

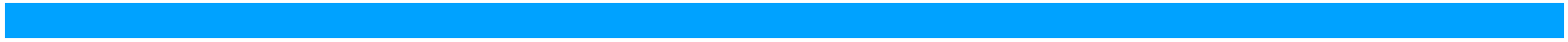


Finally, the angles  $\angle AFB \cong \angle EFC$  since they are vertical angles (remember that  $A - F - E$  and  $B - F - C$ ). Therefore,  $\triangle AFB \cong \triangle EFC$  by AAS. In particular,  $\overline{BF} \cong \overline{FC}$ . This provides the existence of midpoints.

Let  $B$  and  $B'$  be midpoints of  $AC$ , and let  $\preceq$  be an ordering of  $\overleftrightarrow{AC}$  such that  $A \preceq C$ . Without the loss of generality, we may assume that  $B' \preceq B$ . In particular,  $A - B' - B - C$ . Then

$$\overline{AB'} \leq \overline{AB} \cong \overline{BC} \leq \overline{B'C} \cong \overline{AB'}.$$

Hence,  $\overline{AB'} \cong \overline{AB}$ . But by the uniqueness of Segment Translation, we conclude that  $B = B'$ , that is, midpoints are unique.  $\square$





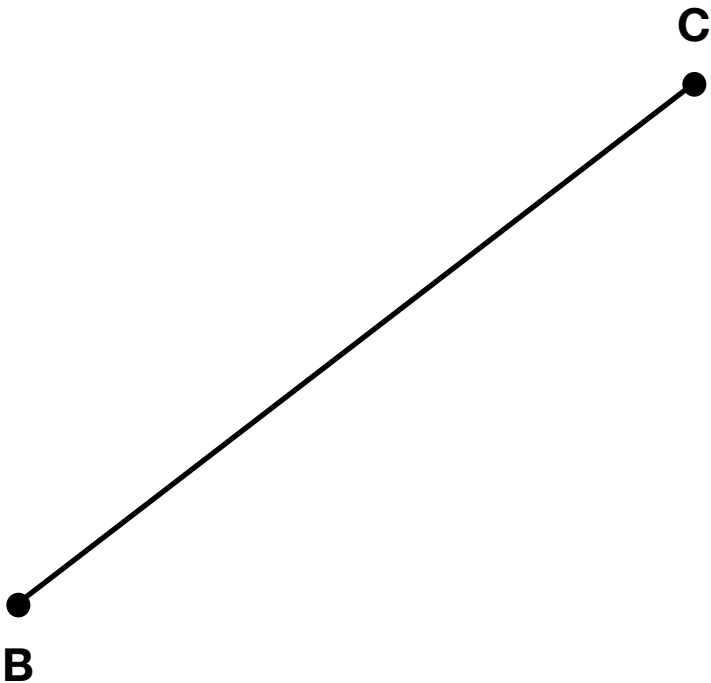








**E**



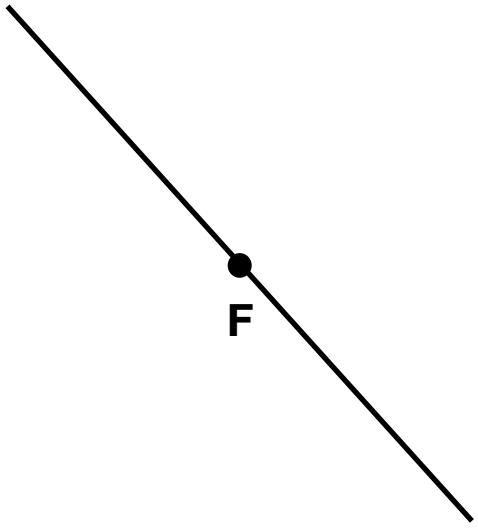
**A**









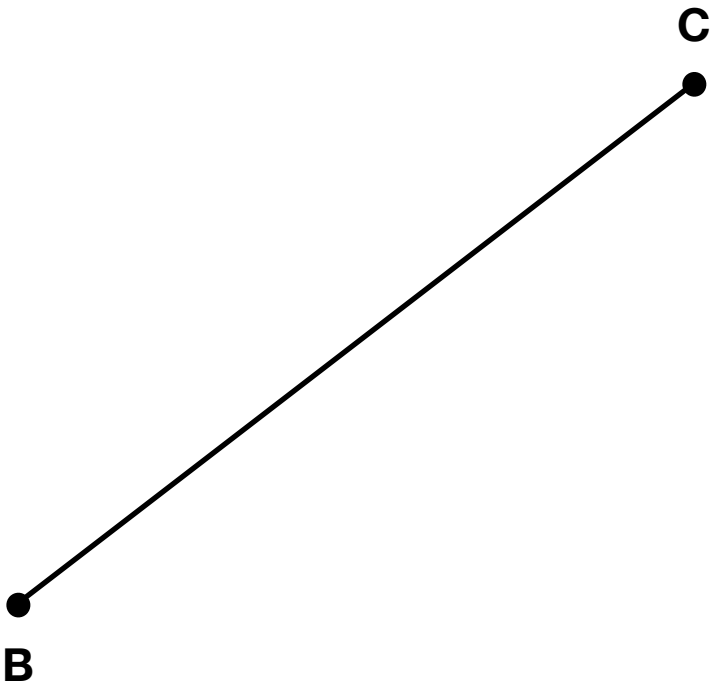


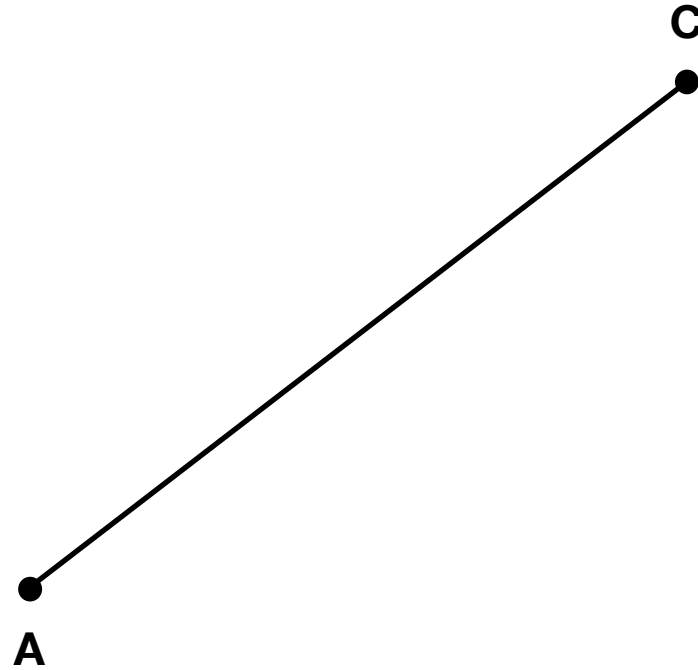










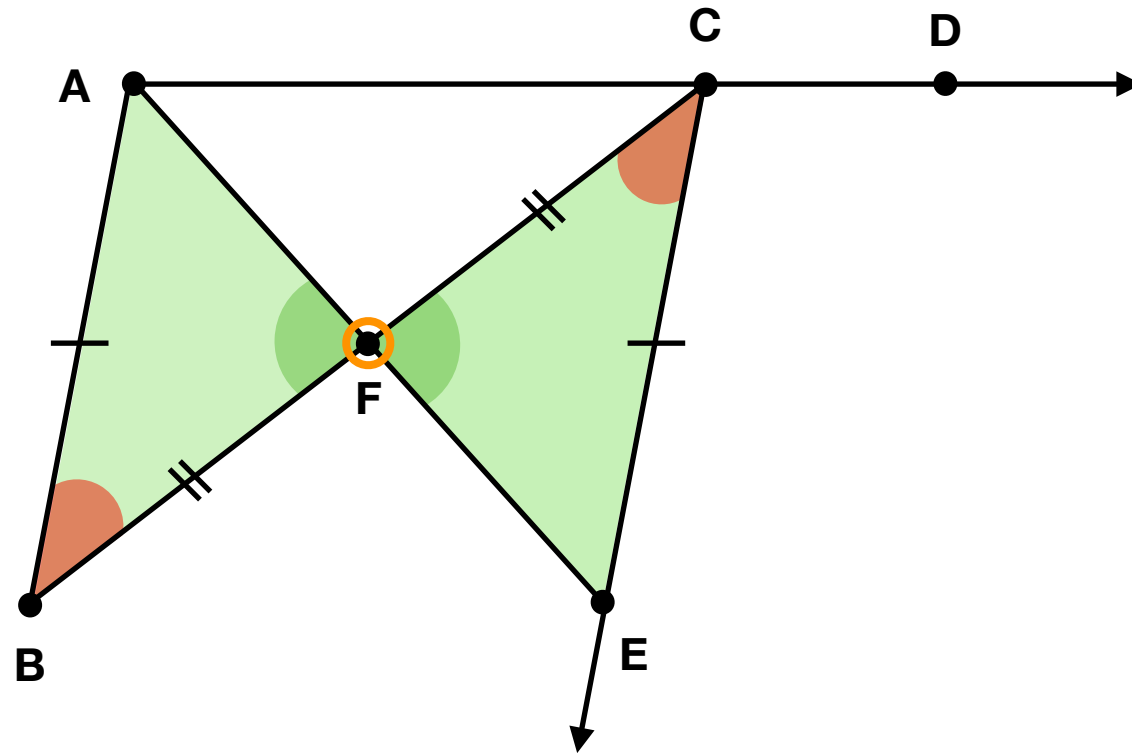


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