27 (a)	$-4\mathbf{b}+\mathbf{a}-2\mathbf{a}+5\mathbf{b}-3\mathbf{a}$ oe		2	M1	for an un-simplified expression for $\overrightarrow{BC}$ in terms of **a** and **b** allow a sign error in one term or in one vector eg $-4\mathbf{b}+\mathbf{a}-2\mathbf{a}-5\mathbf{b}+3\mathbf{a}$ **or** $-4\mathbf{b}-\mathbf{a}-2\mathbf{a}+5\mathbf{b}-3\mathbf{a}$ **or** for an answer of $4\mathbf{a}-\mathbf{b}$
	Correct answer scores full marks (unless from obvious incorrect working)	$\mathbf{b}-4\mathbf{a}$		A1	or $-4\mathbf{a}+\mathbf{b}$
(b)	$\left(\overrightarrow{OD}=\right)2\mathbf{a}+4\mathbf{b}-\mathbf{a}+\frac{1}{4}(\text{"}\mathbf{b}-4\mathbf{a}\text{"})$ oe $(=\frac{17}{4}\mathbf{b}$ oe) **or** $\left(\overrightarrow{OD}=\right)5\mathbf{b}-3\mathbf{a}-\frac{3}{4}(\text{"}\mathbf{b}-4\mathbf{a}\text{"})$ oe		4	M1	ft their $\overrightarrow{BC}$ provided it is in the form $m\mathbf{a}+n\mathbf{b}$ for all method marks
	eg $\overrightarrow{OP}=2\mathbf{a}+4\mathbf{b}-\mathbf{a}+x(4\mathbf{b}-\mathbf{a})$ **or** $\overrightarrow{OP}=2\mathbf{a}+y(4\mathbf{b}-\mathbf{a})$ **or** $\overrightarrow{OP}=5\mathbf{b}-3\mathbf{a}-(\text{"}\mathbf{b}-4\mathbf{a}\text{"})+\lambda(4\mathbf{b}-\mathbf{a})$ **or** $\overrightarrow{OP}=5\mathbf{b}-3\mathbf{a}-\frac{3}{4}(\text{"}\mathbf{b}-4\mathbf{a}\text{"})+n\left(\text{"}\frac{17}{4}\mathbf{b}\text{"}\right)$ **or** $\overrightarrow{OP}=\text{"}\frac{17}{4}\mathbf{b}\text{"}+n\times\text{"}\frac{17}{4}\mathbf{b}\text{"}$ **or** $\overrightarrow{OP}=n\times\text{"}\frac{17}{4}\mathbf{b}\text{"}$ oe **or** $\overrightarrow{AP}=x(4\mathbf{b}-\mathbf{a})$ **or** $\overrightarrow{AP}=-2\mathbf{a}+n\times\text{"}\frac{17}{4}\mathbf{b}\text{"}$oe **or** $\overrightarrow{BP}=y(4\mathbf{b}-\mathbf{a})$ **or** $\overrightarrow{BP}=\frac{1}{4}(\text{"}\mathbf{b}-4\mathbf{a}\text{"})+n\times\text{"}\frac{17}{4}\mathbf{b}\text{"}$oe			M1	for a correct expression, <u>including a parameter</u>, for vector $\overrightarrow{OP}$, must be clearly identified as $\overrightarrow{OP}$ **or** for a correct expression, <u>including a parameter</u>, for vector $\overrightarrow{AP}$, $\overrightarrow{BP}$, $\overrightarrow{CP}$ or $\overrightarrow{DP}$ must be clearly identified
	eg $\overrightarrow{OP}=2\mathbf{a}+4\mathbf{b}-\mathbf{a}+x(4\mathbf{b}-\mathbf{a})$ **and** $\overrightarrow{OP}=n\times\text{"}\frac{17}{4}\mathbf{b}\text{"}$ **or** $\overrightarrow{OP}=2\mathbf{a}+y(4\mathbf{b}-\mathbf{a})$ **and** $\overrightarrow{OP}=5\mathbf{b}-3\mathbf{a}-\frac{3}{4}(\text{"}\mathbf{b}-4\mathbf{a}\text{"})+n\left(\text{"}\frac{17}{4}\mathbf{b}\text{"}\right)$ **or** $\overrightarrow{AP}=x(4\mathbf{b}-\mathbf{a})$ **and** $\overrightarrow{AP}=-2\mathbf{a}+n\times\text{"}\frac{17}{4}\mathbf{b}\text{"}$oe **or** $\overrightarrow{BP}=y(4\mathbf{b}-\mathbf{a})$ **and** $\overrightarrow{BP}=\frac{1}{4}(\text{"}\mathbf{b}-4\mathbf{a}\text{"})+n\times\text{"}\frac{17}{4}\mathbf{b}\text{"}$			M1	for two correct expressions for vector $\overrightarrow{OP}$ **or** two correct expressions for vector $\overrightarrow{AP}$, **or** two correct expressions for vector $\overrightarrow{BP}$ **or** two correct expressions for vector $\overrightarrow{CP}$ **or** two correct expressions for vector $\overrightarrow{DP}$ one of which contains $n\text{"}\frac{17}{4}\mathbf{b}\text{"}$ and one contains $x(4\mathbf{b}-\mathbf{a})$
	Dependent on a correct vector method shown	$\frac{32}{17}$		A1	dep on M3 oe allow 1.88(235…)
					Total 6 marks