Question	Answer	Marks	AO	Guidance
14	$p+\frac{1}{6}p+p^2+\frac{1}{2}=1$	M1*	3.1a	Forming this equation in p, must be fully correct with =1 soi
	$p^2+\frac{7}{6}p-\frac{1}{2}=0$ or $6p^2+7p-3=0$ oe	M1 dep*	1.1	Rearrange their equation to solvable form $ap^2 + bp + c = 0$ and attempt to solve (may be implied by one or both correct roots)
	$p=\frac{1}{3}$	A1	1.1	
	$p=-\frac{3}{2}$ invalid	B1	2.3	For sight of $p=-\frac{3}{2}$ oe provided this root **not** used in subsequent working. Condone "the other root is negative" or "$p > 0$"
	(Hence probabilities are): x: 1, 2, 3, 4 P($X = x$): $\frac{1}{3}$, $\frac{1}{18}$, $\frac{1}{9}$, $\frac{1}{2}$	A1	1.1	These values are likely to be seen in, and may be implied by, subsequent working. Note that a correct numerical denominator or final answer also implies this mark.
	$\left(\frac{\mathrm{P}(X_2=2X_1\cap X_2>X_1)}{\mathrm{P}(X_2>X_1)}=\frac{\mathrm{P}(X_2=2X_1)}{\mathrm{P}(X_2>X_1)}\right)$ Any of: $p\cdot\frac{p}{6}+\frac{p}{6}\cdot\frac{1}{2}=\frac{1}{3}\times\frac{1}{18}+\frac{1}{18}\times\frac{1}{2}$ or $p\cdot\frac{p}{6}+p\cdot p^2+p\cdot\frac{1}{2}+\frac{p}{6}\cdot p^2+\frac{p}{6}\cdot\frac{1}{2}+p^2\cdot\frac{1}{2}$ $=\frac{1}{3}\times\frac{1}{18}+\frac{1}{3}\times\frac{1}{9}+\frac{1}{3}\times\frac{1}{2}+\frac{1}{18}\times\frac{1}{9}+\frac{1}{18}\times\frac{1}{2}+\frac{1}{9}\times\frac{1}{2}$	M1	2.1	Either numerator or denominator attempted (correct form with 2 terms in the numerator or 6 terms in the denominator). FT their probabilities. May be implied by any of: • a correct expression for one of the numerator or denominator either in p or with their probabilities • a correct final answer
	$\frac{p\cdot\frac{p}{6}+\frac{p}{6}\cdot\frac{1}{2}}{p\cdot\frac{p}{6}+p\cdot p^2+p\cdot\frac{1}{2}+\frac{p}{6}\cdot p^2+\frac{p}{6}\cdot\frac{1}{2}+p^2\cdot\frac{1}{2}}$ $=\frac{\frac{1}{3}\times\frac{1}{18}+\frac{1}{18}\times\frac{1}{2}}{\frac{1}{3}\times\frac{1}{18}+\frac{1}{3}\times\frac{1}{9}+\frac{1}{3}\times\frac{1}{2}+\frac{1}{18}\times\frac{1}{9}+\frac{1}{18}\times\frac{1}{2}+\frac{1}{9}\times\frac{1}{2}}$ oe $\left(=\frac{\frac{5}{108}}{\frac{101}{324}}\ or\ \frac{0.0463}{0.3117}\right)$	M1	1.1	Division attempted with a 2-term numerator and 6-term denominator soi either in p or with their probabilities (may see numerator and denominator computed separately and then an attempt to divide)
	$=\frac{15}{101}$ or 0.149 (3sf)	A1 [8]	1.1	oe, need not be simplified