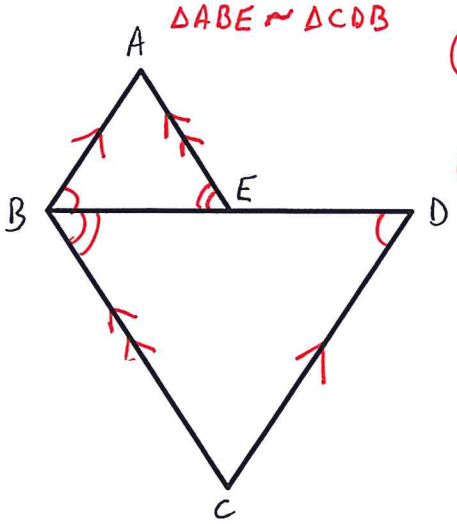
Geometric Proofs

Emphasis on Similarity by Angle – Angle

Prove each of the following using Angle – Angle:

1. **Given:** $\overline{AB} \parallel \overline{CD}$
   $\overline{AE} \parallel \overline{CB}$

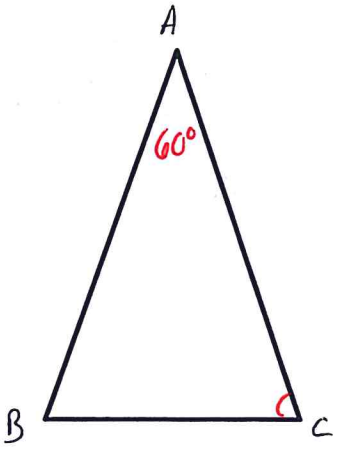
   Prove: ~~$\Delta ABC \sim \Delta DEC$~~ $\Delta ABE \sim \Delta CDB$

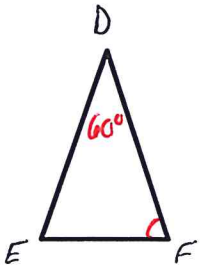


Statements	Reasons
① $\overline{AB} \parallel \overline{CD}$; $\overline{AE} \parallel \overline{CB}$	① Given.
② $\angle ABE \cong \angle D$ $\angle AEB \cong \angle CBD$	② Alt. Int. $\angle$s.
③ $\Delta ABE \sim \Delta CDB$	③ AA.

2. **Given:** $\angle A = 60°$
   $\angle D = 60°$
   $\angle C \cong \angle F$

   Prove: $\Delta ACB \sim \Delta DFE$

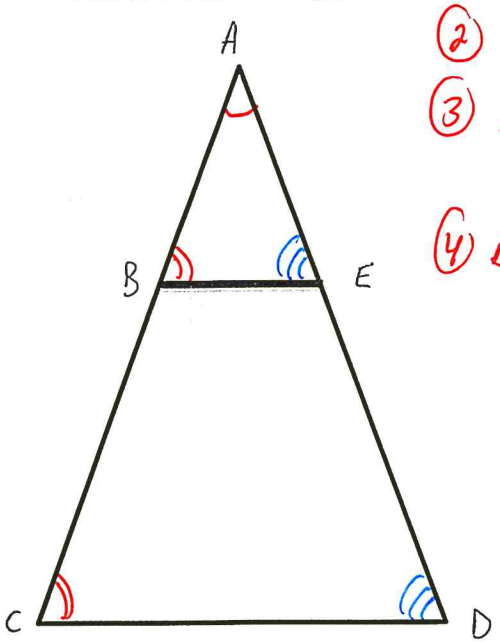




Statements	Reasons
① $\angle A = 60°$; $\angle D = 60°$; $\angle C \cong \angle F$	① Given.
② $\angle A = \angle D$	② Transitive Property
③ $\angle A \cong \angle D$	③ Def $\cong$
④ $\Delta ACB \sim \Delta DFE$	④ AA.

3. **Given:** $\overline{BE} \parallel \overline{CD}$

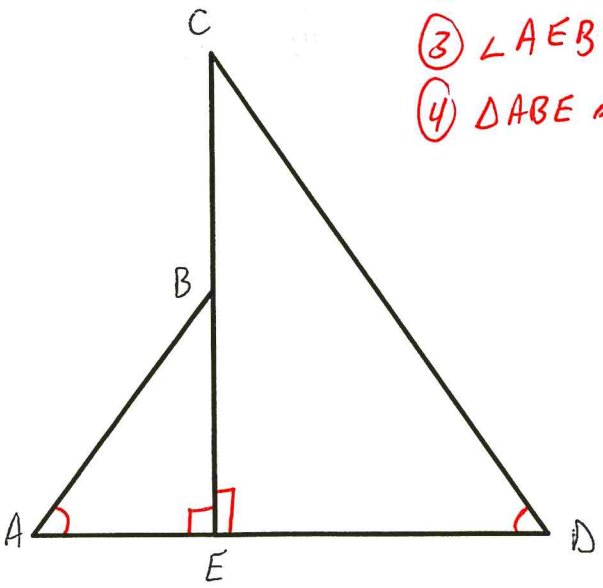
Prove: $\Delta ABE \sim \Delta ACD$



Statements	Reasons
(1) $\overline{BE} \parallel \overline{CD}$	(1) Given.
(2) $\angle A \cong \angle A$	(2) Reflexive Property.
(3) $\angle ABE \cong \angle C$ OR $\angle AEB \cong \angle D$	(3) Alt. Int. Angles.
(4) $\Delta ABE \sim \Delta ACD$	(4) AA.

4. **Given:** $\overline{CE} \perp \overline{AD}$
$\angle A \cong \angle D$

Prove: $\Delta ABE \sim \Delta DCE$



Statements	Reasons.
(1) $\overline{CE} \perp \overline{AD}$; $\angle A \cong \angle D$	(1) Given.
(2) $\angle AEB$ & $\angle DEC$ are Rt. $\angle$'s	(2) Def $\perp$
(3) $\angle AEB \cong \angle DEC$	(3) Rt. $\angle$'s $\cong$ Thm.
(4) $\Delta ABE \sim \Delta DCE$	(4) AA.