23	eg $\frac{\left(\frac{N+3}{2}\right)}{N}\left(=\frac{N+3}{2N}\right)$	eg where b = number of black pens $\frac{b}{2b-3}$ **or** $\frac{b}{N}$ **and** $N=2b-3$ (or $b=\frac{N+3}{2}$)	eg where r = number of red pens $\frac{r+3}{2r+3}$ **or** $\frac{r+3}{N}$ **and** $N=2r+3$ (or $r=\frac{N-3}{2}$)		5	M1	for making a correct start by finding the probability of the first pen being black for their method. If in 2 variables, one must also be defined in terms of the other. (any letter may be used for the variable)
	eg $\frac{N+3}{2N}\times\frac{N-3}{2(N-1)}=\frac{9}{35}$	eg $\frac{b}{2b-3}\times\frac{b-3}{2b-4}=\frac{9}{35}$ **or** $\frac{b}{N}\times\frac{b-3}{N-1}=\frac{9}{35}$	eg $\frac{r+3}{2r+3}\times\frac{r}{2r+2}=\frac{9}{35}$ **or** $\frac{r+3}{N}\times\frac{r}{N-1}=\frac{9}{35}$ **and** $N=2r+3$			M1	oe dep on previous M1 for a correct equation for black, red – must be in one variable or if 2 variables, one must be defined in terms of other.
	eg $35(N+3)(N-3)$ $=9(2N(2N-2))$ **or** $35(N^2-9)=$ $9(4N^2-4N)$	eg $35(b^2-3b)=$ $9(4b^2-14b+12)$	eg $35(r^2+3r)=$ $9(4r^2+10r+6)$			M1	dep on previous marks for a correct equation in one variable with no algebraic fractions – brackets may or may not be expanded
	eg $N^2-36N+315$ (= 0)	eg $b^2-21b+108$ (= 0)	eg $r^2-15r+54$ (= 0)			M1	For correctly rearranging their equation to a 3 term quadratic
	Working must be seen			21, 15		A1	cao dep on M4
							Total 5 marks

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