

Section 2-8: Angle Proofs- Notes

Key

THEOREM 2.5

Congruence of angles is reflexive, symmetric, and transitive.

Reflexive Property $\angle 1 \cong \angle 1$

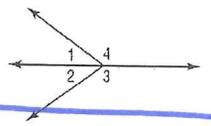
Symmetric Property If $\angle 1 \cong \angle 2$, then $\angle 2 \cong \angle 1$.

Transitive Property If $\angle 1 \cong \angle 2$, and $\angle 2 \cong \angle 3$, then $\angle 1 \cong \angle 3$.

EX1.

Given: $\angle 1$ and $\angle 4$ are a linear pair
 $m\angle 3 + m\angle 1 = 180$

Prove: $\angle 3$ and $\angle 4$ are congruent



- 1.) $\angle 1$ and $\angle 4$ are linear pairs
 $\angle 3 + \angle 1 = 180^\circ$
- 2.) $\angle 1 + \angle 4 = 180^\circ$
- 3.) $\underline{\angle 3} + \angle 1 = \angle 1 + \underline{\angle 4}$
- 4.) $\angle 3 \cong \angle 4$
- 5.) $\angle 3$ and $\angle 4$ are congruent

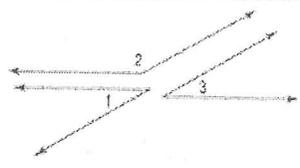
- 1.) given
- 2.) linear pairs are suppl.
- 3.) substitution
- 4.) subtraction
- 5.) def of \cong

THEOREMS

2.6 Angles supplementary to the same angle or to congruent angles are congruent.

Abbreviation: \triangle suppl. to same \angle or $\cong \triangle$ are \cong .

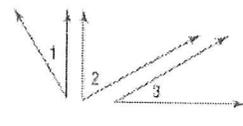
Example: If $m\angle 1 + m\angle 2 = 180$ and $m\angle 2 + m\angle 3 = 180$, then $\angle 1 \cong \angle 3$.



2.7 Angles complementary to the same angle or to congruent angles are congruent.

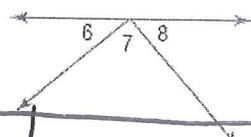
Abbreviation: \triangle compl. to same \angle or $\cong \triangle$ are \cong .

Example: If $m\angle 1 + m\angle 2 = 90$ and $m\angle 2 + m\angle 3 = 90$, then $\angle 1 \cong \angle 3$.



EX2.

Prove: If $\angle 6$ and $\angle 8$ are complementary, the $\angle 7$ is a right angle.



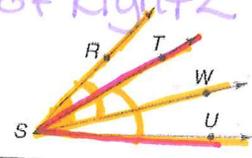
- 1.) $\angle 6$ and $\angle 8$ are compl.
- 2.) $\angle 6 + \angle 8 = 90^\circ$
- 3.) $\underline{\angle 6} + \angle 8 + \angle 7 = 180^\circ$
- 4.) $90 + \angle 7 = 180^\circ$
- 5.) $\angle 7 = 90^\circ$
- 6.) $\angle 7$ is a right \angle

1. given
- 2.) def of compl.
- 3.) \angle addition (straight \angle)
- 4.) substitution
- 5.) subtraction
- 6.) def of Right \angle

EX 3.

Given: $m\angle RSW = m\angle TSU$

Prove: $m\angle RST = m\angle WSU$



- 1.) $\underline{\angle RSW} \cong \underline{\angle TSU}$
- 2.) $\underline{\angle RSW} = \underline{\angle RST} + \underline{\angle TSW}$
 $\underline{\angle TSU} = \underline{\angle TSW} + \underline{\angle WSU}$
- 3.) $\underline{\angle RST} + \underline{\angle TSW} = \underline{\angle TSW} + \underline{\angle WSU}$
 $-\underline{\angle TSW} \quad -\underline{\angle TSW}$
- 4.) $\angle RST \cong \angle WSU$

- 1.) given.
- 2.) \angle addition
- 3.) substitution
- 4.) subtraction

EX 4.

PROOF Copy and complete the proof of Theorem 2.6.

Given: $\angle 1$ and $\angle 2$ are supplementary.
 $\angle 3$ and $\angle 4$ are supplementary.
 $\angle 1 \cong \angle 4$

Prove: $\angle 2 \cong \angle 3$

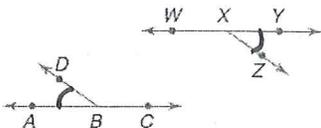


1. $\angle 1$ and $\angle 2$ are suppl.
 $\angle 3$ and $\angle 4$ are suppl.
 $\angle 1 \cong \angle 4$
- 2.) $\angle 1 + \angle 2 = 180$
 $\angle 3 + \angle 4 = 180$
- 3.) $\angle 1 + \angle 2 = \angle 3 + \angle 4$
- 4.) $\angle 1 + \angle 2 = \angle 3 + \angle 1$
- 5.) $\angle 2 \cong \angle 3$

1. Given
2. def of suppl.
- 3.) substitution
- 4.) substitution
- 5.) subtraction

EX 5.

14. Given: $\angle ABD \cong \angle YXZ$
 Prove: $\angle CBD \cong \angle WXZ$



1. $\angle ABD \cong \angle YXZ$
- 2.) $\angle ABD + \angle CBD = 180^\circ$
 $\angle YXZ + \angle WXZ = 180^\circ$
- 3.) $\angle ABD + \angle CBD = \angle YXZ + \angle WXZ$
- 4.) $\angle ABD + \angle CBD = \angle ABD + \angle WXZ$
 $-\angle ABD$ $-\angle ABD$
- 5.) $\angle CBD \cong \angle WXZ$

1. given
- 2.) Linear Pairs are Suppl.
- 3.) substitution
- 4.) substitution
- 5.) subtraction