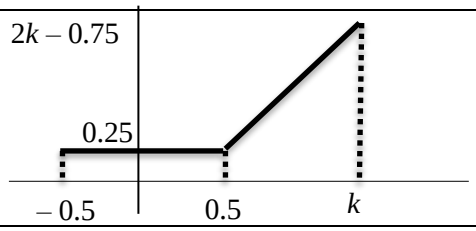
Mark Scheme (Results)

October 2022

Pearson Edexcel International Advanced Level In Statistics S2 (WST02) Paper 01

Question Number	Scheme	Marks
1(a)(i)	$\left[\mathrm{P}\left(F<3 \middle\vert F \sim \mathrm{Po}(1.5)\right)=\right]0.8088$ awrt 0.809	B1
		(1)
(ii)	$\left[\mathrm{P}\left(F \ldots 6\right)=\right]1-\mathrm{P}\left(F \text{ „ } 5\right)$ or 1 – 0.9955	M1
	= 0.0045 awrt 0.0045	A1
		(2)
(b)	$R \sim \mathrm{Po}(10) \ \therefore\left[\mathrm{P}\left(R \text{„} 12\right)\right]=0.7916$ awrt 0.792	M1
	$X \sim \mathrm{B}(15, "0.7916")$	M1
	$\left[\mathrm{P}\left(X=10\right)=\right]{}^{15}C_{10}\left("0.7916"\right)^{10}\left(1-"0.7916"\right)^{5}$	M1
	= 0.11405… awrt 0.114	A1
		(4)
(c)	$H \sim \mathrm{Po}(0.4)$	M1
	$\left[\mathrm{P}\left(H=0\right)=\right]\mathrm{e}^{-0.4}$ [=0.6703…] **or** $\left[\mathrm{P}\left(H>0\right)=\right]1-\mathrm{e}^{-0.4}$ [= 0.32967…]	M1
	Profit = $2.4\times"0.6703..."-3\times"0.32967..."$	dM1
	= 0.6197 awrt 0.62	A1
		(4)

	Notes	Total 11
(a) (i)	**B1**	awrt 0.809
(ii)	**M1**	Writing or using $1-\mathrm{P}\left(F \text{ „ } 5\right)$
	A1	awrt 0.0045
(b)	**M1**	For 0.792 or better
	M1	For writing B(15, " their 0.7916") May be implied by a fully correct method for P(X = 10)
	M1	A correct method to find $\mathrm{P}\left(X=10\right)$ using a binomial distribution (implied by awrt 0.114)
	A1	awrt 0.114
(c)	**M1**	Writing or using Po(0.4) e.g. P(H = 1) = 0.268…
	M1	Correct method to find $\mathrm{P}\left(H=0\right)$ or $\mathrm{P}\left(H>0\right)$ May be implied by awrt 0.67 or 1 – awrt 0.67
	M1dep	Dependent on the previous method mark being awarded. Correct method to find the profit. Allow $7.4\times"0.6703..."+2\times"0.32967..."-5$
	A1	awrt 0.62 Allow 62 p

Question Number	Scheme	Marks
2 (a)		M1 A1
		(2)
(b)	Area = $\frac{1}{4}+\frac{1}{2}\left(\frac{1}{4}+2k-\frac{3}{4}\right)\left(k-\frac{1}{2}\right)=1$ **or** $\frac{1}{4}\left(k+\frac{1}{2}\right)+\frac{1}{2}(2k-1)\left(k-\frac{1}{2}\right)=1$ **or** $\frac{1}{4}+\left[\left(k^2-\frac{3}{4}k\right)-\left(\frac{1}{2}^2-\frac{3}{8}\right)\right]=1$	M1
	$8k^2-6k-5=0$ or $k^2-\frac{3}{4}k-\frac{5}{8}=0$ oe	A1
	$(4k-5)(2k+1)=0$ or $k=\frac{\frac{3}{4}\pm\sqrt{\left(-\frac{3}{4}\right)^2+4\times\left(\frac{5}{8}\right)}}{2}$ oe	M1
	$k = 1.25$*	A1 *
		(4)
(c)	$\left[\int_{-0.5}^{0.5}\frac{1}{4}x\,\mathrm{d}x\right]+\int_{0.5}^{1.25}2x^2-\frac{3}{4}x\,\mathrm{d}x=[0]+\left[\frac{2x^3}{3}-\frac{3}{8}x^2\right]_{0.5}^{1.25}$	M1A1
	$=\left(\frac{2\times1.25^3}{3}-\frac{3}{8}\times1.25^2\right)-\left(\frac{2\times0.5^3}{3}-\frac{3}{8}\times0.5^2\right)$	dM1
	$=\frac{93}{128}$ awrt 0.727	A1
		(4)
(d)	$[Q_1 =]$ 0.5	B1
	$Q_3^2-\frac{3}{4}Q_3+0.125=0.5$ or $Q_3^2-\frac{3}{4}Q_3-0.375=0$ oe	M1
	$Q_3=\frac{\frac{3}{4}\pm\sqrt{\left(-\frac{3}{4}\right)^2+4\times\left(\frac{1}{8}\right)}}{2}$	M1
	IQR ="1.093…" – 0.5	M1
	= 0.593… awrt 0.59	A1
		(5)

	Notes	Total 15
(a)	**M1**	A correct shape. Must not go below zero
	A1	A correct shape including labels. Allow 1.25 for k and 1.75 for $2k – 0.75$
(b)	**M1**	Equating area to 1 (0.75 if ¼ + is not present) A correct method to find the area - allow 1 sign error. May be implied by a correct 3 term quadratic. If using integration then must get to an equivalent equation as the main scheme
	A1	For a correct 3 term quadratic
	M1	A correct method to solve a 3 term quadratic (May be implied by 1.25 **and** –0.5) If the 3 term quadratic is incorrect then a correct method for solving their 3 term quadratic must be shown
	A1*	1.25 must be the only answer given. All previous marks must be awarded.
(c)	**M1**	$\int_{-0.5}^{0.5}\frac{1}{4}x\,\mathrm{d}x+\int_{0.5}^{1.25}2x^2-\frac{3}{4}x\,\mathrm{d}x$ or $\int_{0.5}^{1.25}2x^2-\frac{3}{4}x\,\mathrm{d}x$ on its own

	A1	Correct integration of $2x^2 - \frac{3}{4}x$
	dM1	Dep on previous M being awarded. Substituting in the correct limits (implied by $\frac{93}{128}$ or awrt 0.727 Condone 0.726) If the integration is incorrect, we must see the correct non simplified substitution into their integral. Ignore substitution into $\frac{1}{8}x^2$. Useful values to look for are $\frac{125}{96}, \frac{75}{128}, \frac{1}{12}$ and $\frac{3}{32}$ or $\frac{275}{384}$ and $\pm\frac{1}{96}$
	A1	For $\frac{93}{128}$ or awrt 0.727
(d)	**B1**	For 0.5 May be seen in their IQR
	M1	A correct equation for finding Q_3
	M1	A correct method to solve a 3 term quadratic (implied by $Q_3 = \frac{3+\sqrt{33}}{8}$ or $\frac{3-\sqrt{33}}{8}$ or awrt 1.093 or awrt – 0.343) If the 3 term quadratic is incorrect then a correct method for solving their 3 term quadratic must be shown. If using $Q_3^2 - \frac{3}{4}Q_3 - \frac{5}{8} = 0$ then M0
	M1	Correct method to find the IQR ft their Q_3 or implied by awrt 0.593
	A1	awrt 0.59 Allow $\frac{-1+\sqrt{33}}{8}$

Question Number	Scheme	Marks
3(a)	$H_0: p = 0.35$ $H_1: p \neq 0.35$	B1
	$P(X \leq 8) =$ awrt 0.0303 or $P(X \geq 21) =$ awrt 0.0173 or $P(X \leq 20) =$ awrt 0.9827	M1
	$[P(X \leq 8) =]$ awrt 0.0303 and $[P(X \geq 21) =]$ awrt 0.0173	A1
	CR $X \leq 8$ and $X \geq 21$	A1
		(4)
(b)	0.0476	B1ft
		(1)
(c)	$H_0: p = 0.028$ $H_1: p > 0.028$	B1
	$Y \sim B(250, 0.028) \Rightarrow Y \sim$ Po(7)	M1
	$P(Y \geq 11) = 1 - P(Y \leq 10)$ or $P(Y \geq 13) = 1 - 0.973$	M1
	$= 0.0985$ or Critical region $Y \geq 13$	A1
	There is insufficient evidence to suggest that the <u>proportion</u> of sunflower <u>seeds</u> that grow to a height of more than 3 metres is now <u>greater</u> than 0.028	A1
		(5)

	Notes	Total 10
(a)	**B1**	Both hypotheses in terms or p or π
	M1	One of the correct probability statements. Implied by a correct critical region
	A1	awrt 0.0303 and awrt 0.0173
	A1	Both parts of the critical region given. Allow alternative notation e.g. $X < 9$ and $X > 20$ Do not allow as probability statements.
(b)	**B1**	For 0.0476 Allow awrt 0.0475 (calculator) or ft their **two** critical regions provided probabilities are seen in part (a) Common ft is for $X \leq 7$ and $X \geq 21$ gives 0.0297
(c)	**B1**	Both hypotheses in terms or p or π – If already lost the mark in (a) for incorrect letter allow any letter
	M1	Po(7) written or used
	M1	Writing or using $1 - P(Y \leq 10)$ or $1 - 0.9015$ or $1 - 0.973$ (May be implied by 0.0985) or may be implied by $Y \geq 13$ provided Po(7) seen or used If using N(7, 6.804) or N(7, 7) allow use of $1 - P(Y \leq 10)$ or $1 - P(Y \leq 10.5)$ B(250, 0.028) gives 0.09549… and implies M1 N(7, 6.804) gives awrt 0.09 (Calc gives 0.08983…) or awrt 0.13 (Calc gives 0.125…) and implies M1 N(7, 7) gives awrt 0.09 (Calc gives 0.09293…) or awrt 0.13 (Calc gives 0.1284…) and implies M1
	A1	awrt 0.0985 or CR: $Y \geq 13$ provided Po(7) seen or used (Allow any letter for the CR)
	A1	Independent of the hypotheses but dependent on the previous M1A1 being awarded. A correct conclusion in context. Allow amount/number for proportion, sunflowers for seeds and increased oe for greater. Ignore any non-contextual statements

Question Number	Scheme	Marks
4(a)	$X \sim$ B(20, 0.4)	M1
	$P(5 \leqslant X < 8) = P(X \leqslant 7) - P(X \leqslant 4)$ or 0.4159 – 0.0510	M1
	= 0.3649 awrt 0.365	A1
		(3)
(b)	$Y \sim N(56, 33.6)$	M1A1
	$\frac{n - 0.5 - "56"}{\sqrt{"33.6"}} = -1.98$	M1M1 B1
	$n = 45$	A1cao
		(6)
	Notes	**Total 9**

(a)	**M1**	Writing or using B(20, 0.4)
	M1	For writing or using $P(X \leqslant 7) - P(X \leqslant 4)$ or P(X = 5) + P(X = 6) + P(X = 7)
	A1	awrt 0.365
(b)	**M1**	For writing or using N(56,…) (May be seen in a correct standardisation)
	A1	For writing or using N(56, 33.6) (May be seen in a correct standardisation)
	M1	For standardising (allow $\pm$) using any letter, their "56" and "33.6" and putting = to z value, where $1 < \|z\| < 2$ Condone missing ± 0.5 Condone 1 – standardisation, using any letter, their "56" and "33.6" and putting = to z value, where $1 < \|z\| < 2$
	M1	M1 for using a continuity correction -0.5 if using n or +0.5 if using $n - 1$. Either in their standardisation or after finding ***n*** (but not both) No need to put = to z value
	B1	For using $\pm$ 1.98 or better (calc gives) 1.97914…
	A1	45 – must see a correct continuity correction or an awrt 45.02 or awrt 45.03 45 from no working is 0/6

Question Number	Scheme	Marks
5(a)	$d = 7$	B1
	$\frac{c}{3} - \frac{7}{6} = 1 - \frac{1}{6}("7" - c)^2$	M1
	$\frac{c}{3} - \frac{7}{6} = 1 - \frac{1}{6}("49" - 2\times"7"c + c^2)$ oe or $c^2 - 12c + 36 = 0$ oe	dM1
	$(c-6)^2 = 0 \ \therefore c = 6$ *	A1*
		(4)
(b)	$P(X > 3.5) = 1 - \frac{1}{6}(3.5-3)^2$	M1
	$= \frac{23}{24}$ oe awrt 0.958	A1
		(2)
(c)	$P(3.5 < X < 5.5) = \left(\frac{5.5}{3} - \frac{7}{6}\right) - \left(\frac{1}{6}(3.5-3)^2\right) \left[= \frac{5}{8}\right]$ oe	M1
	$P(X > 4.5 \mid 3.5 < X < 5.5) = \frac{\left(\frac{5.5}{3} - \frac{7}{6}\right) - \left(\frac{4.5}{3} - \frac{7}{6}\right)}{"5/8"}$	M1
	$= \frac{8}{15}$ oe awrt 0.533	A1
		(3)

	Notes	Total 9
(a)	**B1**	realising $d = 7$
	M1	Forming an equation in c with their d or d
	dM1	Dependent on previous M1. Multiplying out brackets and would reduce to a 3 term quadratic correct for their d or d
	A1*	All previous marks must be awarded. For solving the correct 3TQ and statement
(b)	**M1**	Substitution of 3.5 into correct expression
	A1	Allow equivalent fractions or awrt 0.958
(c)	**M1**	Correct method to calculate $P(3.5 < X < 5.5)$ may use $1 - "\frac{23}{24}"$ for $\left(\frac{1}{6}(3.5-3)^2\right)$ Useful figures are $\left(\frac{5.5}{3} - \frac{7}{6}\right) = \frac{2}{3}$ and $\left(\frac{1}{6}(3.5-3)^2\right) = \frac{1}{24}$
	M1	Correct method using their 5/8 Useful figure is $\left(\frac{5.5}{3} - \frac{7}{6}\right) - \left(\frac{4.5}{3} - \frac{7}{6}\right) = \frac{1}{3}$
	A1	Allow equivalent fractions or awrt 0.533

Question Number	Scheme	Marks
6(a)	$\left(2\times\frac{a}{a+7}\times\frac{1}{4}\times\frac{3}{4}\right)+\left(\frac{a}{a+7}\times\frac{1}{4}\times\frac{1}{4}\right)=\frac{63}{256}$ or $\frac{a}{a+7}\times\left(1-\left(\frac{3}{4}\right)^2\right)=\frac{63}{256}$ or $\frac{a}{a+7}\times\left[\left(\frac{1}{4}\right)^2+2\times\frac{1}{4}\times\frac{3}{4}\right]=\frac{63}{256}$	M1 M1
	$\frac{a}{7+a}=\frac{63}{256}\div\frac{7}{16}$ or $\frac{a}{7+a}=\frac{9}{16}$ $\quad\therefore a=9$ *	A1*
		(3)
(b)	Range (R) 0, 5, 10 (and 15)	B1
	Bag: $\mathrm{P}(20)=\frac{9}{16}$ and $\mathrm{P}(5)=\frac{5}{16}$ and $\mathrm{P}(10)=\frac{2}{16}$	B1
	$\left[\mathrm{P}(R=0)=\right]\frac{5}{16}\times\frac{1}{4}\times\frac{1}{4}+\frac{2}{16}\times\frac{3}{4}\times\frac{3}{4}$	M1
	$\left[\mathrm{P}(R=5)=\right]2\times\frac{5}{16}\times\frac{1}{4}\times\frac{3}{4}+\frac{5}{16}\times\frac{3}{4}\times\frac{3}{4}+2\times\frac{2}{16}\times\frac{1}{4}\times\frac{3}{4}+\frac{2}{16}\times\frac{1}{4}\times\frac{1}{4}$	M1
	$\left[\mathrm{P}(R=10)=\right]\frac{9}{16}\times\frac{3}{4}\times\frac{3}{4}$	M1
	R: 0, 5, 10, 15 r: $\frac{23}{256}$, $\frac{89}{256}$, $\frac{81}{256}$, $\frac{63}{256}$	A1cao
		(6)

	Notes		Total 9
(a)	**M1**	For use of $\frac{a}{a+7}$ in an equation	
	M1	Setting up a correct equation to find the value of a	
	A1*	$a=9$ with at least one further correct line of working	
(b)	**B1**	For the 3 ranges 0, 5 and 10 and no extra incorrect ones or all extras have probability of 0	
	B1	For the correct 3 probabilities written or used for the bag $\frac{2}{16}$ and/or $\frac{5}{16}$ may be implied by a correct answer for $\mathrm{P}(R=0)$ or $\mathrm{P}(R=5)$ and $\frac{9}{16}$ may be implied by a correct answer for $\mathrm{P}(R=10)$	
		NB p and q must be consistent for the next 3 method marks	
	M1	A correct method to find one probability for $\mathrm{P}(R=0)$ or $\mathrm{P}(R=5)$ or $\mathrm{P}(R=10)$ allow $p\times q\times q+r\times(1-q)\times(1-q)$ or $2\times p\times q\times(1-q)+p\times(1-q)\times(1-q)+2\times r\times q\times(1-q)+r\times q\times q$ or $m\times(1-p)\times(1-p)$ where m, p, q and r are probabilities. (May be implied by $\frac{23}{256}$ or $\frac{89}{256}$ or $\frac{81}{256}$)	
	M1	A correct method to find two probabilities from $\mathrm{P}(R=0)$ or $\mathrm{P}(R=5)$ or $\mathrm{P}(R=10)$ allow $p\times q\times q+r\times(1-q)\times(1-q)$ or $2\times p\times q\times(1-q)+p\times(1-q)\times(1-q)+2\times r\times q\times(1-q)+r\times q\times q$ or $m\times(1-p)\times(1-p)$ where m, p, q and r are probabilities. (May be implied by 2 from $\frac{23}{256}$ or $\frac{89}{256}$ or $\frac{81}{256}$)	
	M1	A correct method to find all 3 probability for $\mathrm{P}(R=0)$ and $\mathrm{P}(R=5)$ and $\mathrm{P}(R=10)$ allow $p\times q\times q+r\times(1-q)\times(1-q)$ or $2\times p\times q\times(1-q)+p\times(1-q)\times(1-q)+2\times r\times q\times(1-q)+r\times q\times q$ or $m\times(1-p)\times(1-p)$ where m, p, q and r are probabilities. (May be implied by $\frac{23}{256}$ and $\frac{89}{256}$ and $\frac{81}{256}$) or these 3 probabilities that sum to $\frac{193}{256}$	

	A1	Correct ranges with correct associated probabilities attached. All extras must have an associated probability of 0 (Does not have to be seen in a table) **NB Allow decimal answers correct to 3 decimal places** $\frac{23}{256} = 0.090$ $\frac{89}{256} = 0.348$ $\frac{81}{256} = 0.316$ $\left[\frac{63}{256} = 0.246\right]$

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