1	(a)	2**a**	M1	for **a** – **b** + **a** + **b** (=2**a**)	
			A1	cao	
	(b)	4	P1	for a process to find $\overrightarrow{MF}$= −0.5**b**−**a**−(**a**−**b**) (=0.5**b**−2**a**) **or** $\overrightarrow{CE}$= **a** + **b** **or** $\overrightarrow{FM}$ = **a**−**b**+**a**+0.5**b** (=2**a**−0.5**b**)	Accept ft from (a) providing vectors are clearly stated
			P1	For finding a suitable vector expression for **two** of ($\overrightarrow{CE}$ or $\overrightarrow{EC}$), ($\overrightarrow{CX}$ or $\overrightarrow{XC}$) or ($\overrightarrow{EX}$ or $\overrightarrow{XE}$) eg, $\overrightarrow{CX}$ = **a** +0.5**b**+$\frac{1}{n+1}$(0.5**b**−2**a**) **or** $\overrightarrow{CX}$ = −**a** + **b** +$\frac{n}{n+1}$(2**a**−0.5**b**) $\overrightarrow{XE}$ = $\frac{1}{n+1}$(2**a** −0.5**b**) + 0.5**b** **or** $\overrightarrow{XE}$ = $\frac{n}{n+1}$(0.5**b** – 2**a**) + 2**a** **or** $\overrightarrow{XC}$ = $\frac{n}{n+1}$(0.5**b**−2**a**)+**a**−**b** **or** $\overrightarrow{XC}$ = $\frac{1}{n+1}$(2**a** – 0.5**b**) – 0.5**b** − **a** **or** $\overrightarrow{EX}$ = −0.5**b**+$\frac{1}{n+1}$(0.5**b**−2**a**) **or** $\overrightarrow{EX}$ = −2**a** + $\frac{n}{n+1}$(2**a** – 0.5**b**)	$\overrightarrow{CX}=\frac{n-1}{n+1}\mathbf{a}+\frac{n+2}{2(n+1)}\mathbf{b}$ $\overrightarrow{XE}=\frac{2}{n+1}\mathbf{a}+\frac{n}{2(n+1)}\mathbf{b}$ $\overrightarrow{XC}=\frac{1-n}{n+1}\mathbf{a}+\frac{-n-2}{2(n+1)}\mathbf{b}$ $\overrightarrow{EX}=\frac{-2}{n+1}\mathbf{a}-\frac{n}{2(n+1)}\mathbf{b}$
			P1	for complete process to equate the coefficients of **a** and **b** eg $\frac{n-1}{n+1}=\frac{n+2}{2(n+1)}$	
			A1	cao	
				ALTERNATIVE	
			P1	for a process to find $\overrightarrow{MF}$= −0.5**b** − **a** − (**a** − **b**) (=0.5**b** − 2**a**) **or** $\overrightarrow{CE}$= **a** + **b** **or** $\overrightarrow{FM}$ = **a** – **b** + **a** + 0.5**b** (=2**a** − 0.5**b**)	Accept ft from (a) providing vectors are clearly stated
			P1	For finding two suitable vector expressions for $\overrightarrow{FX}$ eg $\overrightarrow{FX}$ = $\frac{n}{n+1}$(2**a** − 0.5**b**) **and** $\overrightarrow{FX}$ = **a** – **b** + *k***a** + *k***b**	
			P1	for complete process to equate the coefficients of **a** and **b** eg $\frac{2n}{n+1}-1=1-\frac{n}{2(n+1)}$	
			A1	cao	

2	4 : 3	P1	Process to find a missing vector using the given ratios as fractions, eg. $\frac{1}{3}$ of $\overrightarrow{OX}$ (=$\frac{1}{3}$**a**) or. $\frac{1}{4}$ of $\overrightarrow{OY}$ (=$\frac{1}{4}$**b**)	
		P1	for a process to use $\overrightarrow{ZO}=\overrightarrow{YX}$ = **a** − **b** oe	Might be embedded in their answer for ZP The award of this mark implies the first two process marks.
		P1	for a process to find either $\overrightarrow{ZP}$ or $\overrightarrow{ZR}$ in terms of **a** and **b**, eg. either $\overrightarrow{ZP}$ = **a** − **b** +$\frac{1}{3}$**a** or $\overrightarrow{ZR}$ = **a** − **b** +$\frac{1}{4}$**b**	
		P1	for a process to write $\overrightarrow{ZP}$ and $\overrightarrow{ZR}$ as multiples of the same vector, eg. multiplying both by 12 to get the ratio, $\frac{4}{3}$(**a** – 0.75**b**) and **a** – 0.75**b** respectively	
		A1	oe	

3	Proof	M1	for $\overrightarrow{DQ}$ = ½ (**b** − **a**) oe or $\overrightarrow{EQ}$ = ½ (**a** − **b**) oe	Vectors could be written on the diagram
		M1	for $\overrightarrow{PQ}$ = ½ **a** + $\overrightarrow{DQ}$ **or** ½ **a** + ½ (**b** − **a**) oe **or** $\overrightarrow{PQ}$ = − ½ **a** + **b** + $\overrightarrow{EQ}$ **or** − ½ **a** + **b** + ½ (**a** − **b**) oe	
		B1	for $\overrightarrow{PQ}$ = ½ **b**	
		C1	for complete proof with statement, eg *FE* = 2*PQ* **or** *FE* is a multiple of *PQ* **or** **b** = 2(½ **b**)	

4	$\frac{2}{5}\mathbf{a}+\mathbf{b}$	P1	for relationship involving D eg $\overrightarrow{OD}=\frac{2}{5}\overrightarrow{OB}$ or $\overrightarrow{DB}=\frac{3}{5}\overrightarrow{OB}$ **or** for relationship involving E eg $\overrightarrow{BE}=\frac{1}{5}\overrightarrow{BC}$ or $\overrightarrow{EC}=\frac{4}{5}\overrightarrow{BC}$	
		P1	for relationship involving D in terms of **a** and **b** eg $\overrightarrow{OD}=\frac{2}{5}(\mathbf{a}+\mathbf{b})$ or $\overrightarrow{DB}=\frac{3}{5}(\mathbf{a}+\mathbf{b})$ **or** for relationship involving E in terms of **a** and **b** eg $\overrightarrow{BE}=\frac{1}{5}(-\mathbf{b}-\mathbf{a}+3\mathbf{b})$ oe or $\overrightarrow{EC}=\frac{4}{5}(-\mathbf{b}-\mathbf{a}+3\mathbf{b})$ oe **or** $\overrightarrow{BC}=2\mathbf{b}-\mathbf{a}$ oe or $\overrightarrow{CB}=\mathbf{a}-2\mathbf{b}$ oe	
		P1	(dep P2) for expression for $\overrightarrow{DE}$ in terms of **a** and **b** eg $\overrightarrow{DE}=\frac{3}{5}(\mathbf{a}+\mathbf{b})+\frac{1}{5}(-\mathbf{b}-\mathbf{a}+3\mathbf{b})$	
		A1	for $\frac{2}{5}\mathbf{a}+(1)\mathbf{b}$ or $\frac{1}{5}(2\mathbf{a}+5\mathbf{b})$	