9709_s10_ms_61

Page 4	Mark Scheme: Teachers' version	Syllabus	Paper
	GCE AS/A LEVEL – May/June 2010	9709	61

1	$a + b = 0.45$ $-3a - b + 1.6 = 0.75$ $a = 0.2 \quad b = 0.25$	B1 M1 A1 A1 **[4]**	Correct sum probs = 1 o.e. Attempt at $\Sigma xp = 0.75$ Correct a Correct b
2 (i)	Key 0 │ 2 5 6 8 8 1 │ 2 represents 1 │ 2 4 6 7 7 9 12 people 2 │ 1 2 3 3 3 5 6 7 3 │ 1 5	B1 B1 B1 **[3]**	Correct stem Correct leaves must be sorted and accurate Key; must have people o.e
(ii)	median = 19 people LQ = 10, UQ = 24 IQ range = 24 – 10 = 14 people	B1 B1 B1ft **[3]**	Correct median Correct quartiles Ft their quartiles
(iii)	median because mode could be any number which is duplicated more than twice	B1 **[1]**	Correct answer must say something about the mode being not much use or another sensible reason
3	(+/–) 1.045, (+/–) 0.313 $20.9 - \mu = -0.313\,\sigma$ $30 - \mu = 1.045\,\sigma$ $\sigma = 6.70$ $\mu = 23.0$	B1, B1 M1 A1 A1 **[5]**	1 correct z-value, the other correct z-value. Valid attempt to solve 2 equations relating to μ, σ, 30, 20.9. No $\sqrt{\sigma}$, σ^2 correct answer correct answer
4 (i)	sd = 0 so all rides must cost the same i.e. the mean.	B1* B1 dep **[2]**	Must see this and some relevant comment, e.g. no change o.e.
(ii)	$1 \times 2.5 + 3 \times 2.5 + 6 \times x = 3.76 \times 10$ $6x = 37.6 - 10$ $x = 4.6$ for revolving drum $\sigma^2 = (2.5^2 \times 1 + 2.5^2 \times 3 + 4.6^2 \times 6)/10 - 3.76^2$ $\sigma = 1.03$	M1 A1 A1 M1 A1 **[5]**	attempt to find cost of revolving drum ride correct equation correct x substituting in correct variance formula correct answer

9709_s10_ms_61

Page 5	Mark Scheme: Teachers' version	Syllabus	Paper
	GCE AS/A LEVEL – May/June 2010	9709	61

5	**(i)**	$P(X=2)) = (0.25)^2 \times (0.75)^6 \times {}^8C_2$	M1	3 term binomial expression involving ${}^8C$ something, powers summing to 8	
		$= 0.311$	A1 **[2]**	correct answer	
	(ii)	$12 \times 0.25 = 3$, < 5 so not possible	B1 **[1]**		
	(iii)	mean $= 40 \times 0.25$ ($= 10$) variance $= 40 \times 0.25 \times 0.75$ ($= 7.5$)	B1	40×0.25 and $40 \times 0.25 \times 0.75$ seen, o.e.	
		$P(X \text{ at least } 13) = P\left(z > \dfrac{12.5 - 10}{\sqrt{7.5}}\right)$	M1	standardising, $\pm$, with or without cc, must have sq rt	
		$= P(z > 0.913)$	M1	continuity correction 12.5 or 13.5	
		$= 1 - \Phi(0.913)$	M1	correct area, i.e. < 0.5 legit	
		$= 1 - 0.8194$ $= 0.181$	A1 **[5]**	correct answer	
6	**(i)**	${}^{10}C_1 + {}^{10}C_3 + {}^{10}C_5 + {}^{10}C_7 + {}^{10}C_9$	M1	Summing some ${}^{10}C$ combinations with odd numbers, all different	
			A1	At least 3 correct unsimplified expressions	
		$= 512$	A1 **[3]**	Correct answer	
	(ii)	$6! \times 7 \times 6 \times 5$	B1	6! seen	
			M1	multiplying by ${}^7P_3$ o.e.	
		$= 151200$	A1 **[3]**	correct answer	
	(iii)	$12! / (4! \times 7!)$	B1	12! Seen	
			M1	dividing by 4!7!	
		$= 3960$	A1 **[3]**	correct answer	

9709_s10_ms_61

Page 6	Mark Scheme: Teachers' version	Syllabus	Paper
	GCE AS/A LEVEL – May/June 2010	9709	61

7	(i)	P(1st correct) = 0.7 + 0.2 × 0.95 = 0.89 AG	B1	
	(ii)		M1	Considering any 2 of *CC, CHA, HAC* or *HAHP* [where *C* = Peter correct, *H* = ask for help, *A* = audience correct, *P* = phone correct] or tree diagram with 'top half' labels and probs shown
			M1	Considering *other 2*
			M1	Summing 4 probabilities
		P(CC) = 0.7 × 0.7 (= 0.49) P(CHA) = 0.7 × 0.2 × 0.95 (= 0.133)	B1	Two correct probabilities
		P(HAC) = 0.2 × 0.95 × 0.7 (= 0.133) P(HAHP) = 0.2 × 0.95 × 0.2 × 0.65 (= 0.0247)	B1	Three correct probabilities
		P(both correctly answered) = 0.781	A1 **[6]**	Correct
	(iii)	P(audience | both correct) $= \dfrac{P(CHA) + P(HAC) + P(HAHP)}{ans \ \textbf{(ii)}}$	M1*	Summing two or three 3-factor terms in numerator of a fraction
		$=$ $\dfrac{0.7 \times 0.2 \times 0.95 + 0.2 \times 0.95 \times 0.7 + 0.2 \times 0.95 \times 0.2 \times 0.65}{0.7807}$	M1dep	Dividing by their **(ii)**
		= 0.2907/0.7807 = 0.372	A1 **[3]**	Correct answer