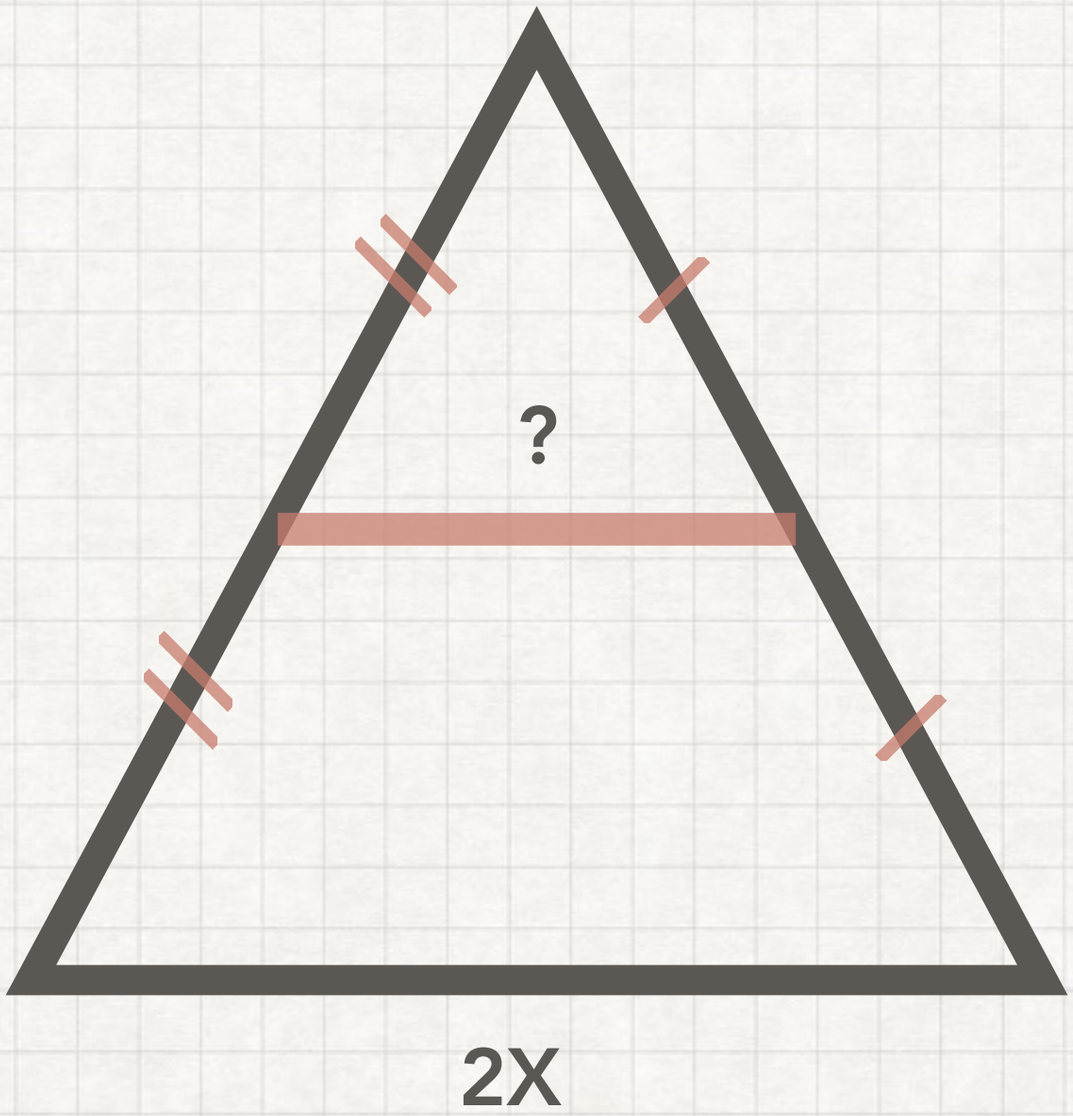
QUADRILATERAL MIDSEGMENTS AND PROOF DEVELOPMENT

BRAINSTORM

HOW DOES THE LENGTH OF A TRIANGLE MIDSEGMENT COMPARE TO THE LENGTH OF THE BASE?



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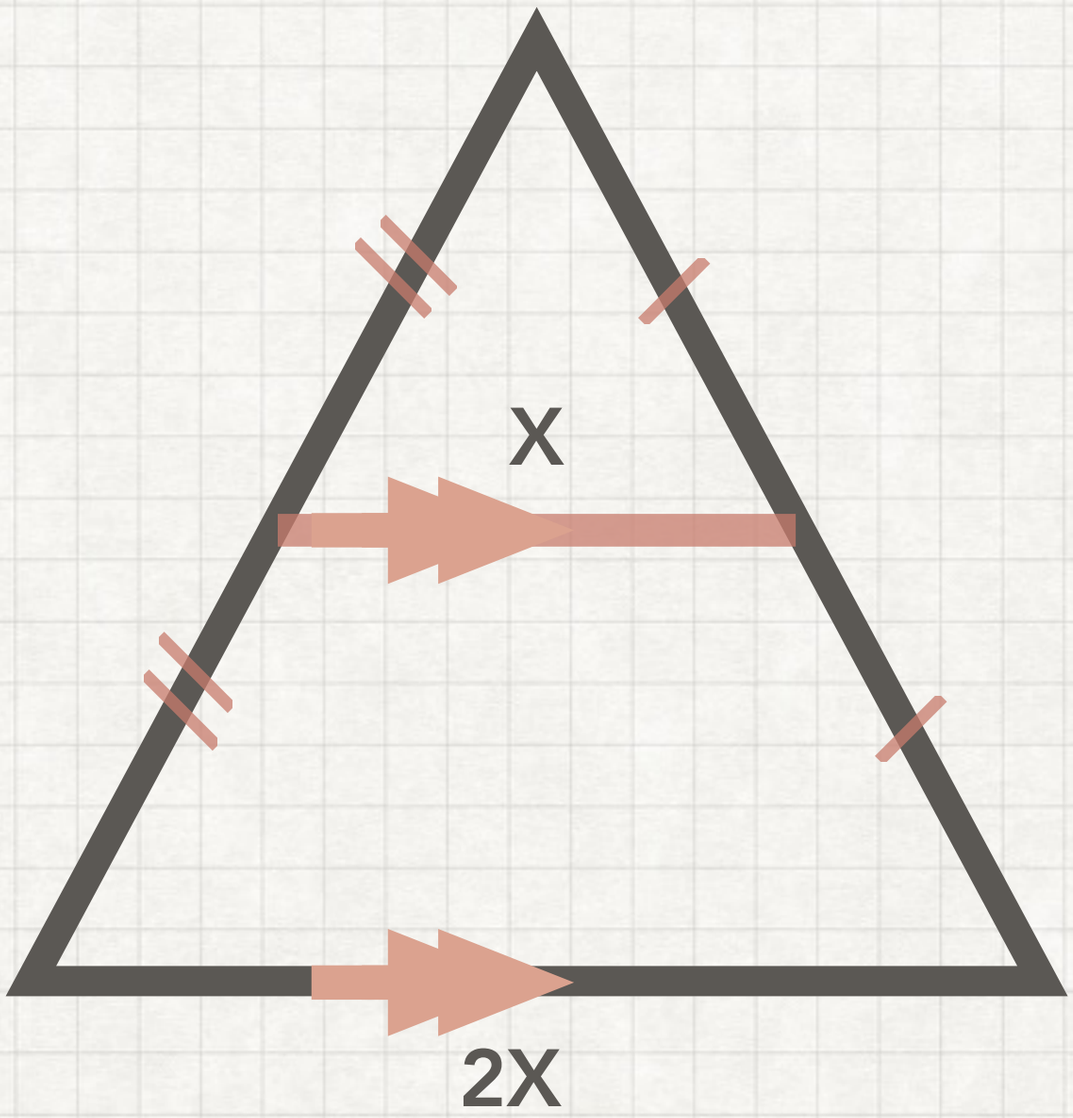
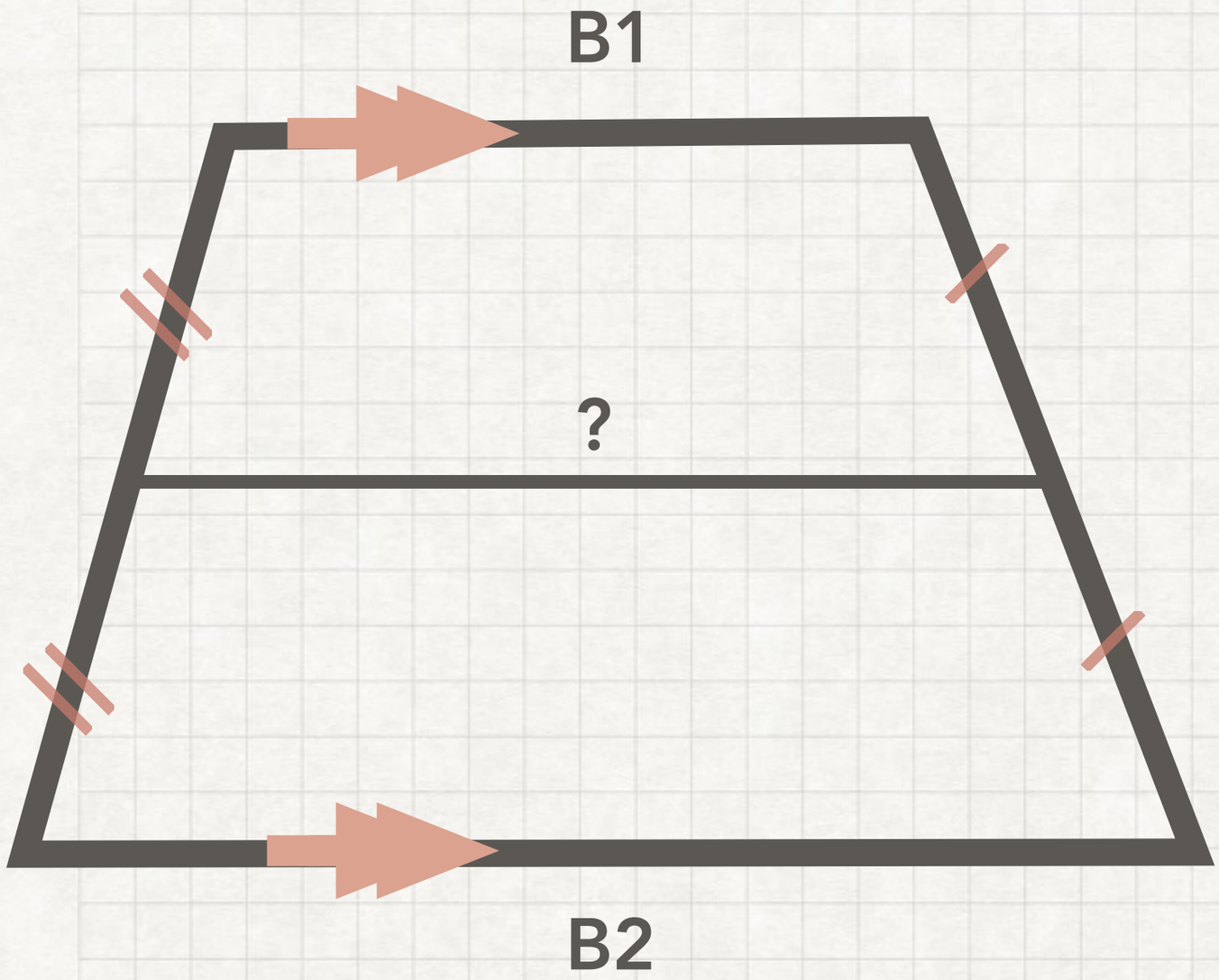


PREDICT

HOW DOES THE LENGTH OF A TRAPEZOID MIDSEGMENT COMPARE TO THE LENGTH OF THE BASES?



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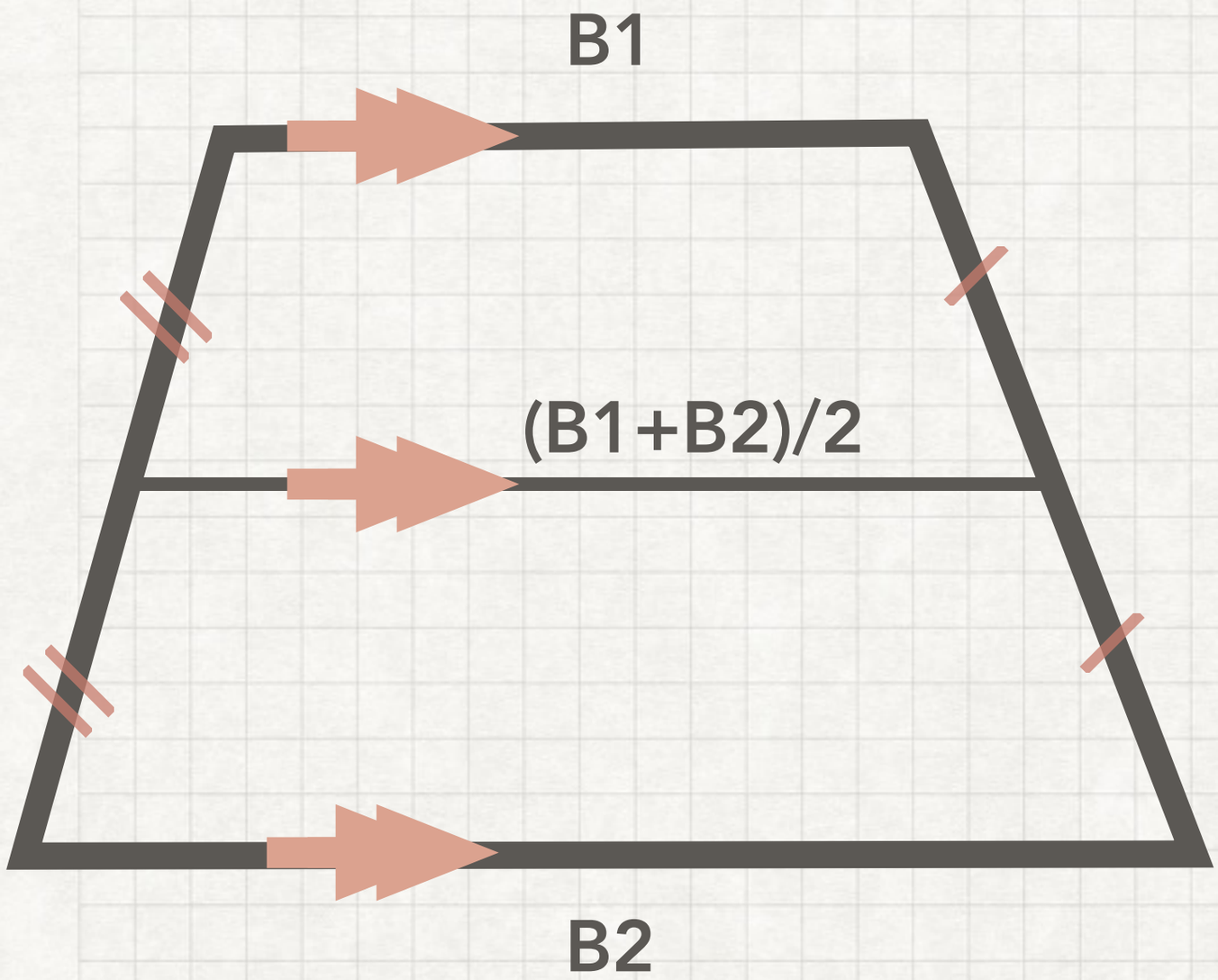
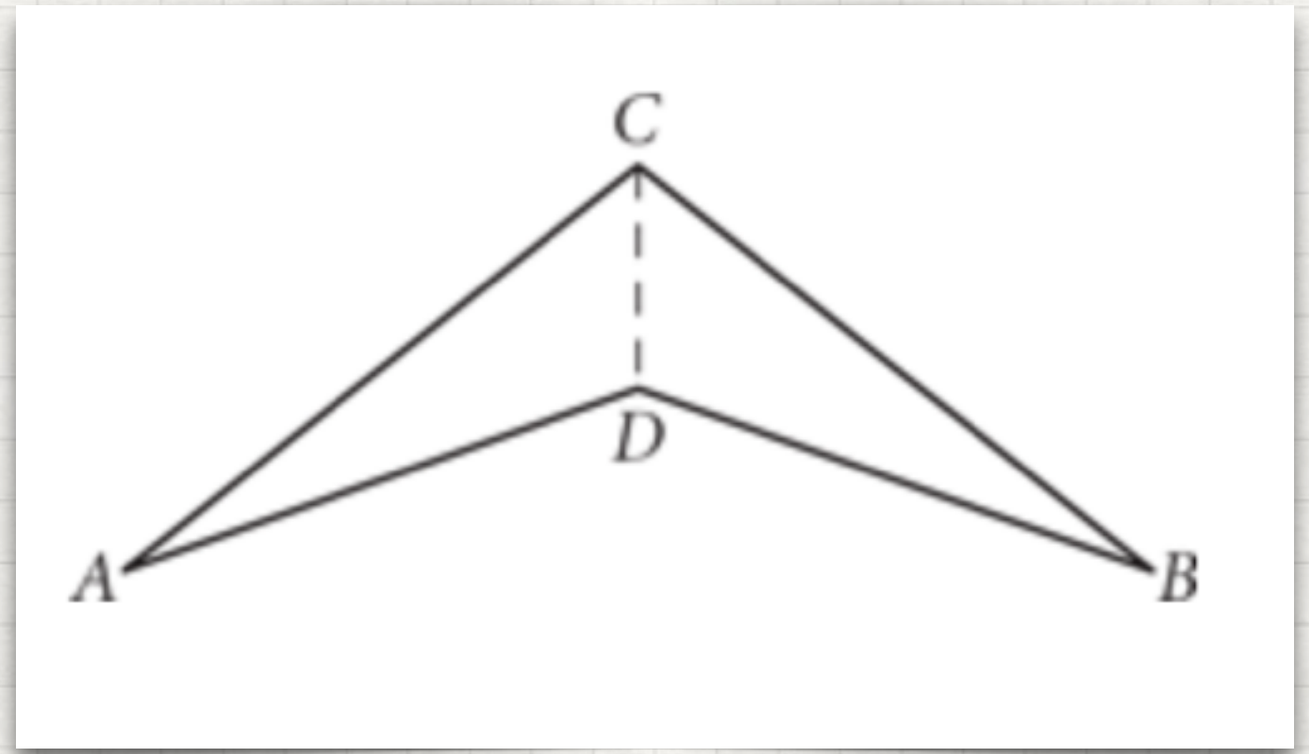


PROOF DEVELOPMENT: BACKWARDS DESIGN

EXAMPLE

Given: Dart $ADBC$ with $\overline{AC} \cong \overline{BC}$, $\overline{AD} \cong \overline{BD}$

Show: $\overline{CD}$ bisects $\angle ACB$



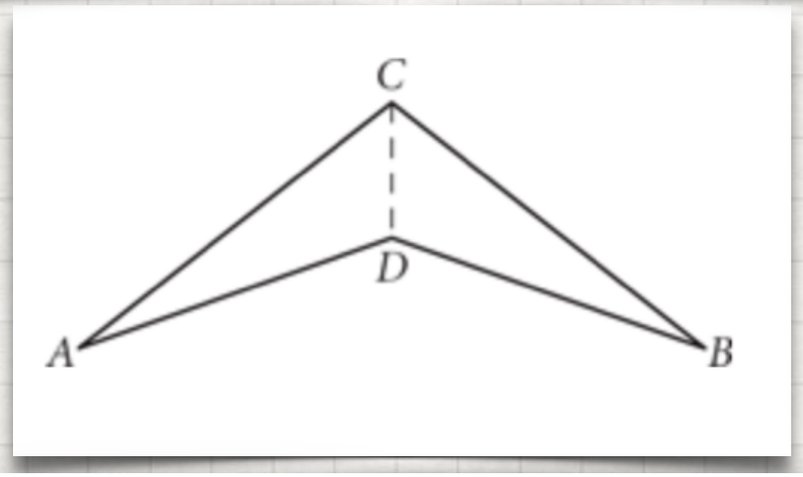
PROOF DEVELOPMENT: BACKWARDS DESIGN

EXAMPLE

Given: Dart $ADBC$ with $\overline{AC} \cong \overline{BC}$, $\overline{AD} \cong \overline{BD}$

Show: $\overline{CD}$ bisects $\angle ACB$

STEP 1: START WITH WHAT YOU WANT TO PROVE



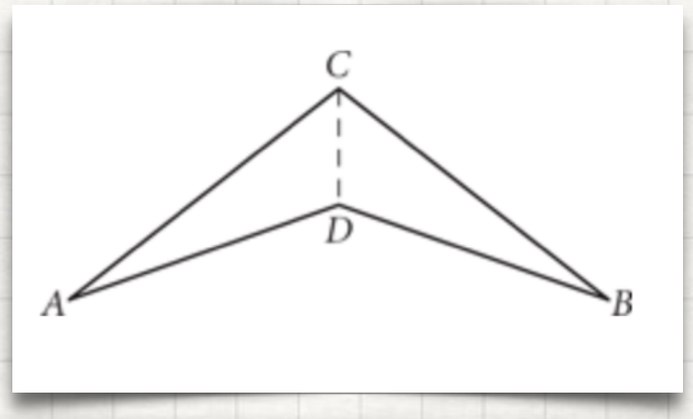
BRAINSTORM WHAT YOU WOULD NEED IN THE FINAL STEP OF YOUR PROOF TO PROVE IT

"I can show $\overline{CD}$ is the bisector of $\angle ACB$ if I can show $\angle ACD \cong \angle BCD$."

$\angle ACD \cong \angle BCD$ → $\overline{CD}$ is the bisector of $\angle ACB$

PROOF DEVELOPMENT: BACKWARDS DESIGN

STEP 2: MOVE BACKWARDS
FROM THE FINAL STEP



"I can show $\overline{CD}$ is the bisector of $\angle ACB$ if I can show $\angle ACD \cong \angle BCD$."

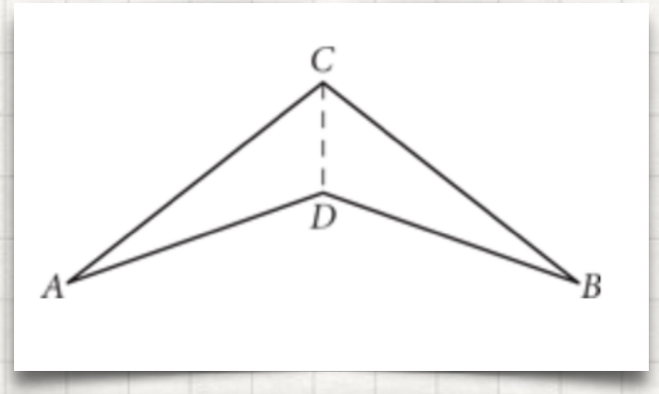
$\angle ACD \cong \angle BCD$ → $\overline{CD}$ is the bisector of $\angle ACB$

"I can show $\angle ACD \cong \angle BCD$ if they are corresponding angles in congruent triangles."

$\triangle ADC \cong \triangle BDC$ → $\angle ACD \cong \angle BCD$ → $\overline{CD}$ is the bisector of $\angle ACB$

PROOF DEVELOPMENT: BACKWARDS DESIGN

STEP 3: KEEP MOVING BACKWARDS UNTIL YOU REACH INFORMATION YOU'RE GIVEN



"I can show $\angle ACD \cong \angle BCD$ if they are corresponding angles in congruent triangles."

$\triangle ADC \cong \triangle BDC$ → $\angle ACD \cong \angle BCD$ → $\overline{CD}$ is the bisector of $\angle ACB$

"Can I show $\triangle ADC \cong \triangle BDC$? Yes, I can, by SSS, because it is given that $\overline{AC} \cong \overline{BC}$ and $\overline{AD} \cong \overline{BD}$, and $\overline{CD} \cong \overline{CD}$ because it is the same segment in both triangles."

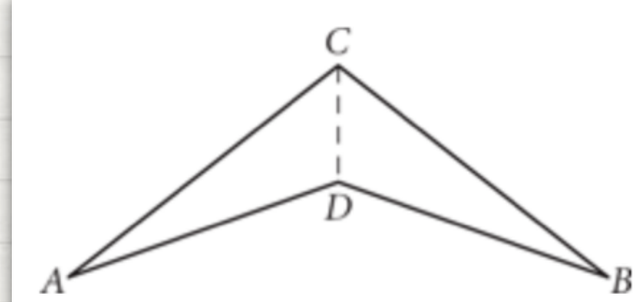
$\overline{AD} \cong \overline{BD}$

$\overline{AC} \cong \overline{BC}$ → $\triangle ADC \cong \triangle BDC$ → $\angle ACD \cong \angle BCD$ → $\overline{CD}$ is the bisector of $\angle ACB$

$\overline{CD} \cong \overline{CD}$

PROOF DEVELOPMENT: BACKWARDS DESIGN

EXAMPLE

Given: Dart $ADBC$ with $\overline{AC} \cong \overline{BC}$, $\overline{AD} \cong \overline{BD}$

Show: $\overline{CD}$ bisects $\angle ACB$