Question	Scheme	Marks
2 (a)	$\left[\mathrm{P}(2X-3>5)=\right]0.45$	B1
		(1)
(b)	$\mathrm{E}\left(X^2\right)=2^2\times0.25+4^2\times0.3+5^2\times0.2+7^2\times0.1+8^2\times0.15\left[=25.3\right]$	M1
	$\mathrm{Var}(X)=2^2\times0.25+4^2\times0.3+5^2\times0.2+7^2\times0.1+8^2\times0.15-4.6^2$ or $\mathrm{Var}(X)=\text{"25.3"}-4.6^2$	M1
	$=25.3-4.6^2=4.14$*	A1*
		(3)
(c)	$\left[\mathrm{E}(Y)=\right]13.4=a\times4.6-b$	M1
	$\left[\mathrm{Var}(Y)=\right]a^2\times4.14=66.24$	M1
	$a=4$	A1
	$b=5$	A1
		(4)
(d)	Sam throws 8 and Alex throws 2, 4 or 5 Sam throws 7 and Alex throws 2 or 4 Sam throws 5 or 4 or 2 and Alex throws 2	M1
	$0.15\times(0.25+0.3+0.2)$ or $0.1\times(0.25+0.3)$ or $(0.2+0.3+0.25)\times0.25$	M1
	$0.15\times(0.25+0.3+0.2)$ + $0.1\times(0.25+0.3)$ + $(0.2+0.3+0.25)\times0.25$	M1
	$=0.355\quad\left(=\frac{71}{200}\right)$	A1
		(4)
ALT	Alex throws 2 Alex throws 4 and Sam throws 7 or 8 Alex throws 5 and Sam throws 8	M1
	0.25 or $0.3\times(0.1+0.15)$ or 0.2×0.15	M1
	$0.25+0.3\times(0.1+0.15)+0.2\times0.15$	M1
	$=0.355\quad\left(=\frac{71}{200}\right)$	A1
	Notes	**Total 12**

(a)	**B1**	0.45 oe
(b)	**M1**	for a correct method to find $\mathrm{E}\left(X^2\right)$ At least 3 terms correct and added This is not implied by 25.3 on its own
	M1	for use of correct equation ft their $\mathrm{E}\left(X^2\right)$
	A1*	for a correct expression, with all terms seen, leading to the given answer
(c)	**M1**	for writing or using a correct equation for E(Y)
	M1	for writing or using a correct method for Var(Y)
	A1	for a = 4 may be seen as part of the expression $4X\pm...$
	A1	for b = 5 may be seen as part of the expression $...X-5$
(d)	**M1**	for recognising all the required combinations – implied by 3 correct probabilities Ignore any repeats but do not ignore any incorrect combinations
	M1	for any one correct calculation from the 3 given
	M1	for any 2 correct calculations from the 3 given
	A1	0.355 oe