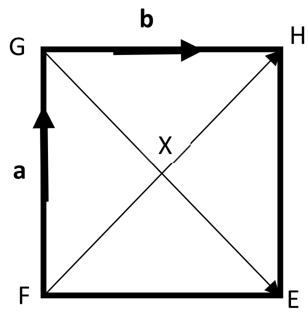
Prove that the two longest lines in a **square** bisect each other and their point of intersection X is in the middle of the Square



We want to have two separate expressions for $\overrightarrow{FX}$ which must be equal to eachother and then to equate their coefficients to find our unknowns

$\overrightarrow{FG} = \boldsymbol{a}$

$\overrightarrow{GH} = \boldsymbol{b}$

Rewrite the following using **a** and **b**

$\overrightarrow{FH} =$

$\overrightarrow{GE} =$

$\overrightarrow{GX} = \boldsymbol{m}\overrightarrow{GE} =$

Now Re-Write $\overrightarrow{FX}$ *in two ways*

$\overrightarrow{FX} = \boldsymbol{k}\overrightarrow{FH} =$

Or

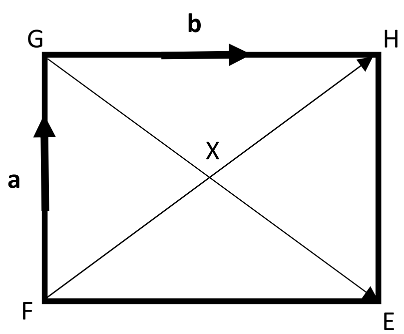
$\overrightarrow{FX} = \overrightarrow{FG} + \overrightarrow{GX} =$

Equate Coefficients and then solve for $\boldsymbol{k}$

$\overrightarrow{FX} \equiv \overrightarrow{FX}$

$\overrightarrow{FG} + \overrightarrow{GX} \equiv \boldsymbol{k}\overrightarrow{FH}$

Prove that the Ratio FX:XH is of the form 1:n and find a value for n



We want to have two separate expressions for $\overrightarrow{FX}$ which must be equal to eachother and then to equate their coefficients to find our unknowns

This shape is a RECTANGLE

$\overrightarrow{FG} = \boldsymbol{a}$

$\overrightarrow{GH} = \boldsymbol{b}$

Rewrite the following using **a** and **b**

$\overrightarrow{FH} =$

$\overrightarrow{GE} =$

$\overrightarrow{GX} = \boldsymbol{m}\overrightarrow{GE} =$

$\overrightarrow{FX} = \dfrac{\mathbf{1}}{\boldsymbol{n}+\mathbf{1}}\overrightarrow{FH} =$

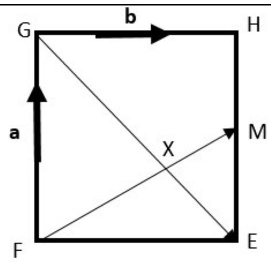
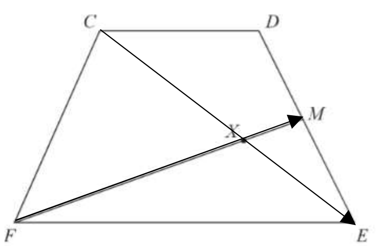
Or

$\overrightarrow{FX} = \overrightarrow{FG} + \overrightarrow{GX} =$

Equate Coefficients

$\overrightarrow{FX} \equiv \overrightarrow{FX}$

$\overrightarrow{FG} + \overrightarrow{GX} \equiv \dfrac{\mathbf{1}}{\boldsymbol{n}+\mathbf{1}}\overrightarrow{FH}$

Find the Ratio FX:XM where M is the midpoint of HE		
 $\overrightarrow{FG} = \boldsymbol{a}$ $\overrightarrow{GH} = \boldsymbol{b}$ Rewrite the following using **a** and **b** $\overrightarrow{FM}=$ $\overrightarrow{GE}=$ $\overrightarrow{GX} \equiv \boldsymbol{m}\overrightarrow{GE} \equiv$ $\overrightarrow{FX} \equiv \boldsymbol{k}\,\overrightarrow{FM} \equiv$ And $\overrightarrow{FX} \equiv \overrightarrow{FG} + \overrightarrow{GX} = \overrightarrow{FG} + \boldsymbol{m}\overrightarrow{GE} =$	We now have two separate expressions for $\overrightarrow{FX}$ which must be equal to eachother <u>Equate Coefficients</u> $\overrightarrow{FX} \equiv \overrightarrow{FX}$ $\overrightarrow{FG} + \overrightarrow{GX} \equiv \boldsymbol{k}\overrightarrow{FM}$	
Find the ratio of FX:XM		
 $\overrightarrow{CD} = \mathbf{a}$, $\overrightarrow{DE} = \mathbf{b}$ and $\overrightarrow{FC} = \mathbf{a} - \mathbf{b}$. *M* is the midpoint of *DE*. *X* is the point on *FM* such that $FX : XM = n : 1$ *CXE* is a straight line. Rewrite the following using **a** and **b** $\overrightarrow{FE}=$ $\overrightarrow{FM}=$ $\overrightarrow{CE} \equiv$ $\overrightarrow{CX} \equiv \boldsymbol{m}\overrightarrow{CE} \equiv$ $\overrightarrow{FX} \equiv \boldsymbol{k}\overrightarrow{FM} \equiv$ And $\overrightarrow{FX} \equiv \overrightarrow{FC} + \overrightarrow{CX} = \overrightarrow{FC} + \boldsymbol{m}\overrightarrow{CE} =$ We now have two separate expressions for $\overrightarrow{FX}$ which must be equal to eachother	Equate Coefficients and then solve for ***k*** and ***m*** $\overrightarrow{FX} \equiv \overrightarrow{FX}$ $\overrightarrow{FC} + \overrightarrow{CX} \equiv \boldsymbol{k}\overrightarrow{FM}$ $\overrightarrow{FC} + \boldsymbol{m}\overrightarrow{CE} \equiv \boldsymbol{k}\overrightarrow{FM}$	