1(a)	1 or 100%	B1	oe fraction, decimal or percentage eg $\frac{56}{56}$
	Additional Guidance		
	Do not accept answers in words only, eg 'Certain'		B0

2(a)	12	B2	B1 $(1 - 0.85) \times 80$ or 0.15×80 or 0.85×80 or 68
	Additional Guidance		
	For B1 allow oe calculations eg 17×4		B1
2(b)	25	B2	B1 0.71×80 or 56.8 or 56 or $(1 - 0.71) \times 80$ or 0.29×80 or 23.2 or 24 or $(0.71 - 0.3875) \times 80$ or 0.3225×80 or 25.8
	Additional Guidance		
	For B1 allow oe calculations eg $\left(0.71 - \frac{31}{80}\right) \times 80$		B1
	Answer only 26		B0

3(a)	**Alternative method 1**		
	35 + 48 – their 32 or 35 – their 14 + 48 – their 18 or 51	M1	oe their 32 from (a) their 14 and their 18 from (a)
	$\frac{51}{83}$ or 0.61(4...) or 61(.4...)%	A1ft	ft their 32 from (a)
	Alternative method 2		
	$\left(1-\frac{2}{5}\right) \times 35 + \left(1-\frac{3}{8}\right) \times 48$ or $\frac{3}{5} \times 35 + \frac{5}{8} \times 48$ or 21 + 30	M1	oe
	$\frac{51}{83}$ or 0.61(4...) or 61(.4...)%	A1	
	Additional Guidance		
	Ignore incorrect conversion if correct fraction seen		
	If their answer in part (a) is a fraction, only allow follow through if their numerator is used in part (b)		
	Alt 1 ft decimal or percentage answers accept rounding to at least 2 sf		

Question	Answer	Mark	Comments
4(a)	0.1 on Fail for First check	B1	oe fraction, decimal or percentage
	0.01 on Fail and 0.99 on Pass for Second check	B1	oe fraction, decimal or percentage
	Additional Guidance		
	Ignore any extra branches drawn		

Question	Answer	Mark	Comments
4(b)	**Alternative method 1**		
	0.9 × their 0.01 or 0.009	M1	oe eg $\frac{9}{10} \times \frac{1}{100} = \frac{9}{1000}$
	their 0.009 + their 0.1	M1dep	oe their 0.1 must be > 0 and < 1
	0.109	A1ft	oe fraction, decimal or percentage ft their tree diagram if all probabilities are > 0 and < 1
	Alternative method 2		
	0.9 × their 0.99 or 0.891	M1	oe eg $\frac{9}{10} \times \frac{99}{100} = \frac{891}{1000}$
	1 – their 0.891	M1dep	oe
	0.109	A1ft	oe fraction, decimal or percentage ft their tree diagram if all probabilities are > 0 and < 1
	Additional Guidance		
	Answer 0.109%		M2A0

Q	Answer	Mark	Comments
5(a)	**Alternative method 1**		
	$\frac{2}{11} \times \frac{5}{9}$ or $\frac{10}{99}$ or $\frac{9}{11} \times \frac{4}{9}$ or $\frac{36}{99}$	M1	oe fractions, decimals or percentages
	$\frac{2}{11} \times \frac{5}{9} + \frac{9}{11} \times \frac{4}{9}$ or $\frac{10}{99} + \frac{36}{99}$	M1dep	oe fractions, decimals or percentages
	$\frac{46}{99}$	A1	oe fraction, decimal or percentage allow 0.465 or better allow 46.5% or better SC2 $\frac{54}{99}$ oe

5(a) cont	**Alternative method 2**		
	$\frac{2}{11} \times \frac{4}{9}$ or $\frac{8}{99}$ or $\frac{9}{11} \times \frac{5}{9}$ or $\frac{45}{99}$	M1	oe fractions, decimals or percentages
	$1 - \frac{2}{11} \times \frac{4}{9} - \frac{9}{11} \times \frac{5}{9}$ or $1 - \frac{8}{99} - \frac{45}{99}$ or $1 - \frac{53}{99}$	M1dep	oe fractions, decimals or percentages
	$\frac{46}{99}$	A1	oe fraction, decimal or percentage allow 0.465 or better allow 46.5% or better SC2 $\frac{54}{99}$ oe
	Additional Guidance		
	For M marks, accept values given as recurring decimals or correctly rounded to 2 dp or better eg Alt 1 $0.18 \times 0.56 + 0.818 \times 0.44$		M1M1
	M1 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts		
	Ignore conversion attempt if correct answer seen		

Q	Answer	Mark	Comments
5(b)	$\frac{9}{11} \times \frac{8}{10}$	M1	oe fractions, decimals or percentages
	$\frac{72}{110}$ or $\frac{36}{55}$	A1	oe fraction, decimal or percentage allow [0.65, 0.655] allow [65%, 65.5%]
	Additional Guidance		
	For M1, accept $\frac{9}{11}$ given as a recurring decimal or correctly rounded to 2 dp or better eg 0.82×0.8		M1
	Ignore conversion attempt after correct answer seen		

Q	Answer	Mark	Comments
6	**Alternative method 1**		
	All three of 1, 8 and 1, 2, 4, 8 and 1, 3, 5, 7, 9 or all three of 2, 4 and 5	B2	B1 any two correct do not allow 2, 4 or 5 from an incorrect list of numbers
	their 2 × their 4 × their 5 or 40	M1	working out the number of possible codes ft their non-zero number of options for each digit implied by $\frac{1}{\text{their 2}} \times \frac{1}{\text{their 4}} \times \frac{1}{\text{their 5}}$
	$\frac{1}{40}$	A1ft	oe fraction, decimal or percentage ft their non-zero number of options for each digit
	Alternative method 2		
	All three of $\frac{1}{2}$ and $\frac{1}{4}$ and $\frac{1}{5}$	B2	B1 any two correct oe fractions, decimals or percentages do not allow $\frac{1}{2}$, $\frac{1}{4}$ or $\frac{1}{5}$ from an incorrect list of numbers
	their $\frac{1}{2}$ × their $\frac{1}{4}$ × their $\frac{1}{5}$	M1	oe fractions, decimals or percentages allow their $\frac{1}{2}$ to be 1 their $\frac{1}{4}$ must be < 1 their $\frac{1}{5}$ must be < 1
	$\frac{1}{40}$	A1ft	oe fraction, decimal or percentage ft their probabilities

6 cont	**Additional Guidance**	
	If 0 is taken to be a cube number, $\frac{1}{3} \times \frac{1}{4} \times \frac{1}{5} = \frac{1}{60}$	B1M1A1ft
	If they only have one cube number, $1 \times \frac{1}{4} \times \frac{1}{5} = \frac{1}{20}$	B1M1A1ft
	8, 9 and 1, 2, 4, 8 and 1, 3, 5, 7, 9 $\frac{1}{2} \times \frac{1}{4} \times \frac{1}{5} = \frac{1}{40}$	B1 M1A1ft
	Ignore conversion attempt after correct answer seen	
	Allow 1^3, 2^3 for 1, 8	

Q	Answer	Mark	Comments
7(a)	$8 \times 4 \times 5$	M1	
	160	A1	
	Additional Guidance		
	$\frac{1}{8} \times \frac{1}{4} \times \frac{1}{5} = 160$ (recovered)	M1A1	
	$\frac{1}{8} \times \frac{1}{4} \times \frac{1}{5}$	M0A0	

Q	Answer	Mark	Comments
7(b)	$\frac{1}{160}$ or 0.00625 or 0.625% or 6.25×10^{-3}	B1ft	oe fraction, decimal or percentage ft $\frac{1}{\text{their answer to (a)}}$
	Additional Guidance		
	Accept decimal or percentage answers rounded to 2 sf or better for ft eg ft 17 gives 0.058823529… so accept 0.059 or better		
	Ignore an attempt to convert a fraction to a decimal or round a decimal or percentage after a correct value is seen		
	1 : 160 or 1 in 160 or 1 out of 160	B0	
	$\frac{1}{160} + \frac{1}{160} = \frac{2}{320} = \frac{1}{160}$	B0	
	$\frac{1}{160} \times \frac{1}{160} = \frac{2}{320} = \frac{1}{160}$	B0	

Q	Answer	Mark	Comments
8(a)	All values correct	B2	B1 1 or 2 rows correct
	Additional Guidance		
	<table><tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th></tr><tr><td>$2x$</td><td>2</td><td>4</td><td>6</td><td>8</td><td>10</td><td>12</td></tr><tr><td>$3x$</td><td>3</td><td>6</td><td>9</td><td>12</td><td>15</td><td>18</td></tr><tr><td>x^2</td><td>1</td><td>4</td><td>9</td><td>16</td><td>25</td><td>36</td></tr></table>		B2

Q	Answer	Mark	Comments
8(b)	$\frac{8}{18}$ or $\frac{4}{9}$ or 0.44(4…) or 44(.4…)%	B1ft	oe fraction, decimal or percentage ft their table with ⩾ 12 values must be using 18 for the total number of possible scores
	Additional Guidance		
	Ignore simplification or conversion attempt (not ratio) after correct probability seen		
	Ratio answer eg 8 : 18, even alongside a correct probability is B0		
	ft decimals or percentages must be correct to the same accuracy as in the scheme eg 10 winning values in their table $\frac{10}{18}$ or 0.55(5…) or 0.56 or 0.556 or 55(.5…)% or 56% or 55.6%		B1ft

Q	Answer	Mark	Comments
8(c)	711 × their $\frac{8}{18}$	M1	oe ft their probability from (b) or if no probability in (b), ft their table with ⩾ 12 values where 0 < their probability < 1 probabilities, if rounded in (c), must be truncated or rounded to at least 2 sf
	316	A1	SC2 395
	Additional Guidance		
	Answer 316		M1A1
	$\frac{316}{711}$ on answer line		M1A0
	Condone 316 out of 711		M1A1
	Do not treat estimating by rounding as a misread eg1 700 used instead of 711 eg2 (b) 0.44 (c) 0.4 × 711 (rounded to 1sf in (c) for the probability) eg3 (b) 0.4 (c) 0.4 × 711 (follows through their (b))		 M0A0 M0A0 M1A0
	Do not allow ft for a ratio from (b) but may ft their (a) instead		
	For 0.44 × 711, accept 44% × 711 but do not accept 44% of 711 unless recovered		
	The method mark may be implied by a ft answer (decimal or truncated to the nearest integer or rounded up to the nearest integer) eg1 (b) $\frac{7}{18}$ (c) 276.5 or 276 or 277 (correct ft method implied using (b)) eg2 (a) completed table has 7 winning values (b) no probability shown (c) 276.5 or 276 or 277 (correct ft method implied using (a))		 M1A0 M1A0

Q	Answer	Mark	Comment
9	**Alternative method 1**		
	$7 \times 5 \times 11$ or 385 or $3 \times 2 \times 4$ or 24 or $\frac{3}{7}$ or $\frac{2}{5}$ or $\frac{4}{11}$	M1	oe
	$\frac{3\times2\times4}{7\times5\times11}$ or $\frac{24}{385}$ or 0.062(…)	M1dep	oe eg $\frac{3}{7} \times \frac{2}{5} \times \frac{4}{11}$
	6.2(...) **or** 0.062(…) and 0.05	A1	allow 6 with M2 scored **or** allow 0.06 and 0.05 with M2 scored
	Alternative method 2		
	$3 \times 2 \times 4$ or 24	M1	oe
	$0.05 \times 7 \times 5 \times 11$ or 0.05×385 or 19(.25) or 19.3	M1	oe
	24 and 19(.25) **or** 24 and 19.3	A1	
	Additional Guidance		
	Up to M1 may be awarded for correct work with no answer, or incorrect answer, even if this is seen amongst multiple attempts		
	Alt 1 6 or 0.06 without M2 scored is A0		
	Alt 1 6.2(...) with no working		M2A1
	Alt 2 24 and 19 with no working		M2A1
	Do not allow any misreads		

Q	Answer	Mark	Comment
10(a)	0.9×0.8^2 or 0.9×0.64	M1	oe
	0.576 or 0.58 or $\frac{72}{125}$	A1	oe fraction decimal or percentage
	Additional Guidance		
	Ignore any attempt to convert a correct answer		M1A1

Q	Answer	Mark	Comments
11(a)	The same number of 7s as even numbers	M1	any order may be in a list or on the spinner must be at least one 7
	5, 5, 6, 7, 7, 8	A1	any order may be in a list or on the spinner may be implied
	$\frac{2}{6}$	A1ft	oe fraction, decimal or percentage ft M1A0 with completed spinner or list of six numbers
	Additional Guidance		
	Ignore simplification or conversion attempt after correct answer seen		
	Accept 0.33(…) or 33.(…)% for $\frac{2}{6}$		
	A list/spinner with blanks and/or using other numbers may still score M1 eg 5, 5, 7, 10 or 5, 6, 7, 7, 8, 9	M1	
	$\frac{2}{6}$ with no incorrect working eg 5, 6, 7, 8 on spinner with 2 blanks answer $\frac{2}{6}$ (M1A1 is implied)	M1A1A1	
	5, 5, 6, 6, 7, 7 with answer $\frac{2}{6}$	M1A0A1ft	
	5, 5, 5, 5, 6, 7 with answer $\frac{4}{6}$	M1A0A1ft	
	5, 6, 6, 7, 7, 9 with answer $\frac{2}{6}$	M1A0A0ft	
	5, 5, 5, 5, 5, 6 with answer $\frac{5}{6}$	M0A0A0ft	

Q	Answer	Mark	Comments
11(b)	Valid reason	B1	eg sum of probabilities is not 1
	Additional Guidance		
	Ignore irrelevant statements alongside a correct statement eg the sum of the probabilities is not 1 and the probabilities are not percentages	B1	
	Do not ignore incorrect statements alongside a correct statement eg the sum of the probabilities is 0.11 not 1	B0	
	They add up to 1.1	B1	
	They add up to 110%	B1	
	It is 0.1 too much	B1	
	One of the probabilities is 0.1 too much	B1	
	It should be something like 0.1, 0.2, 0.3, 0.4	B1	
	B should be 0.4	B1	
	They don't add up correctly	B0	
	They add up to 0.11	B0	
	It's not a fair spinner	B0	

Q	Answer	Mark	Comments
12	$\frac{52}{200}$ or $\frac{26}{100}$ or $\frac{13}{50}$	B1	oe fraction, decimal or percentage eg 0.26 or 26%
	Valid reason involving the number of trials	B1	eg it is from using the largest number of flips
	Additional Guidance		
	1st B1 Ignore simplification or conversion attempt after correct answer seen eg $\frac{52}{200} = 0.28$		1st B1
	52 out of 200 or 52 : 200		1st B0
	Probability from incorrect working eg $\frac{10+30+40+50}{50+100+150+200} = \frac{130}{500}$		1st B0
	Ignore irrelevant statements alongside a correct statement eg Using most flips and they could have done more		2nd B1
	Do not ignore incorrect statements alongside a correct statement eg Uses all the flips but they could have used 100 flips		2nd B0
	It uses all the flips		2nd B1
	More spins		2nd B1
	200 is the largest amount of data		2nd B1
	200 is the highest number		2nd B1
	200 is the total number of flips		2nd B0
	200 flips gives 52 heads		2nd B0
	200 is the final result		2nd B0
	That is the highest number in the table		2nd B0
	The highest results are more accurate		2nd B0
	100 flips is easier to work out		2nd B0
	He could use any of the results		2nd B0
	B0B1 is possible eg Answer 27% Reason Use the one from most spins		B0B1

Q	Answer	Mark	Comments	
13	**Alternative method 1**			
	1 – 0.38 or 0.62	M1	oe	
	their 0.62 × 150	M1dep	oe implied by $\frac{93}{150}$	
	93	A1		
	Alternative method 2			
	0.38 × 150 or 57	M1	oe	
	150 – their 57	M1dep	oe implied by $\frac{93}{150}$	
	93	A1		
	Additional Guidance			
	'93 out of 150' on answer line			M1M1A1
	Ignore attempt to simplify $\frac{93}{150}$			M1M1A0
	$\frac{93}{150}$ and 93 both on answer line			M1M1A0
	$\frac{57}{150}$			M1M0A0
	Do not allow a misread of any probability			