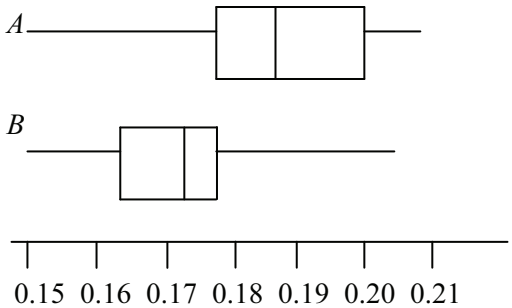
1	$\bar{x} = 4.3$	B1		4.3 or 645/150 or 18.49 seen
	$\text{sd} = \sqrt{\left(\frac{8287.5}{150} - 4.3^2\right)} = \sqrt{36.76} = 6.063$	M1		Subst in correct formula to find sd or var or expand $\Sigma(x-\bar{x})^2$ correctly and substitute
	$\Sigma(x-\bar{x})^2 = 150 \times 6.063^2$	M1		Mult by 150
	$= 5514\ (5510)$	A1	[4]	Answer rounding to 5510
2	**(i)**			
	y | 0 | 2 | 4 P($Y = y$) | 0.42 | 0.48 | 0.1	B1		0, 2, 4 only seen for Y no probs needed. Accept other vals if P(value) = 0 seen in table, allow 0002244 with probs
		M1		Summing two or more 2-factor probs (can be implied)
		A1		One correct prob
		A1	[4]	Correct table or list
	(ii) $0.96 + 0.4 = 1.36$	B1ft	[1]	Ft their table for Y or X $\Sigma p = 1$
3	**(i)** $\text{P}(2 < X < 12) = 1 - \text{P}(0, 1, 2, 12)$	M1		Using binomial with ${}_{12}\text{C}_{\text{something}}$ and powers summing to 12, $\Sigma p = 1$
	$= 1 - (0.35)^{12} - (0.65)(0.35)^{11}{}_{12}\text{C}_1 - (0.65)^2(0.35)^{10}{}_{12}\text{C}_2 - (0.65)^{12}$	A1		Correct unsimplified answer
	$= 1 - 0.0065359$			
	$= 0.993$	A1	[3]	Accept 0.994 from correct working only
	(ii) $1 - (0.87)^n > 0.95$	M1		Equality or inequality in (0.87 or 0.78 or 0.35), power n or $n-1$, 0.95 or 0.05
	$0.05 > (0.87)^n$	M1		Attempt to solve an equation with a power in (can be implied)
	$n = 22$	A1	[3]	Correct answer
4	**(i)** A: median = 0.186,	B1		
	IQ range = 0.198 – 0.179	M1		Subt LQ from their UQ
	$= 0.019$	A1ft	[3]	Correct IQ range ft dp in wrong place
	(ii) 	B1ft		2 correct boxes ft **(i)** OK if superimposed
		B1		2 pairs correct whiskers lines up to box not inside
		B1	[3]	Correct uniform scale from at least 0.15 to 0.21 seen. No scale no marks **(ii)** unless perfect A and B with all 10 values shown

5	**(i)**	$_{11}C_6 = 462$	B1		
		OR A3 B3 or A4 B2 or A5 B1 or A6			
		$= {}_8C_3 + {}_8C_4 \times {}_3C_2 + {}_8C_5 \times {}_3C_1 + {}_8C_6$	B1		
		$= 56 + 210 + 168 + 28$			
		$= 462$		[1]	
	(ii)	${}_8C_4 \times {}_3C_2 + {}_8C_5 \times {}_3C_1 + {}_8C_6$	M1		∑ 2 or more two-factor terms, *P* or *C* any numbers
		$= 210 + 168 + 28$	B1		Any correct option unsimplified
		$= 406$	A1	[3]	Correct answer
	(iii)	${}_9C_4 + {}_9C_6 = 126 + 84$	M1		Summing ${}_9C_x + {}_9C_y$ can be mult by 2 no other terms
			B1		126 or 84 seen or unsimplified ${}_9C_4$, ${}_9C_6$
		$= 210$	A1		Correct answer
		OR			
		1,2 in A tog with : A1B3 + A2B2 + A3B1 + A4B0 + 1,2 out of A : A3B3 + A4B2 + A5B1 + A6B0	M1		∑ 5 or more 2-factor ${}_6P_x$ or ${}_6C_x$ with ${}_3C_x$ or ${}_3P_x$ only (can be mult by 2)
		$= {}_6C_1 + {}_6C_2 \times {}_3C_2 + {}_6C_3 \times {}_3C_1 + {}_6C_4 + {}_6C_3 \times {}_3C_3 + {}_6C_4 \times {}_3C_2 + {}_6C_5 \times {}_3C_1 + {}_6C_6$	B1		3 or more correct unsimplified options
		$= 6 + 45 + 60 + 15 + 20 + 45 + 18 + 1 = 210$	A1		Correct answer
		OR			
		$462 - {}_9C_5 - {}_9C_5$	M1 B1		subt two ${}_9C_x$ options from their **(i)** ${}_9C_5$ seen oe if using this method
		$= 210$	A1	[3]	Correct answer
6	**(i)**				
			B1		One correct row or column numbers
			B1	[2]	All correct including labels
	(ii)	12/30 (0.4)	B1ft	[1]	Ft their table
	(iii)	10/18 (5/9) (0.556)	B1ft	[1]	Ft their table
	(iv)	10/17 (0.588)	B1ft	[1]	Ft their table
	(v)	P(2 wrapped)			
		$= 12/30 \times 11/29 \times 18/28 \times 17/27 \times {}_4C_2$	M1 M1 M1		Mult by ${}_4C_2$ $12 \times 11 \times 18 \times 17$ seen in num $30 \times 29 \times 28 \times 27$ seen in denom
		$= 0.368$ (374/1015)	A1		Correct answer
		OR			
		$({}_{12}C_2 \times {}_{18}C_2)/{}_{30}C_4$	M1 M1 M1		${}_{12}C_2$ seen mult or alone in num (not added) ${}_{18}C_2$ seen mult or alone in num (not added) ${}_{30}C_4$ seen in denom
		$= 0.368$	A1	[4]	Correct answer

	wrapped	unwrapped	total
choc	7	10	17
not choc	5	8	13
total	12	18	30

7	**(i)** $P(> 42) = P\left(z > \frac{42 - 41.1}{3.4}\right)$	M1		Standardising no cc no sq rt no sq
	$= P(z > 0.2647)$			
	$= 1 - 0.6045$			
	$= 0.3955$	A1		Correct prob rounding to 0.395 or 0.396
	$\text{Prob} = (0.3955)(0.6045)^2{}_3C_1$	M1		Binomial ${}_3C_x$ powers summing to 3, any p, $\Sigma p = 1$
	$= 0.433$ or 0.434	A1	[4]	Rounding to correct answer
	(ii) $-1.282 = \frac{26.5 - \mu}{\sigma}$	B1		±1.282 seen
		B1		±1.645 seen
	$1.645 = \frac{34.6 - \mu}{\sigma}$	M1		An eqn with a z-value, μ and σ, no $\sqrt{\sigma}$ no σ^2
		M1		Sensible attempt to eliminate μ or σ by substitution or subtraction
	$\mu = 30.0$ $\sigma = 2.77$	A1	[5]	Correct answers, accept 30.1, accept 30, rounding to 2.77
	(iii) $P(B6 < 34.6) = P\left(z < \frac{34.6 - 41.1}{3.4}\right)$	M1		Standardising for B6 no cc no sq rt no sq
	$= P(z < -1.912) = 1 - 0.9720$			
	$= 0.0280$	A1		Correct answer rounding to
	$P(B5 < 34.6) = 0.95$	M1		Mult by 0.95 or their regurgitated 0.95
	$P(\text{both} < 34.6) = 0.028 \times 0.95$			
	$= 0.0266$	A1	[4]	Correct answer rounding to 0.027, accept 0.027