Question Number	Scheme	Marks
1.(a)	B and C or "band" and "choir" but NOT P(B) and P(C)	B1 (1)
(b)	[L and C independent implies] $P(L \cap C) = P(L) \times P(C) = 0.4 \times 0.3$	M1
	$p = \underline{\mathbf{0.12}}$	A1 (2)
(c)	$q = 0.4 - 0.13 -$ their $p = \underline{\mathbf{0.15}}$	B1ft
	$r = 0.3 -$ their $p = \underline{\mathbf{0.18}}$	B1ft
	$s = 1 - (0.4 + 0.3 -$ their $p)$ $\underline{\text{or}}$ $1 - (0.4 +$ their $r) = \underline{\mathbf{0.42}}$	B1ft (3)
(d)	$P(L \mid B \cup C)$ $\underline{\text{or}}$ $\frac{P(L \cap [B \cup C])}{P(B \cup C)} = ;$ $\frac{0.13 + "0.12"}{0.13 + 0.3}$	M1; A1ft
	$= \underline{\frac{25}{43}}$	A1 (3)
		[9 marks]

Qu	Scheme	Marks
5(a)	$P(Y = y)$ | $2k$ | k | k | $8k$ | $17k$ | k	M1
	$2k + k + k + 8k + 17k + k = 1$ or $30k = 1$ $\left[\Rightarrow k = \frac{1}{30}\right]$*	A1*
		(2)
(b)	$k + k + 8k$ or $1 - (2k + 17k + k)$	M1
	$= \frac{1}{3}$ **oe** **awrt 0.333**	A1
		(2)
(c)	$(1 \times 2k) + (2 \times k) + (3 \times k) + (4 \times 8k) + (5 \times 17k) + (6 \times k) =$	M1
	$\frac{13}{3}$ oe **awrt 4.33**	A1
		(2)
(d)	$P(Y \geqslant 15 - 2Y)$ or [X =] 13 11 9 7 5 3 only or [Y =] 5 or 6 only	M1
	$[P(Y \geqslant 5) = P(Y = 5) + P(Y = 6)] = \frac{"17"}{30} + \frac{"1"}{30}$	M1
	$= \frac{3}{5}$ oe	A1ft
		(3)
(e)	Var (X) = 4Var(Y)	M1
	$[E(Y^2) =](1 \times 2k) + (2^2 \times k) + (3^2 \times k) + (4^2 \times 8k) + (5^2 \times 17k) + (6^2 \times k)\left[= \frac{302}{15} \text{ or awrt } 20.1\right]$	M1
	$[\text{Var}(Y) =]"\frac{302}{15}" - \left("\frac{13}{3}"\right)^2 \left[= \frac{61}{45} \text{ or awrt } 1.36\right]$	M1d
	[Var (X) =] $\frac{244}{45}$ oe **awrt 5.42**	A1
	ALT for 1st 3 marks	(4)
	$[E(X) =]$ $(13 \times 2k) + (11 \times k) + (9 \times k) + (7 \times 8k) + (5 \times 17k) + (3 \times k)\left[= \frac{19}{3} \text{ or awrt } 6.33\right]$	M1
	$[E(X^2) =](13^2 \times 2k) + (11^2 \times k) + (9^2 \times k) + (7^2 \times 8k) + (5^2 \times 17k) + (3^2 \times k)\left[= \frac{683}{15} \text{ or awrt } 45.5\right]$	M1
	$[\text{Var}(X) =]"\frac{683}{15}" - \left("\frac{190}{30}"\right)^2$	M1d
	Notes	**Total 13**

Qu	Scheme	Marks
2(a)	$S_{tw} = 2304.53 - \frac{297.8 \times 114.8}{15}$ or $S_{ww} = 6089.12 - \frac{297.8^2}{15}$	M1
	$S_{tw} = 25.367...$ **awrt 25.4**	A1
	$S_{ww} = 176.797$ **awrt 177**	A1
		(3)
(b)	$r = \frac{"25.367"}{\sqrt{5.3173 \times "176.797..."}}$	M1
	$= 0.82735....$ **awrt 0.827 or 0.828**	A1
		(2)
(c)	$b = \frac{"25.367..."}{5.3173} [= 4.77065...]$	M1
	$a = \frac{297.8}{15} - \frac{"25.367"}{5.3173} \times \frac{114.8}{15} [= -16.658....]$	M1
	$b = 4.771$ or better **or** $a = -16.66$ or better seen **and** $w = -16.7 + 4.77t$*	A1*cso
		(3)
(d)	[On average,] for each **cm/1 cm** of tail **length/*t*** the **weight/*w* increases** by **4.77 g/grams**	B1
		(1)
(e)	$w = -16.7 + 4.77 \times 2 [= -7.16]$ or $4.77 \times 2 [= 9.54]$ or $[t =] \frac{16.7}{4.77} [= 3.5]$ or sd = awrt 0.6	M1
	$[w =] -7.16$ or $9.54 < 16.7$ or $2 < 3.5$ which is negative/weight cannot be negative or for sd extrapolation since a 2 cm tail is (approx 9 sd)/(more than 3 sd) from the mean	A1
		(2)
(f)	0.827	B1ft
		(1)
(g)	$2y + 10 = -16.7 + 4.77(x + 6)$ oe	B1ft
		(1)
	Notes	**Total 13**

Question Number	Scheme	Marks
3.(a)	$[S_{vs}] = 177.311 - \frac{36.8 \times 29}{8} = 43.911$ = awrt **43.9**	A1
	$[S_{ss}] = 209.72 - \frac{36.8^2}{8} = 40.44$ = awrt **40.4**	M1 A1 (3)
(b)	$r = \frac{"43.911"}{\sqrt{55.275 \times "40.44"}}$, $= 0.92875\ldots$ = awrt **0.929**	M1, A1 (2)
(c)	r is close to 1 so there is support for the publisher's belief [if $1 > \lvert r \rvert$ … 0.5] (Allow "yes" because "strong corr." but "yes" & "positive corr." is B0)	B1ft (1)
(d)	$b = \frac{"43.911"}{55.275}$, $= 0.7944\ldots$ = awrt 0.79	M1, A1
	$a = \bar{s} - b\bar{v} = 4.6 - "0.7944..." \times 3.625$ [= 1.720…]	M1
	$s = 1.72 + 0.794v$	A1 (4)
(e)	$\frac{y}{1000} = "1.72" + "0.794" \times \left(\frac{x+50}{200}\right)$	M1
	$y = 1920 + 3.97x$	A1 A1ft (3)
(f)	Gradient of textbooks is greater spend more advertising on textbooks	B1ft dB1ft (2) **[15 marks]**