

Geometry Info Sheet #16

New Theorems; Example Geometric Proofs

Theorems

Congruent Supplements Theorem: If two angles are supplements of congruent angles (or of the same angle), then the two angles are congruent.

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Example Proofs

Given: $\angle 1 \cong \angle 3$

$\angle 1$ and $\angle 2$ are supplementary

$\angle 3$ and $\angle 4$ are supplementary

Prove: $\angle 2 \cong \angle 4$ (Congruent Supplements Theorem)



Step #	Statement	Reason
1.	$\angle 1 \cong \angle 3$	Given
2.	$m\angle 1 = m\angle 3$	Two congruent angles have equal measures
3.	$\angle 1$ and $\angle 2$ are supplementary	Given
4.	$\angle 3$ and $\angle 4$ are supplementary	Given
5.	$m\angle 1 + m\angle 2 = 180^\circ$	Definition of Supplementary Angles
6.	$m\angle 3 + m\angle 4 = 180^\circ$	Definition of Supplementary Angles
7.	$m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	Substitution Property of Equality (from steps 5 and 6)
8.	$m\angle 1 + m\angle 2 = m\angle 1 + m\angle 4$	Substitution Property of Equality (from steps 2 and 7)
9.	$m\angle 2 = m\angle 4$	Subtraction Property of Equality
10.	$\angle 2 \cong \angle 4$	Two angles with equal measures are congruent

Given: $\angle 1$ and $\angle 2$ are supplementary

$\angle 1$ and $\angle 3$ are supplementary

Prove: $\angle 2 \cong \angle 3$ (Congruent Supplements Theorem)



Step #	Statement	Reason
1.	$\angle 1$ and $\angle 2$ are supplementary $\angle 1$ and $\angle 3$ are supplementary	Given
2.	$m\angle 1 + m\angle 2 = 180^\circ$ $m\angle 1 + m\angle 3 = 180^\circ$	Definition of Supplementary Angles
3.	$m\angle 1 + m\angle 2 = m\angle 1 + m\angle 3$	Substitution Property of Equality (from step 2)
4.	$m\angle 1 = m\angle 1$	Reflexive Property of Congruence This step can be skipped.
5.	$m\angle 2 = m\angle 3$	Subtraction Property of Equality
6.	$\angle 2 \cong \angle 3$	Two angles with equal measures are congruent