Question Number	Scheme	Marks
7(a)(i)	$2a+2b=0.5$ oe ; $5a+11b=1.55$ oe (any unsimplified form)	B1; B1
	e.g. $5a+11(0.25-a)=1.55$ [implies $6a=1.2$ oe]	M1
	$a=0.2$*	A1 cso
(ii)	$b=$ **0.05**	B1
		(5)
(b)	$\left[\mathrm{E}(X^2)=\right]1^2\times0.35+2^2\times0.2+3^2\times0.2+4^2\times0.15+5^2\times0.05+6^2\times0.05$ [=8.4]	M1
	Var(X) = "8.4" -2.5^2 =[2.15]	M1
	Var $(4X+3)$ = 16 Var (X)	M1
	= **34.4**	A1
		(4)
(c)	Expected profit = 2.5×60 or $2.5\times80-2.5\times20$ oe	M1
	= **150** (cents) or \$1.50 per customer	A1
		(2)
(d)	Let W be the profit, in cents per customer	
	y | 1 | 2 | 3 | 5 | 6	
	w | 60 | 120 | 180 | 220 | 280	B1; B1
	P($Y=y$) | $\frac{3}{40}$ | $\frac{4}{40}$ | $\frac{3}{40}$ | $\frac{22}{40}$ | $\frac{8}{40}$	
	$\left[\mathrm{E}(W)\right]=\frac{1}{40}\left(60\times3+120\times4+180\times3+220\times22+280\times8\right)$	M1
	= **207** cents per customer	A1
	[May work in dollars e.g. \$2.67 or \$2.27 scores B1B0M1A0 and \$2.07 4/4]	**(4)**
		Total 15

	Notes
	Mark (a)(i) and (a)(ii) together
(a)(i)	1st B1 for a correct equation using Σprob = 1
	2nd B1 for a correct equation using E(X) = 2.5
	M1 dep on at least B1 for eliminating a or b leading to a linear equation in a or b only
	A1cso for a = 0.2 correctly shown. Dependent on M1 scored and two correct equations seen.
(ii)	B1 for b = 0.05 (or exact equivalent) Independent of other marks in (a)(i). **Look by table**
(b)	1st M1 for an attempt at E(X^2) with at least 3 correct products. Allow ft of their value of b
	Allow expression even if labelled Var(X) but label of Var(X) loses 2nd M1 but can get 3rd M1
	2nd M1 for use of E(X^2) – [E(X)]^2 ft their value of E(X^2)
	3rd M1 for seeing 16 Var(X) [Allow this mark if clearly stated Var(X) = E(X^2) = 8.4]
	A1 for 34.4 or exact equivalent e.g. $\frac{172}{5}$
(c)	M1 for 2.5×60 or any other fully correct equivalent expression (allow 2.5×0.6)
	A1 for 150 or accept \$1.5 (working with dollars requires units)
(d)	1st B1 for 1st 3 values of W (can allow in an expression for E(W)) **Look by table** but must be in part (d)
	2nd B1 for last 2 values for W
	M1 for attempt at E(W) ft their W values but at least 3 correct ft products
	Dependent on at least one of the first two B1 marks
	A1 for 207
ALT	**Use of E(Y)** [= 4.45] with at least 3 correct products seen **and** E(W) = pE(Y) – q
	1st B1 for p = 60 and 2nd B1 for $q=\left(\frac{22}{40}+\frac{8}{40}\right)\times80$ (or 60)
	M1 for E(W) expression of the form above and dep on at least one B mark scored

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