Notes: ACC Geometry 2.7 Segment Proofs

There are 3 main types of proofs:

1. Two column
2. Flow
3. Paragraph

Proof is a form of Deductive **Reasoning.**

What postulates or theorems do we already know about segments?

Midpoint Theorem : If B is the midpoint of $\overline{AC}$, then $\overline{AB} \cong \overline{BC}$. or def of midpt is fine

Segment Addition : If B is between collinear points A and C, then AB + BC=AC.

NEW postulates or theorems about segments

Def of Congruence: If $\overline{BC} \cong \overline{AB}$, then $BC = AB$
If $BC = AB$, then $\overline{BC} \cong \overline{AB}$

Reflexive: $\overline{BC} \cong \overline{BC}$

Symmetric: If $\overline{BC} \cong \overline{AB}$ then, $\overline{AB} \cong \overline{BC}$

Transitive: If $\overline{XY} \cong \overline{AB}$ and $\overline{AB} \cong \overline{CD}$, then $\overline{XY} \cong \overline{CD}$

1. Prove the following.

Given: C is the midpoint of $\overline{AB}$ and B is the midpoint of $\overline{CD}$

Prove: $\overline{AC} \cong \overline{BD}$

Statements	reasons
1. C is midpt of AB B is midpt of CD	1. Given
2. $\overline{AC} \cong \overline{CB}$, $\overline{CB} \cong \overline{BD}$	2. midpt theorem
3. $\overline{AC} \cong \overline{BD}$	3. substitution ✓

2. Prove the following.

If $\overline{PR} \cong \overline{QS}$, then $PQ = RS$.

Given $\overline{PR} \cong \overline{QS}$ Prove $PQ = RS$

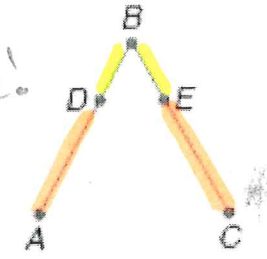
Statements	Reasons
1. $\overline{PR} \cong \overline{QS}$	1. Given
2. $PR = PQ + QR$ $QS = RS + QR$	2. segment addition
3. $PQ + QR = RS + QR$ $-QR \qquad -QR$	3. Substitution
4. $PQ = RS$	4. Subtraction

From Picture

If you have nothing else given then use the Picture

3. **Given:** $\overline{AD} \cong \overline{CE}$, $\overline{DB} \cong \overline{EB}$

Prove: $\overline{AB} \cong \overline{CB}$ ← need to introduce!



1. $\overline{AD} \cong \overline{CE}$ $\overline{DB} \cong \overline{EB}$	1. Given
2. $AB = AD + DB$ $CB = CE + EB$	2. Segment addition
3. $AB = AD + DB$ $CB = AD + DB$	3. Substitution (Step 1)
4. $\overline{AB} \cong \overline{CB}$	4. Substitution (Transitive)

You can now sub yellow in for yellow + orange in for orange

Note! need to intro AB and CB in the proof. So use Picture

They are both = to the same stuff so they are = to each other

HW: pg 121 #1-3, 6, 8, 10