			Marsh Oal		<u>9709 s14 ms 61</u>				
	Ра	Page 4 Mark Scheme				4.4	Syllabus	Paper	
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1	P(2	1.6 < <i>x</i> < 2	8.7)						
	= P	$= \mathbf{P}\left(\left(\frac{21.6 - 24}{4.7}\right) < z < \left(\frac{28.7 - 24}{4.7}\right)\right)$				Standardising; no cc, no sq rt One rounding to $\Phi(0.841 \text{ or } 0.695)$			
	= P	$= P(-0.5106 < z < 1) = \Phi(1) - \Phi(-0.5106)$				$\Phi_1 + \Phi_2 - 1$			
	= 0.8413 - (1 - 0.6953)								
	= 0.537 (0.5366)			A1	4	Correct answer			
2	$1.751 = \frac{12 - \mu}{\sigma}$			B1		Rounding to ± 1.75 seen			
	0.46	$0.468 = \frac{9 - \mu}{\sigma}$				±0.468 seen			
						An eqn with a <i>z</i> -value, μ and σ no $\sqrt{\sigma}$, no σ^2			
	$\sigma^{=}$	$\sigma = 2.34$ $\mu = 7.91$				Sensible attempt to eliminate μ or σ by substitution or subtraction, need a value correct answers			
	$\mu =$				5				
3	(i)	constant /	given p, independent trials,	B1		Any one c	correct		
		outcomes			2	Any 3 correct			
	(ii)	$P(x \ge 3)$	= 1 - P(0, 1, 2)	M1		Any binor seen	mial expression p'	$(1-p)^{18-r} {}^{18}C_r$	
		$= 1 - [(0.85)^{16})^{16}$	$(0.15)^{18} + (0.85)^{17}(0.15) \times 18 + (0.15)^2 \times {}^{18}C_2]$	M1		1 - P(0, 1)	, 2), any <i>n,p,q</i>		
		= 0.520		A1	3	Correct ar	nswer		
4	(i)	P(exactly	2) = $\frac{{}^{6}C_{2}}{{}^{8}C_{4}} = \frac{15}{70} = \frac{3}{14}AG$	M1		$^{6}Cx / ^{8}Cx$ (last 2 can	seen or ${}^{4}C_{2}$ mult b to be implied)	by 4 fractions	
		OR P(2) =	$= \frac{6}{8} \times \frac{5}{7} \times \frac{2}{6} \times \frac{1}{5} \times {}^{4}C_{2} = \frac{3}{14} \text{ AG}$	A1	2	Answer le	egit obtained		
	(ii)	x Prob	2 3 4 3/14 8/14 3/14	B1 B1 B1√ [▲]	3	2, 3, 4 onl one correct third correct	y in top line et prob other than ect prob ft $\Sigma = 1$	P(2)	
	(iii)	$\operatorname{Var}(X) =$	$\frac{12}{14} + \frac{72}{14} + \frac{48}{14} - 3^2$	M1		using $\sum x^2 \mu$ evaluated	$v - 3^2$ (or their {E	(X) ²) must be	
		$=\frac{3}{7}(0.42)$	29)	A1	2	correct an	swer		

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5 (i)	P(X and F) P(Y and F)	$P(x) = \frac{1}{4} \times \frac{4}{9} = \frac{1}{9}$ $P(x) = \frac{1}{4} \times \frac{2}{12} = \frac{1}{24}$	M1 A1		Mult a pla	h a <i>P</i> prob		
	$P(Z \text{ and } P) = \frac{1}{2} \times \frac{1}{16} = \frac{1}{32}$ $P(P) = \frac{53}{288} = 0.184$				Summing at least two 2-factor probs			
				4	Correct answer			
(ii)	ii) $P(Y C) = \frac{P(Y \cap C)}{P(C)}$ $\frac{\frac{1}{4} \times \frac{1}{12}}{\frac{1}{4} \times \frac{1}{12} + \frac{1}{2} \times \frac{4}{16}}$				Attempt at $P(Y \cap C)$ as numerator of a fraction Attempt at $P(C)$ in form of summing two 2-factor products, seen anywhere Correct unsimplified $P(C)$ seen anywhere			
	$=\frac{\frac{1}{48}}{\frac{7}{48}}=$	<u>1</u> 7	A1	4	Correct an	swer		
6 (i)	$\frac{0!}{2!} = 360$		B1 B1	2	Dividing b	by 2! only		
(ii)	$\frac{4!}{2!} \times \frac{4!}{3!}$		B1 B1		4! seen mu Dividing b B1B1)	ult by 2! or 3! (Mult I	by 4 implied	
	= 48		B1	3	Correct answer			
(iii)	1N and 1 a = 3 ways	A: N A xx in ${}^{3}C_{2}$	M1 A1	2	${}^{3}C_{x}$ or ${}^{x}C_{2}$ Correct an	seen alone swer		
(iv)	0 A : Nxx 2 As: NA 3 As: NA	x = 1 way Ax in ${}^{3}C_{1} = 3$ ways AA in 1 way	M1 M1		Finding w Summing	ays with 0 or 2 or 3 or 4 options	· 3 As	
	Total = 8	ways	A1	3	Correct an	swer		

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7 (i) clas	(i) class widths 5, 15, 15, 25, 20 $fd = \frac{24}{5}, \frac{9}{15}, \frac{21}{15}, \frac{15}{25}, \frac{42}{20}$ $= 4.8, 0.6, 1.4, 0.6, 2.1$				Attempt at class widths Correct widths of bars, with or without halves, seen on diagram		
fd =							
= 4							
					Attempt at fd or scaled freq		
3 —			A1		Correct he	ights seen on grap	oh ft their fd
10.5 20.5 30.5 40.5 50.5 60.5 70.5 80.5 errors			B1	5	Correct la	bels, scales and ha	llves
(ii) me	ean =						
(3)	×24+1	$\frac{3 \times 9 + 28 \times 21 + 48 \times 15 + 70.5 \times 42)}{111}$	M1 M1		Using mid using (Σ the second seco	l points neir fx) / their 111	
= 4	40.2 erro	Drs	A1	3	correct and	swer	
(iii) LQ UQ Lea) in 6 –) in 61 - ast valu	20 - 80 e of IQ range is 61 - 20 = 41	B1 B1 B1√	3	ft any or b sensible	oth wrong quartil	e ranges if