and German but not Spanish
			     22 speak French but not German or Spanish
			       0 speak German but not French or Spanish	

		P1	for complete process to find number of people who speak only Spanish (= 6)	Award first 3 marks to students who show this on the Venn diagram or in a statement.
		P1	for $\dfrac{\text{[number speaking Spanish only]}}{50} \times \dfrac{\text{[number speaking Spanish only]} - 1}{49}$, eg $\dfrac{6}{50} \times \dfrac{5}{49}$	Award this mark for use of their number of students who speak Spanish. Must be a clear link, eg from Venn diagram
		A1	for $\dfrac{6}{490}$ oe	See note 8 in general marking guidance but 0.01 or 1% must be from seen correct working.

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1 (a)	0.4, 0.4	P1	for process to find sum of unknown probabilities, eg 1 − 0.2 (= 0.8)	Award mark for any two probabilities given that sum to 0.8, eg given in the table
Q15 (b)		A1	oe	Accept any equivalent fraction or 40%
	60	P1	for complete process to find total number of cubes, eg 12 ÷ 0.2 **or** 12 × 5 **or** ("0.4" ÷ 0.2) ×12 + ("0.4" ÷ 0.2) ×12 + 12 **OR** states 0.1 = 6 **or** 0.4 = 24	
		A1	cao	

Paper: 1MA1/1H

Question	Answer	Mark	Mark scheme	Additional guidance
22	12 red, 9 green	P1	for process to find a relationship between r and g eg $\dfrac{g}{r+g}=\dfrac{3}{7}$ **or** $\dfrac{g}{r}=\dfrac{3}{4}$	
		P1	for process to find a second relationship between r and g eg $\dfrac{g+3}{r+2+g+3}=\dfrac{6}{13}$ **or** $\dfrac{g+3}{r+2}=\dfrac{6}{7}$	
		P1	(dep P2) for start to process of solving pair of equations, eg eliminates one variable from the equations **or** removes fractions from both equations	
Q16		P1	(dep P3) for complete process to solve equations to find g **or** r	
		A1	cao	
			OR	
		P1	for two of $3x + 3$, $4x + 2$ and $7x + 5$	
		P1	for $\dfrac{3x+3}{7x+5}=\dfrac{6}{13}$	
		P1	(dep P2) for removing fractions from the equation, eg $13(3x + 3) = 6(7x + 5)$ **or** $39x + 39 = 42x + 30$	
		P1	(dep P3) for complete process to solve $13(3x + 3) = 6(7x + 5)$	
		A1	cao	

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
10 (a)	Diagram completed 0.85 0.15, 0.85, 0.15, 0.85	M1 A1	for $1 - 0.15$ (=0.85) fully correct diagram	
(b) **Q17**	0.2775	M1	for one correct product eg 0.15×0.15 (= 0.0225) or 0.15×0.85 (= 0.1275) or 0.85×0.85 (= 0.7225)	ft their diagram provided probabilities are less than 1
		M1	for a complete method eg "0.0225" + 2×"0.1275" **OR** 1 – "0.7225" oe	ft their diagram provided probabilities are less than 1
		A1	oe, eg $\frac{111}{400}$	

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
14 **Q18**	0.42	P1	for appropriate multiplication eg 0.3 × 0.7 (=0.21) **or** 0.3 × 0.1 (=0.03) **or** 0.3 × 0.6 (=0.18)	Probabilities could also be given in fraction or percentage form
		P1	(dep) for complete process eg 0.3 × 0.7 + 0.7 × 0.3 **or** 0.3 × 0.1 + 0.3 × 0.6 + 0.6 × 0.3 + 0.1 × 0.3	
		A1	oe	Acceptable equivalents are 42% or $\frac{42}{100}$ oe

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
23 **Q19**	$\dfrac{27}{56}$	P1	for $\dfrac{3}{8}$ **and** $\dfrac{7}{9}$ **OR** uses a total of 72 cards and shows a process to find the number of cards with a black shape **or** the number of cards with a triangle, eg 72 ÷ 8 × 3 (=27) **or** 72 ÷ 9 × 7 (=56)	72 or any multiple of 72 Could be seen in a ratio, eg 27 : 45 or 16 : 56
		P1	for process shown to divide fractions $\dfrac{3}{8} \div \dfrac{7}{9}$ **or** $\dfrac{3}{8} \times \dfrac{9}{7}$ **OR** for $\dfrac{3}{8} \times \dfrac{9}{9}$ ($=\dfrac{27}{72}$) **and** $\dfrac{7}{9} \times \dfrac{8}{8}$ ($=\dfrac{56}{72}$) **OR** uses a total of 72 cards and shows a process to find the number of cards with a black shape **and** the number of cards with a triangle, eg 72 ÷ 8 × 3 (=27) **and** 72 ÷ 9 × 7 (=56)	Accept the division shown as $\dfrac{\frac{3}{8}}{\frac{7}{9}}$ Could be seen in ratios, eg 27 : 45 and 16 : 56
		A1	for $\dfrac{27}{56}$ or any other equivalent fraction	Answer of 27 : 56 gets P2A0

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
20 (a) **Q20**	Shown	M1	for $\dfrac{n}{n+8}$ **or** starts to work with ratios, eg 3:7	
		M1	forms equation and clears fractions, eg $10n = 7n + 56$ or $10n + 3(n + 8) = 10\,(n + 8)$ **or** equates $\dfrac{3}{10} = \dfrac{8}{x}$ or $\dfrac{3}{10} = \dfrac{8}{n+8}$ **or** continues to work with ratios, eg 3:7 = 24:56	
		C1	gives the total sweets eg $\dfrac{80}{3}$ oe **or** number of red sweets $n = \dfrac{56}{3}$ oe **or** gives number of red as $\dfrac{56}{3}$ **OR** award 3 marks for a complete written argument, eg, P(y) = $\dfrac{3}{10}$ and there are 8 yellows. This cannot work as 3 is not a factor of 8 (and $\dfrac{3}{10}$ is in its simplest form)	Does not have to restate the $\dfrac{7}{10}$; giving a different probability will suffice

Paper: 1MA1/2H

Question	Answer	Mark	Mark scheme	Additional guidance
20 (b)	28	P1	for $\dfrac{n}{n+8}$ and $\dfrac{n-1}{n+7}$ oe	
		P1	forms an appropriate equation, eg $\dfrac{n}{n+8}\times\dfrac{n-1}{n+7}=\dfrac{3}{5}$	
		P1	for correctly forming a quadratic ready for solving, eg $an^2 + bn + c\ (=0)$, $2n^2 - 50n - 168\ (=0)$, $n^2 - 25n - 84\ (=0)$ oe	Note we do not need to see "= 0"; just the LHS is sufficient.
		P1	process to solve quadratic equation, ft a 3 term quadratic factorising eg $(n + 3)(n - 28)\ (=0)$ oe **or** completing the square **or** correct use of formula eg $\dfrac{--25\pm\sqrt{25^2-4\times-84}}{2}$, $\dfrac{--50\pm\sqrt{50^2-4\times2\times-168}}{2\times2}$	
		A1	cao	Award 0 marks for a correct answer with no supportive working.

Paper: 1MA1/3H					
Question		**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
5 (a) **Q21**		$\dfrac{1}{3}, \dfrac{2}{3}$ $\dfrac{1}{3}, \dfrac{2}{3}, \dfrac{1}{3}, \dfrac{2}{3}$	B2	six fully correct probabilities	Accept any equivalent fraction, decimal form 0.33(3...) and 0.66(6...) or 0.67 or percentage form 33(.3...)% and 66(.6...)% or 67%
			(B1	at least 2 correct probabilities)	
(b)		$\dfrac{2}{9}$	M1	for $\dfrac{1}{3} \times \dfrac{2}{3}$ oe or ft probabilities from diagram	
			A1	for $\dfrac{2}{9}$ oe	Accept any equivalent fraction, decimal form 0.22(2...) or percentage form 22(.2...)%

Paper: 1MA1/3H

Question	Answer	Mark	Mark scheme	Additional guidance
8

Q22 | 24 | P1 | for start to process of working out the unknown probabilities, eg $1 - 0.32 - 0.20$ (= 0.48) **or** assigning probabilities as $5x$ and x **or** process to work out the number of blue or green counters, eg 0.32×300 (= 96) or 0.20×300 (= 60) or 0.52×300 (= 156) | Award for P(R) + P(Y) = 0.48, may be seen in table |
| | | P1 | for process to find the probability, eg $5x + x =$ "0.48" or "0.48" ÷ 6 (= 0.08) **or** process to find the number of red or yellow counters, eg $300 -$ "96" $-$ "60" or $300 \times$ "0.48" | |
| | | A1 | cao | |

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
16 **Q23**	$\dfrac{180}{336}$	P1	for $\dfrac{3}{7}$ or $\dfrac{4}{7}$ or $\dfrac{5}{7}$ as probability for second counter	May be seen in a calculation or on a diagram
		P1	for one correct product eg $\dfrac{3}{8} \times \dfrac{5}{7} \times \dfrac{4}{6}$ $(= \dfrac{60}{336})$ **or** $\dfrac{5}{8} \times \dfrac{3}{7} \times \dfrac{4}{6}$ $(= \dfrac{60}{336})$ **or** $\dfrac{5}{8} \times \dfrac{4}{7} \times \dfrac{3}{6}$ $(= \dfrac{60}{336})$	
		P1	for a complete process eg $\dfrac{3}{8} \times \dfrac{5}{7} \times \dfrac{4}{6}$ + $\dfrac{5}{8} \times \dfrac{3}{7} \times \dfrac{4}{6}$ + $\dfrac{5}{8} \times \dfrac{4}{7} \times \dfrac{3}{6}$	
		A1	oe, eg $\dfrac{15}{28}$ SC B1 for answer of $\dfrac{225}{512}$ (replacement)	Accept equivalent fractions, decimals (0.53... or 0.54) or percentages (53% or 54%)

Paper: 1MA1/2H

Question	Answer	Mark	Mark scheme	Additional guidance
20 **Q24**	0.748	P1	for a process to find a correct probability product for 2 consecutive days, eg. 0.7×0.8 (rain M + T) **or** 0.7×0.2 (rain M + no rain T) **or** 0.3×0.6 (no rain M + rain on T) **or** 0.3×0.4 (no rain M + T)	Throughout accept probabilities given as fractions or percentages Could be for Tuesday and Wednesday also
		P1	for process to find a correct triple probability product for it raining on Wednesday, eg. $0.7 \times 0.8 \times 0.8$ (rain M + T + W) (= 0.448 **or** $\frac{56}{125}$ oe) **or** $0.7 \times 0.2 \times 0.6$ (rain M + no rain T + rain W) (= 0.084 **or** $\frac{21}{250}$ oe) **or** $0.3 \times 0.6 \times 0.8$ (no rain M + rain T + rain W) (= 0.144 **or** $\frac{18}{125}$ oe) **or** $0.3 \times 0.4 \times 0.6$ (no rain M + no rain T + rain W) (= 0.072 **or** $\frac{9}{125}$ oe)	
		P1	for complete process, eg. "0.448" + "0.084" + "0.144" + "0.072"	
		A1	oe eg, $\frac{187}{250}$	NB: correct answer without supportive working gets 0 marks

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
6 (a)	0.5, 0.3	P1	for $1 - 0.05 - 0.15 (= 0.8)$	Award this mark for any two probabilities that sum to 0.8
Q25		A1	oe	
(b)	120	M1	$18 \div 0.15$ oe **or** $6 + 18 + a + b$ where $a + b = 96$	
		A1	cao	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
20 **Q26**	$1 - \left(\dfrac{1}{2}\right)^n - \left(\dfrac{1}{2}\right)^n$	M1	for $\left(\dfrac{1}{2}\right)^n$ oe	
		A1	oe eg $1 - \left(\dfrac{1}{2}\right)^{n-1}$	

Paper: 1MA1/1H

Question	Answer	Mark	Mark scheme	Additional guidance
22 **Q27**	21	P1	for a relevant probability, eg P(green) $= \dfrac{x}{2x+3}$ or P(blue) $= \dfrac{x+3}{2x+3}$	the number of green and blue pens could be $x-3$ and x or equivalent probabilities must be in an algebraic form in a single variable
		P1	for a relevant product, eg. $"\dfrac{x}{2x+3}" \times "\dfrac{x-1}{2x+2}"$ or $"\dfrac{x+3}{2x+3}" \times "\dfrac{x+2}{2x+2}"$ **OR** $\left("\dfrac{x}{x+3}"\right)^2 + \left("\dfrac{x+3}{2x+3}"\right)^2 = \dfrac{27}{75}$	This is an exception using replacements. No further credit is available
		P1	forms an appropriate equation, eg. $"\dfrac{x}{2x+3} \times \dfrac{x-1}{2x+2}" + "\dfrac{x+3}{2x+3} \times \dfrac{x+2}{2x+2}" = \dfrac{27}{55}$	
		P1	(dep P3) process to reduce equation to $ax^2 + bx + c = 0$ eg. $x^2 - 25x + 84 = 0$	
		P1	process to solve quadratic equation eg. $(x - 21)(x - 4) = 0$	
		A1	cao	

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
16 (a)	0.455	M1	for $0.65 \times (1 - 0.65)$ or 0.65×0.35 $(=0.2275$ or $\frac{91}{400})$ or 2×0.2275 oe	Could be shown on a tree diagram but must show an intention to multiply
Q28		A1	oe	Acceptable equivalents are 45.5% or $\frac{91}{200}$ oe
(b)	42	M1	for a start of the process eg $78 \div 0.65$ (= 120) or 78×0.35 (=27.3)	$\frac{78 \times 0.35}{0.65}$, $\frac{78}{0.65} - 78$
		A1	cao	

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
16 **Q29**	$\dfrac{52}{72}$	P1	for $\dfrac{4}{9} \times \dfrac{3}{8} \left(\dfrac{12}{72}\right)$ **or** $\dfrac{4}{9} \times \dfrac{5}{8}$ **or** $\dfrac{5}{9} \times \dfrac{4}{8} \left(\dfrac{20}{72}\right)$	
		P1	for $1 - \left(\dfrac{5}{9} \times \dfrac{4}{8}\right)$ **or** $\dfrac{4}{9} \times \dfrac{3}{8} + \dfrac{4}{9} \times \dfrac{5}{8} + \dfrac{5}{9} \times \dfrac{4}{8}$ oe	
		A1	for $\dfrac{52}{72}$, $\dfrac{13}{18}$ oe SC B1 for answer of $\dfrac{56}{81}$ (replacement)	Accept equivalent fractions, decimals (0.72…) or percentages (72.22…..%)

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
11 **Q30**	0.1709	M1	for one product, 0.07×0.98 (=0.0686) **or** 0.93×0.11 (=0.1023) **or** 0.07×0.02 (=0.0014) **or** 0.93×0.89 (= 0.8277)	If all products shown, award this mark
		M1	for a fully correct method, eg $0.07 \times 0.98 + 0.93 \times 0.11$ **or** $1 - (0.07 \times 0.02) - (0.93 \times 0.89)$	
		A1	oe	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
21 **Q31**	$\dfrac{1}{81}$	M1 A1	for finding the probability of heads eg $\sqrt[4]{\dfrac{16}{81}}$ $(=\dfrac{2}{3})$ **or** for finding the probability of tails $1 - \sqrt[4]{\dfrac{16}{81}}$ $(=\dfrac{1}{3})$ oe	Seeing a probability of $\dfrac{2}{3}$ or $\dfrac{1}{3}$ is enough for this mark

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
10 (a) **Q32**	$\dfrac{1}{16}$	M1 A1	for method to find probability of getting a score of 5, eg $\dfrac{10}{6+8+9+7+10}$ $(=\dfrac{10}{40})$ oe for $\dfrac{1}{16}$ oe	 Accept any equivalent fraction, decimal form 0.06(25) or 0.063, percentage form 6(.25)% or 6.3% Ignore subsequent incorrect attempts to write the correct answer in a different form.
(b)	15	M1 A1	for method to find the proportion of 1s, eg $\dfrac{6}{40}$ oe cao	

Paper: 1MA1/1H

Question	Answer	Mark	Mark scheme	Additional guidance
20 **Q33**	$\dfrac{62}{110}$	P1	for process to find a probability of 2 cards of different colours, eg $\dfrac{3}{11}\times\dfrac{7}{10}$ or $\dfrac{3}{11}\times\dfrac{1}{10}$ or $\dfrac{7}{11}\times\dfrac{3}{10}$ or $\dfrac{7}{11}\times\dfrac{1}{10}$ or $\dfrac{1}{11}\times\dfrac{3}{10}$ or $\dfrac{1}{11}\times\dfrac{7}{10}$ oe or $\dfrac{3}{11}\times\dfrac{8}{10}$ oe or $\dfrac{7}{11}\times\dfrac{4}{10}$ oe or $\dfrac{1}{11}\times\dfrac{10}{10}$ oe	May see fraction with denominator 110
		P1	for a complete process, eg $\dfrac{3}{11}\times\dfrac{7}{10}+\dfrac{3}{11}\times\dfrac{1}{10}+\dfrac{7}{11}\times\dfrac{3}{10}+\dfrac{7}{11}\times\dfrac{1}{10}+\dfrac{1}{11}\times\dfrac{3}{10}+\dfrac{1}{11}\times\dfrac{7}{10}$ oe or $\dfrac{3}{11}\times\dfrac{8}{10}+\dfrac{7}{11}\times\dfrac{4}{10}+\dfrac{1}{11}\times\dfrac{10}{10}$ oe	
		A1	for $\dfrac{62}{110}$ oe	Accept equivalent fraction, decimal form 0.56(36…) or percentage form 56(.36…)%
			OR	
		P1	for process to find a probability of 2 cards of the same colour, eg $\dfrac{3}{11}\times\dfrac{2}{10}$ or $\dfrac{7}{11}\times\dfrac{6}{10}$ or $\dfrac{1}{11}\times\dfrac{0}{10}$ oe	
		P1	for a complete process, eg $1-\dfrac{3}{11}\times\dfrac{2}{10}-\dfrac{7}{11}\times\dfrac{6}{10}\ (-\dfrac{1}{11}\times\dfrac{0}{10})$ oe	
		A1	for $\dfrac{62}{110}$ oe SC B1 for answer of $\dfrac{62}{121}$ (replacement)	Accept equivalent fraction, decimal form 0.56(36…) or percentage form 56(.36…)%

Paper: 1MA1/3H					
Question	Answer	Mark	Mark scheme		Additional guidance
6 (a) **Q34**	0.7	B1	for 0.7 on the first branch		Accept equivalent fractions or percentages for probabilities
	0.65, 0.65	B1	for 0.65, 0.65 on the second branches		
(b)	0.105	M1	for 0.3×0.35		
		A1	oe		

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
19 **Q35**	16	P1 P1 A1	for Prob(R or G) = 1 – 0.4 (= 0.6) or for (number of red or green counters) = 50 – 0.4 × 50 (= 30) or for use of ratio, eg [probability] × $\dfrac{8}{15}$ (= 0.32) or [number of counters] × $\dfrac{8}{15}$ for a complete process to find number of green counters, eg (1 – 0.4) × $\dfrac{8}{15}$ × 50 or for $\dfrac{16}{50}$ cao	[probability] may be 0.4 or 0.6 [number of counters] may be 20 or 50

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
16 **Q36**	0.78	P1	for using 0.75 or 0.25 in a relevant product, eg $0.75 \times x$ **or** $0.25 \times y$	Allow different letters Could work with fractions
		P1	for using two products to form an equation, eg $0.75x + 0.25y = 0.36$	
		P1	for a correct equation in one variable, eg $0.75(1 - p) + 0.25p = 0.36$ **or** $0.75f + 0.25(1 - f) = 0.36$	Could set up an equation for pass $\times$ pass + fail $\times$ fail = 0.64
		A1	oe	Accept 78% or any equivalent fraction, eg $\frac{39}{50}, \frac{156}{200}$

Paper: 1MA1/3H

Question	Answer	Mark	Mark scheme	Additional guidance
21 **Q37**	$\dfrac{11}{21}$	P1	for any product of 3 probabilities of the form $\frac{a}{9} \times \frac{b}{8} \times \frac{c}{7}$ where $a < 9$, $b < 8$, $c < 7$	May see fraction with denominator 504 Students who indicate they are using the approach P(even) = 1 – P(odd) should be given credit as appropriate
		P1	for a product of 3 probabilities giving an even sum, eg. E,E,E $= \frac{4}{9} \times \frac{3}{8} \times \frac{2}{7}$ or E,O,O $= \frac{4}{9} \times \frac{5}{8} \times \frac{4}{7}$	
		P1	for summing the product of at least three correct triples, eg (E,E,E + E,O,O + O,O,E =) $\frac{4}{9} \times \frac{3}{8} \times \frac{2}{7} + \frac{4}{9} \times \frac{5}{8} \times \frac{4}{7} + \frac{5}{9} \times \frac{4}{8} \times \frac{4}{7}$ OR $3(\frac{4}{9} \times \frac{5}{8} \times \frac{4}{7})$	
		A1	for $\frac{11}{21}$ oe SCB1 for answer of $\frac{364}{729}$ (replacement)	Accept any equivalent fraction, decimal form 0.52(38...) or percentage form 52(.38…)%