Question	Answer	Mark	Mark scheme	Additional guidance
19 (a)	$\frac{1}{18}(8k\mathbf{b}+10\mathbf{b}-\mathbf{a})$	P1	for a correct expression for $\overrightarrow{CB}$ or $\overrightarrow{BC}$ eg, $\overrightarrow{CB}=-k\mathbf{b}-\mathbf{a}+\mathbf{b}$ or $\overrightarrow{BC}=-\mathbf{b}+\mathbf{a}+k\mathbf{b}$	All vectors must be clearly identified
		P1	for a correct expression for $\overrightarrow{CN}$ or $\overrightarrow{BN}$ or $\overrightarrow{NC}$ or $\overrightarrow{NB}$ eg, $\overrightarrow{CN}=\frac{5}{9}(-k\mathbf{b}-\mathbf{a}+\mathbf{b})$ or $\overrightarrow{BN}=\frac{4}{9}(-\mathbf{b}+\mathbf{a}+k\mathbf{b})$ or $\overrightarrow{NC}=\frac{5}{9}(-\mathbf{b}+\mathbf{a}+k\mathbf{b})$ or $\overrightarrow{NB}=\frac{4}{9}(-k\mathbf{b}-\mathbf{a}+\mathbf{b})$	This mark implies the previous one
		P1	for a correct unsimplified expression for $\overrightarrow{MN}$ eg $\frac{1}{2}\mathbf{a}+k\mathbf{b}+\frac{5}{9}(-k\mathbf{b}-\mathbf{a}+\mathbf{b})$ oe or $-\frac{1}{2}\mathbf{a}+\mathbf{b}+\frac{4}{9}(-\mathbf{b}+\mathbf{a}+k\mathbf{b})$ oe	
		A1	for $\frac{1}{18}(8k\mathbf{b}+10\mathbf{b}-\mathbf{a})$ oe eg $\frac{5}{9}\mathbf{b}+\frac{4}{9}k\mathbf{b}-\frac{1}{18}\mathbf{a}$	Must have a maximum of 3 vector terms, $\mathbf{a}$, $\mathbf{b}$, and $k\mathbf{b}$
(b)	No, with explanation	C1	No with supporting reason ft (a) **Acceptable reasons:** No, since $\frac{1}{18}(8k\mathbf{b}+10\mathbf{b}-\mathbf{a})$ is not a multiple of $\mathbf{b}$ No, as *N* is not the midpoint of *BC* No, they are not multiples of each other No, does not factorise to $\mathbf{b}$ Not a multiple of *OB* *OB* doesn't have an $\mathbf{a}$ **Not acceptable reasons:** Yes… No, they don't share the same multiples *OB* doesn't go into *MN*	