(ii) $\frac{8}{25}$ 1B1for 32 ce (penlise incorrect notation once only in (a))2 $1 - (0.24 + 0.31) (= 0.45)$ or $(0.24 + 0.31) \times 180 (= 99)$ 4M1or for a correct equation for mising values eg $x + 0.24 + 2.431 = 10$ ec (can be implied by 2 probabilities or $(0.45' + 3 (= 0.15)$ or $(0.45' + 3 (= 0.15)$ or $(0.45' + 3 (= 0.15)$ or $(0.45' \times 180 (= 81))$ 4M1or for a correct plate in total contradicted in working space) $0.45' \times 180 (= 81)$ or $(0.45' \times 180 = 81)$ $0.15' \times 180$ or $(15' \times 180$ or $(15' \times 180)$ 27 A1 3 $(0.15' \times 180$ or $(1-(\frac{10}{100} + \frac{12}{100} + \frac{16}{100})) (= 60)$ or $1-(\frac{10}{100} + \frac{12}{100} + \frac{16}{100}) (= 60(%))$ or $0^2 + 0.12 + 0.08 + 3\pi + \pi = 10e$ 3M1for a correct calculation for the remaining probabilities or a correct equation for the remaining probabilities $0.45' + 4 (= 0.15)$ co $corr = 0.5'' + 4 \times 3$ or $0.5' - 4 (= 0.15)$ co $correct or answerscore fill marks (unless from obviousmcorrect working0.45A1oror2 = \frac{20}{20} co rest the equation in the finalscore fill marks (unless from obviousmcorrect working0.45A1oror2 = 0 correct calculation to the themultice of the above.(b)0.12 \times 150 oe eg 12 + 62M1or a correct calculation to find themumber of times has builtor a score still marks (unless from obviousmcorrect working)0.45A1oror2 = 0 correct calculation to find themumber of times has builtor a score still and still unces form abviousmcorrect working)0.45A1or0 = \frac{20}{20} correct c$	1	(a)(i)		$\frac{10}{25}$		1	B1	for 0.4 oe
aorfull with y (with y)missing values eg $x \pm 0.24 \pm 2x \pm 0.31 = 1$ oe (can be implied by 2 probabilities that total 0.45 in table if not contradicted in working space) $(0.45^{\circ} \pm 3 (= 0.15))$ or $(0.45^{\circ} \pm 3 (= 0.15))$ or $(0.45^{\circ} \pm 180 (= 81))$ or $(0.45^{\circ} \times 180 (= 61))$ M1(or 0.15 correctly placed in table if not contradicted in working space)3(a)eg 1 - (0.2 + 0.12 + 0.08) (= 0.6) or $1 - \left(\frac{10}{100} + \frac{12}{100} + \frac{8}{100}\right) \left(= \frac{60}{100}\right)$ oe or $1 - \left(\frac{20}{100} + \frac{12}{100} + \frac{8}{100}\right) \left(= 60(\%)\right)$ or $0^{\circ} - 4 (= 0.15)$ oe or "0.6" $+ 4 \times 3$ or "0.6" $+ 4 \cdot (-0.15)$ oe or "0.6" $+ 4 \times 3$ or "0.6" $+ 4 \cdot (-0.15)$ oe or "0.6" $+ 4 \times 3$ or "0.6" $+ 4 \cdot (-0.15)$ oe or "0.6" $+ 4 \times 3$ correst full marks (unless from obvious incorrect working)M1For dividing the remaining probability by 4 or finding % of the remaining probability NB "0.6" means 0.6 must come from correct working)(b)0.12 $\times 150$ oe eg 12 $+ 6$ 0.45A1or $\frac{9}{20}$ oe or 45% (if working in % final answer must have % sign). Allow $\frac{0.45}{15}$ H on answer on answer line, check in the correct space in table above.(b)0.12 $\times 150$ oe eg 12 $+ 6$ 18A1(an answer of $\frac{13}{15}$ scores M1A0 as this is a probability tot a number of times)		(ii)		8 25		1	B1	(penalise incorrect notation once
aorfull with y (with y)missing values eg $x \pm 0.24 \pm 2x \pm 0.31 = 1$ oe (can be implied by 2 probabilities that total 0.45 in table if not 								
or $0.45 \times 180 (= 81)$ or $180 - 99 (= 81)$ not contradicted) $0.15^{\circ} \times 180 (= 81)$ or $(81^{\circ} \times 3)$ MI or an answer of $\frac{27}{180}$ 3 (a)eg 1 - (0.2 + 0.12 + 0.08) (= 0.6) or $1 - \left(\frac{20}{100} + \frac{12}{100} + \frac{8}{100}\right) \left(= \frac{60}{100}\right)$ oe or $1 - \left(\frac{20}{100} + \frac{12}{100} + \frac{8}{100}\right) \left(= \frac{60}{100}\right)$ oe or $0 = 0.2 + 0.12 + 0.08 + 3x + x = 1 oe$ MI or or a correct equation for the remaining probabilities or a correct equation for the remaining probabilities $00(\%) - (20(\%) + 12(\%) + 8(\%)) (= 60(\%))$ or $0.2 + 0.12 + 0.08 + 3x + x = 1 oe$ MI or $0.6^{\circ} \times 0.75$ oe $0^{\circ} = 0.45$ MI or 0.45 For dividing the remaining probability by 4 or finding $\frac{1}{2}$ of the remaining probability 0.45 $Working not required, so correct answerscores full marks (unless from obviousincorrect working)0.45AIor0^{\circ} = 0 eor 45\% (if working in \% finalanswer must have \% sign). Allow \frac{0.45}{1}If no answer of \frac{18}{150} cores M1A0 as this isis a probability not a number of times by0^{\circ} means of times)$	2		or			4	M1	missing values eg x + 0.24 + 2x + 0.31 = 1 oe (can be implied by 2 probabilities that total 0.45 in table if not
or (81' + 3)Or an answer of $\overline{180}$ 3(a)eg 1 - (0.2 + 0.12 + 0.08) (= 0.6) or $1 - (\frac{20}{100} + \frac{12}{100} + \frac{8}{100}) (= \frac{60}{100})$ oe or $1 - (\frac{20}{100} + \frac{12}{100} + \frac{8}{100}) (= \frac{60}{100})$ oe or $1 - (20(%) + 12(%) + 8(%)) (= 60(%))$ or $0.2 + 0.12 + 0.08 + 3x + x = 1$ oe3M1for a correct calculation for the remaining 			or '0.45' × 180 (= 81) or				M1	(or 0.15 correctly placed in table if not contradicted)
or (81' + 3)Or an answer of $\overline{180}$ 3(a)eg 1 - (0.2 + 0.12 + 0.08) (= 0.6) or $1 - (\frac{20}{100} + \frac{12}{100} + \frac{8}{100}) (= \frac{60}{100})$ oe or $1 - (\frac{20}{100} + \frac{12}{100} + \frac{8}{100}) (= \frac{60}{100})$ oe or $1 - (20(%) + 12(%) + 8(%)) (= 60(%))$ or $0.2 + 0.12 + 0.08 + 3x + x = 1$ oe3M1for a correct calculation for the remaining 			180 - 99 (= 81)					
3(a)eg 1 - (0.2 + 0.12 + 0.08) (= 0.6) or $1 - \left(\frac{20}{100} + \frac{12}{100} + \frac{8}{100}\right) \left(= \frac{60}{100}\right)$ oe or $1 - \left(\frac{20}{100} + \frac{12}{100} + \frac{8}{100}\right) \left(= \frac{60}{100}\right)$ oe or $1 - \left(\frac{20}{100} + \frac{12}{100} + \frac{8}{100}\right) \left(= \frac{60}{100}\right)$ oe or $0 = 100(\%) - (20(\%) + 12(\%) + 8(\%)) (= 60(\%))$ or $0.2 + 0.12 + 0.08 + 3x + x = 1$ oeM1For dividing the remaining probabilities or a correct equation for the remaining probabilities $\frac{0.66^{\circ} + 4 (= 0.15)$ oe or $0.66^{\circ} + 4 \times 3$ or 0.45×0.75 oe (Sight of 0.15 in the table for Orange or Pink or 0.45 M1For dividing the remaining probability by 4 or finding ³ /4 of the remaining probability NB $^{\circ}0.66^{\circ}$ means 0.6 must come from correct workingWorking not required, so correct answer scores full marks (unless from obvious incorrect working)0.45A1or $\frac{9}{20}$ oe or 45% (if working in % final answer must have % sign). Allow $\frac{0.45}{1}$ If no answer on answer line, check in the correct space in table above.(b)0.12 \times 150 oe eg 12 + 62M1for a correct calculation to find the number of times the spinner lands on blue a probability not a number of times)			or				M1	Or an answer of $\frac{27}{180}$
3(a)eg 1 - (0.2 + 0.12 + 0.08) (= 0.6) or $1 - \left(\frac{20}{100} + \frac{12}{100} + \frac{8}{100}\right) \left(=\frac{60}{100}\right)$ oe or $1 - \left(\frac{20}{100} + \frac{12}{100} + \frac{8}{100}\right) \left(=\frac{60}{100}\right)$ oe or $0 = \frac{100(\%)}{0} - (20(\%) + 12(\%) + 8(\%)) (= 60(\%))$ or $0.2 + 0.12 + 0.08 + 3x + x = 1$ oe3M1for a correct equation for the remaining probabilities or a correct equation for the remaining probabilities $0.6^{\circ} + 4 (= 0.15)$ oe or $0.6^{\circ} + 4 \times 3$ or $0.6^{\circ} + 4 (= 0.15)$ oe or $0.6^{\circ} + 4 \times 3$ or $0.6^{\circ} \times 0.75$ oe (Sight of 0.15 in the table for Orange or Pink or 0.45 for Pink gains M2)M1For dividing the remaining probability by 4 or finding $\frac{3}{4}$ of the remaining probability NB 0.6° means 0.6 must come from correct working $Working not required, so correct answerscores full marks (imless from obviousincorrect working)0.45A1or \frac{9}{20} oe or 45\% (if working in \% finalanswer nust have \% sign). Allow \frac{0.45}{1}If no answer on answer line, check in thecorrect space in table above.(b)0.12 \times 150 oe eg 12 + 62M1for a correct calutation to find thenumber of times the spinner lands on blueincorrect working)$				27			Al	
3(a)eg $1 - (0.2 + 0.12 + 0.08) (= 0.6)$ or3M1for a correct calculation for the remaining probabilities or a correct equation for the remaining probabilities3(a)								Total 4 marks
(b)(c)(
or "0.6" \times 0.75 oe (Sight of 0.15 in the table for Orange or Pink or 0.45 for Pink gains M2)4 or finding ¼ of the remaining probability NB "0.6" means 0.6 must come from correct workingWorking not required, so correct answer scores full marks (unless from obvious incorrect working)0.45A1or $\frac{9}{20}$ oe or 45% (if working in % final answer must have % sign). Allow $\frac{0.45}{1}$ (b)0.12 \times 150 oe eg 12 + 62M1for a correct calculation to find the number of times the spinner lands on blueWorking not required, so correct answer scores full marks (unless from obvious incorrect working)18A1(an answer of $\frac{18}{150}$ scores M1A0 as this is a probability not a number of times)	3	(a)	or $1 - \left(\frac{20}{100} + \frac{12}{100} + \frac{8}{100}\right) \left(=\frac{60}{100}\right) \text{ oe}$ or 100(%) - (20(%) + 12(%) + 8(%)) (= 60(%)) or		3	M1	proba or a corr	bilities ect equation for the remaining
scores full marks (unless from obvious incorrect working)or $\frac{1}{20}$ oe or 45% (if working in % final answer must have % sign). Allow $\frac{0.45}{1}$ If no answer on answer line, check in the correct space in table above.(b) 0.12×150 oe eg 12 + 62M1for a correct calculation to find the number of times the spinner lands on blueWorking not required, so correct answer scores full marks (unless from obvious incorrect working)18A1(an answer of $\frac{18}{150}$ scores M1A0 as this is a probability not a number of times)			or "0.6" × 0.75 oe (Sight of 0.15 in the table for Orange or Pink			M1	4 or fi proba NB "(inding ³ ⁄4 of the remaining bility 0.6" means 0.6 must come from
(b) 0.12 × 150 oe eg 12 + 6 2 M1 for a correct calculation to find the number of times the spinner lands on blue Working not required, so correct answer scores full marks (unless from obvious incorrect working) 18 A1 (an answer of $\frac{18}{150}$ scores M1A0 as this is a probability not a number of times)			scores full marks (unless from obvious	0.45		A1	or $\frac{9}{20}$ answe	oe or 45% (if working in % final er must have % sign). Allow $\frac{0.45}{1}$ answer on answer line, check in the
scores full marks (unless from obvious incorrect working)(an answer of $\frac{150}{150}$ scores M1A0 as this is a probability not a number of times)		(b)	0.12×150 oe eg 12 + 6		2	M1	for a c	correct calculation to find the
			scores full marks (unless from obvious	18		A1	(an an	nswer of $\frac{18}{150}$ scores M1A0 as this is
								Total 5 marks

4	eg 7 + 5 = 12 and $\frac{6}{13} = \frac{12}{26}$ or 26 or eg $\frac{7+5}{7+5+x} = \frac{6}{13}$ and $13(7+5) = 6(7+5+x)$		3	M1	for method to find the total number of counters
	eg 26 – 12 or eg 6x = 84			M1	complete method to find the number of yellow counters or a correct equation with <i>x</i> terms isolated
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	14		A1	cao
· · · · ·					Total 3 marks

5	(a)			$\frac{13}{30}$	1	B1 accept 0.43(333) or 43(.333)%
	(b)	e.g. $1 - \frac{7}{30}$ or $\frac{13+4+6}{30}$ or $\frac{23}{a}$ where $a > 23$ and	<i>a</i> ≠ 30	50	2	M1
		U		$\frac{23}{30}$		A1 accept 0.76(666) or 0.77 or 76(.666)% or 77%
						penalise incorrect notation once only
	· · ·					Total 3 marks
6	(a)		0.4	45	1	B1 oe eg $\frac{9}{20}, \frac{45}{100}, 45\%$
	(b)	eg $1 - (0.25 + 0.2 + 0.2) (= 0.35)$ or $1 - (``0.45'' + 0.2) (= 0.35)$ or $300 \times (0.25 + 0.2 + 0.2) (= 195)$			3	M1 allow use of their "0.45" from part (a), check the table
		eg 300 × "0.35" or 300 – "195"				M1 for a complete method
			10)5		A1 cao (award $\frac{105}{300}$ M2 only)
						Total 4 marks
7	(i)		$\frac{7}{2}$		1	B1 oe
	(ii)	$\frac{2+6}{20}$ oe or $1-\frac{5+7}{20}$ oe	2	0	2	M1 ft their (i)
			$\frac{8}{2}$			A1 oe penalise incorrect notation only once
						Total 3 marks
8		0.65 × 300 oe				Ml
			19	95		A1 (SCB1 for 105)
						Total 2 marks
						1
9	(a)	1 - (0.24 + 0.16 + 0.38) oe	0.2	22	2	M1 A1 oe
	(b)	0.24 + 0.16 (= 0.4) oe	0.2	<u> </u>	2	M1
			0.	4		Al oe Total 4 marks
10		$28 \div 0.35 (= 80)$ oe eg $(28 \div 7) \times 20 (= 80)$		5		dep for calculating total number of sweets
		1-(0.2+0.35) (= 0.45) oe or $(0.2+0.35) \times (80)^{\circ} (= 44)$ or $28 + (16)^{\circ} (= 44)$				for a correct equation for missing values eg $+2x + 0.2 + 0.35 = 1$ oe
		or $(0.2 \pm 0.55) \times 80^{-44}$ or $(-44)^{-44}$ or $(-44)^{-44}$			(ca 0.4	an be implied by 2 probabilities that total 45 in table if not contradicted in working
		"0.45" ÷ 3 (= 0.15) oe or "0.45" × "80" (= 36)				ace) r 0.15 or 0.3 seen in table – either order)
		or "80" - "44" (= 36) "80" × "0.15" or "80" × "0.3" (= 24)			M1 A	correct calculation for the number of white
		or "36" \div 3 or "36" \div $\frac{3}{2}(=24)$				reets or the number of pink sweets
		-	12		A1	
10	alt	1-(0.2+0.35) (= 0.45) or 100(%) - 20(%) - 35(%) = 45(%)		5	<i>x</i> -	for a correct equation for missing values eg $+2x + 0.2 + 0.35 = 1$ oe
		"0.45" ÷ 3 (= 0.15) 45(%) ÷ 3 (= 15(%))			M1 (o	r 0.15 or 0.3 seen in table – either order)
		$\frac{n}{28} = \frac{0.15}{0.35} \text{ or } \left(\frac{n}{0.15} = \right) \frac{28}{0.35} \text{ oe or}$			wl	r using proportion with an expression for n hite sweets or
		$\frac{n}{28} = \frac{0.3}{0.35}$ or $\left(\frac{n}{0.3}\right) = \frac{28}{0.35}$ or $35\% = 28$ so $5\% = 4$			tir	ading 5% oe to enable calculation to 15%
		$(n =) 28 \times \frac{0.15}{0.35}$ or $(n =) 0.15 \times \frac{28}{0.35}$ or $15\% = 3 \times 4$				calculation using proportion that would lead finding their n or $2n$
		or $28 \times \frac{0.3}{0.35}$ or $0.3 \times \frac{28}{0.35}$ or $30\% = 6 \times 4 \ (= 24)$				
			12		A1	
			1	1	1	Total 5 marks

11 (a)	Correct Venn diagram	3	B3	for all sections completed correctly If not B3 then award B2 for 3 correct sections B1 for 1 or 2 correct sections
(b)(i)	$\frac{13}{30}$	1	B1	oe, ft their Venn diagram
(ii)	$\frac{6}{30}$	1	B1	oe, ft their Venn diagram
				Total 5 marks

12 (a)			s	oinn	er A		Correct scores	2	B2 for all scores correct (B1 for 3 or 4 scores correct)
			1	2	3				
		1	1	2	3				
	Spinn	2	2	4	6				
	B	3	3	6	9				
		4	4	8	12				
(b)						_	$\frac{4}{12}$	1	B1 ft oe accept 0.33(33)
·									Total 3 marks

13	1 - (0.24 + 0.4) (= 0.36) oe or		4	M1
	3x + x = 1 - (0.24 + 0.4) oe			
	48 ÷ 0.24 (= 200) or			M1
	"0.36" ÷ 4 (= 0.09) or			
	$(0.36) \div 4 \times 3 (= 0.27)$			
	"0.27" × "200" or			M1 for a complete method
	"200" × "0.36" ÷ 4 × 3			
	("200" – 48 – "80") ÷ 4 × 3			
		54		Al
				Total 4 marks

13	1 - (0.24 + 0.4) (= 0.36) oe or		4	M1
ALT	3x + x = 1 - (0.24 + 0.4) oe			
	$48 \div 24 (= 2)$ oe or			M1
	$\left(\frac{"0.36"}{4} \times 3\right) \div 0.24 \left(=\frac{9}{8} = 1.125\right)$ oe or			
	$\left(\frac{"36"}{4} \times 3\right) \div 24 \left(=\frac{9}{8} = 1.125\right) \text{oe}$			
	"2"× $\left(\frac{"36"}{4}\times 3\right)$ oe or			M1 for a complete method
	$"\frac{9}{8}" \times 48 \text{ oe or}$			
	$("27" \div 24) \times 48 \text{ oe}$			
	Correct answer scores full marks (unless from obvious incorrect working)	54		Al
				Total 4 marks

			1		
14	eg		2	M1	for a method to work out an
	$0.74 \times 300 \ (= 222) \ or$				estimate for the number of games
					Evie will win
	1 - 0.74 = 0.26 seen or				or
					the probability that Evie will lose
	78				or
	300				an answer of $\frac{78}{300}$
	Correct answer scores full marks (unless from	78		A1	cao
	obvious incorrect working)				
					Total 2 marks

.5 (a)			$\frac{13}{30}$	1	B1	oe eg	0.43(33	3) or 43.(33)%
(b)			$\frac{6}{30}$	1	B1	oe eg	$\frac{1}{5}$ or $\frac{3}{1}$	$\frac{3}{5}$ or 0.2 or 20%
(c)		eg $\frac{2}{5} = \frac{16}{40}$ or $\frac{2}{5} \times (10+30)(=16)$ oe		2	M1			to work out the number of white in the bag
		Correct answer scores full marks (unless from obvious incorrect working)	5		A1			
								Total 4 mark
								Total 4 mark
16	0 0 0	1-(0.32+0.13+0.28) oe eg 1-0.73 (= 0.27) or $0.32 \times 200 (= 64) \text{ or}$ $0.13 \times 200 (= 26) \text{ or}$ $0.28 \times 200 (= 56) \text{ or}$ $0.73 \times 200 (= 146)$				3	M1	Total 4 marl (0.27 may be seen in table) [could work with percentages eg 100 – 32 – 13 – 28 (=27)]

Correct answer scores full marks (unless from	54	A1	
obvious incorrect working)			
			Total 3 marks