Question Number	Scheme	Marks
7(i)	$\frac{a+b}{2}=9$ and $\frac{13-5}{b-a}=\frac{1}{5}$ or $a = -11$ and $b = 29$	M1
	$\mathrm{P}\left(X>\frac{"29"-"11"}{3}\right)\left[=\mathrm{P}(X>6)\right]$ or $\mathrm{P}\left(X>\frac{9\times 2}{3}\right)\left[=\mathrm{P}(X>6)\right]$ $=\frac{23}{40}$	M1A1
		(3)
(ii)	$\frac{1}{12}(c-1)^2=0.48 \Rightarrow c=3.4$	M1
	$\mathrm{E}(Y)=\frac{1+"3.4"}{2}$	M1
	$\mathrm{E}(Y^2)=0.48+"\left(\frac{1+3.4}{2}\right)"^2 = 5.32$	M1A1
		(4)
(iii)	$W \sim \mathrm{U}[0,20]$ $X \sim \mathrm{U}[10,20]$ $Y \sim \mathrm{U}[0,10]$	
	$W<6$ or $W>14$ or $X<12$ or $Y>8$ any letter, ignore distribution	M1
	$2\times\mathrm{P}(W<6)=2\times\frac{(6-0)}{20}$ or $2\times\mathrm{P}(W>14)=2\times\frac{(20-14)}{20}$ or $\mathrm{P}(W<6)=\frac{6-0}{20}$ **and** $\mathrm{P}(W>14)=\frac{20-14}{20}$ or $\mathrm{P}(X>14)=\frac{20-14}{10}$ or $\mathrm{P}(Y<6)=\frac{6-0}{10}$	M1
	$\mathrm{P}(8<W<12)=\frac{12-8}{20}$ or $\mathrm{P}(X<12)=\frac{12-10}{10}$ or $\mathrm{P}(Y>8)=\frac{10-8}{10}$	M1
	$\mathrm{P}(\text{ shortest side} < 6)="\frac{3}{10}"+"\frac{3}{10}"+"\frac{1}{5}"$ or $"\frac{1}{5}"+"\frac{3}{5}" = \frac{4}{5}$	dM1A1
		(5)
	Alternative 1	
	$6<W<8$ or $12<W<14$ any letter, ignore distribution	M1
	$\mathrm{P}(6<W<8)=\frac{8-6}{20}$ or $\mathrm{P}(12<W<14)=\frac{14-12}{20}$	M1
	$\mathrm{P}(6<W<8)=\frac{1}{10}$ and $\mathrm{P}(12<W<14)=\frac{1}{10}$ or $2\times\mathrm{P}(6<W<8)=2\times\frac{1}{10}$ or $2\times\mathrm{P}(12<W<14)=2\times\frac{1}{10}$	M1
	$\mathrm{P}(\text{shortest side} < 6)=1-"\frac{1}{10}"-"\frac{1}{10}"$ or $1-"\frac{2}{10}" = \frac{4}{5}$	dM1A1
		(5)
	Alternative 2	
	$W>10$ or $12<W<14$ or $6<W<8$ or $W<10$ any letter, ignore distribution	M1
	$\mathrm{P}(12<W<14)=\frac{14-12}{20}$ and $\mathrm{P}(W>10)=\frac{20-10}{20}$ or $\mathrm{P}(6<W<8)=\frac{8-6}{20}$ and $\mathrm{P}(W<10)=\frac{10-0}{20}$	M1
	$\mathrm{P}(12<W<14\mid W>10)=\frac{"1/10"}{"1/2"}\left[=\frac{1}{5}\right]$ or $\mathrm{P}(6<W<8\mid W<10)=\frac{"1/10"}{"1/2"}\left[=\frac{1}{5}\right]$	M1
	$\mathrm{P}(\text{ shortest side} < 6)=1-"\frac{1}{5}" = \frac{4}{5}$	dM1A1
		(5)
	NB Any answer of $\frac{4}{5}$ scores 5/5 provided it has not come from incorrect working	
		Total 12

M2 for $\mathrm{P}(12<X<14)=\frac{14-12}{10}$ or $\mathrm{P}(6<Y<8)=\frac{8-6}{10}$

	Notes	
	NB Allow any letter throughout the question	
(i)	**M1**	For setting up 2 correct equations May be implied correct answers for *a* and *b*
	M1	Realising the need to find P($X > 6$) or allow use of "their *a*" and " their *b*" or their "$\frac{a+b}{2}=9$"
	A1	23/40 oe or 0.575
(ii)	**M1**	Correct equation to find *c* with *c* = …
	M1	Correct method for finding E(*Y*) using "their *c*"
	M1	Correct method for finding E(Y^2) using "their E(Y)^2"
	A1	For 5.32 (Allow $\frac{133}{25}$)
(iii)	**M1**	For identifying a correct region required to answer the question. Allow any letter and ignore the distribution associated with the letter. May be implied by $W<6$ or $W>14$ or $X<12$ or $Y>8$
	M1	For a correct method to find a required probability. Allow any letter but the probability must be associated to the correct distribution. e.g. $2\times P(W<6)=2\times\frac{3}{10}$ or $2\times P(W>14)=2\times\frac{3}{10}$ or $P(W<6)=\frac{3}{10}$ **and** $P(W>14)=\frac{3}{10}$ or $P(X>14)=\frac{3}{5}$ or $P(Y<6)=\frac{3}{5}$
	M1	For a correct method to find a second required probability. Allow any letter but the probability must be associated to the correct distribution. e.g. $P(8<W<12)=\frac{1}{5}$ or $P(X<12)=\frac{1}{5}$ or $P(Y>8)=\frac{1}{5}$
	dM1	Dependent on previous 3 M marks. For $P(W<6)+P(W>14)+P(8<W<12)$ or $P(X>14)+P(X<12)$ or $P(Y<6)+P(Y>8)$ ft their probabilities
	A1	cao
Alternative 1		
(iii)	**M1**	For identifying a correct region required to answer the question. Allow any letter and ignore the distribution associated with the letter. May be implied by $6<W<8$ or $12<W<14$
	M1	For a correct method to find a required probability. Allow any letter but the probability must be associated to the correct distribution. e.g. $P(6<W<8)=\frac{1}{10}$ or $P(12<W<14)=\frac{1}{10}$
	M1	For a correct method to find a second required probability. Allow any letter but the probability must be associated to the correct distribution. e.g. $P(6<W<8)=\frac{1}{10}$ and $P(12<W<14)=\frac{1}{10}$ or $2\times P(6<W<8)=2\times\frac{1}{10}$ or $2\times P(12<W<14)=2\times\frac{1}{10}$
	dM1	Dependent on previous 3 M marks. For $1-"\frac{1}{10}"-"\frac{1}{10}"$ or $1-"\frac{2}{10}"$
	A1	cao
Alternative 2		
	M1	For identifying a correct region required to answer the question. Allow any letter and ignore the distribution associated with the letter. May be implied by $W>10$ or $12<W<14$ or $W<10$ or $6<W<8$
	M1	For a correct method to find both the required probabilities. Allow any letter but the probability must be associated to the correct distribution. e.g. $P(12<W<14)=\frac{1}{10}$ **and** $P(W>10)=\frac{1}{2}$ or $P(6<W<8)=\frac{1}{10}$ **and** $P(W<10)=\frac{1}{2}$
	M1	For correct use of conditional probability e.g. $\frac{"1/10"}{"1/2"}$
	dM1	Dependent on previous 3 M marks. For $1-"\frac{1}{5}"$
	A1	cao

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