Name: Key

Angle and Segment Proofs Notes

Example 1: Theorem - If two angles are supplementary to the same angle, then they are congruent.

Given: $\angle 3$ and $\angle 4$ are supplementary; $\angle 3$ and $\angle 5$ are supplementary

Prove: $\angle 4 \cong \angle 5$

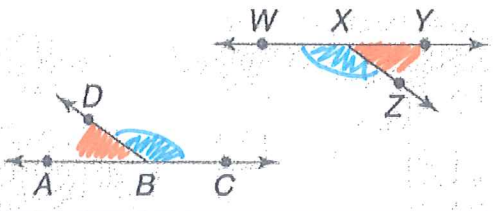
1. <3 and <4 are supplementary <3 and <5 are supplementary	1. Given
2. $<3 + <4 = 180$ $<3 + <5 = 180$	2. Definition of Supplementary
3. $\angle 3 + \angle 4 = \angle 3 + \angle 5$ $-<3 \quad -<3$	3. Substitution
4. $<4 \cong <5$	4. Subtraction

Example 2: Given: C is the midpoint of $\overline{AB}$ and B is the midpoint of $\overline{CD}$

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

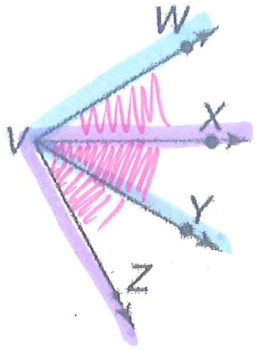
1. C is midpt of AB B is midpt of CD	1. given
2. $AC \cong CB$ $CB \cong BD$	2. def of midpoint
3. $AC \cong BD$	3. substitution

Example 3: **Given:** $\angle ABD \cong \angle YXZ$
Prove: $\angle CBD \cong \angle WXZ$



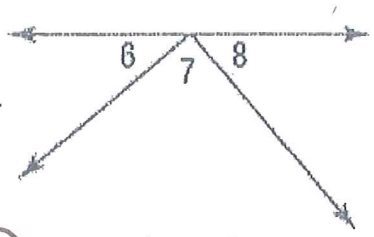
1. $\angle ABD \cong \angle YXZ$	1. Given
2. $\angle ABD + \angle CBD = 180°$ $\angle YXZ + \angle WXZ = 180°$	2. linear pairs are suppl.
3. $\angle ABD + \angle CBD = \angle YXZ + \angle WXZ$	3. Substitution
4. $\angle ABD + \angle CBD = \angle ABD + \angle WXZ$	4. Substitution
5. $\angle CBD \cong \angle WXZ$	5. Subtraction

Example 4: **Given:** $\overrightarrow{VX}$ bisects $\angle WVY$.
$\overrightarrow{VY}$ bisects $\angle XVZ$.
Prove: $\angle WVX \cong \angle YVZ$



1. $\overrightarrow{VX}$ bisects $\angle WVY$ $\overrightarrow{VY}$ bisects $\angle XVZ$	1. given!
2. $\angle WVX \cong \angle XVY$ $\angle YVZ \cong \angle XVY$	2. def of $\angle$ bisector
3. $\angle WVX \cong \angle YVZ$	3. Substitution

Example 5: Prove: If <6 and <8 are complementary, the <7 is a right angle.

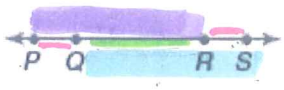


1. <6 and < 8 are complementary	1. Given
2. $\angle 6 + \angle 8 = 90°$	2. def of compl. ← what can I conclude from the given?
3. $\angle 6 + \angle 7 + \angle 8 = 180°$	3. Angle Addition: Straight Angle ← what can I get from the Picture?
4. $90 + \angle 7 = 180°$	4. Substitution
5. $\angle 7 = 90°$	5. Subtraction
6. <7 is a Right <	6. def of RT ∠.

Example 6:

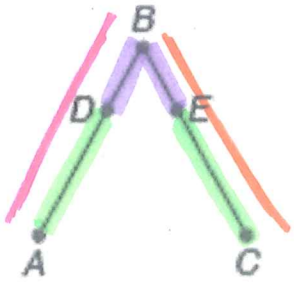
Prove the following. (given / prove)

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



1.) $\overline{PR} \cong \overline{QS}$	1.) given
2.) $PR = PQ + QR$ $QS = RS + QR$	2.) Segment additn
3.) $PQ + QR = RS + QR$ (−QR, −QR)	3.) substitution
4.) $\overline{PQ} \cong \overline{RS}$	4.) subtraction

Example 7: **Given:** $\overline{AD} \cong \overline{CE}$, $\overline{DB} \cong \overline{EB}$
Prove: $\overline{AB} \cong \overline{CB}$



1.) $\overline{AD} \cong \overline{CE}$ $\overline{DB} \cong \overline{EB}$	1.) given
2.) $AB = AD + DB$ $CB = CE + EB$ (they are ≅ to the same stuff!)	2.) Segment additn
3.) $AB = CE + EB$	3.) Substitutn
4.) $AB \cong CB$	4.) Substitutn