

Honors Geometry

Notes Section 2.7

Prove Angles Pair Relationships

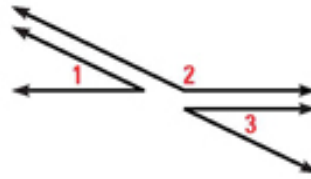
THEOREM 2.3 Right Angles Congruence Theorem

All right angles are congruent.

THEOREM 2.4 Congruent Supplements Theorem

If two angles are supplementary to the same angle (or to congruent angles), then they are congruent.

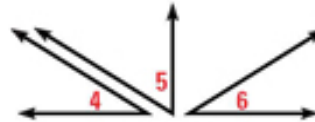
If $\angle 1$ and $\angle 2$ are supplementary and $\angle 3$ and $\angle 2$ are supplementary, then $\angle 1 \cong \angle 3$.



THEOREM 2.5 Congruent Complements Theorem

If two angles are complementary to the same angle (or to congruent angles), then they are congruent.

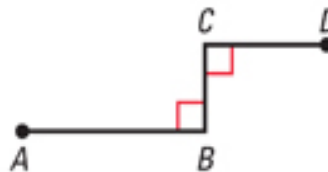
If $\angle 4$ and $\angle 5$ are complementary and $\angle 6$ and $\angle 5$ are complementary, then $\angle 4 \cong \angle 6$.



EXAMPLE 1 Complete the reasons for the following proofs.

a) **GIVEN** $\triangleright \overline{AB} \perp \overline{BC}, \overline{DC} \perp \overline{BC}$

PROVE $\triangleright \angle B \cong \angle C$



1. $\overline{AB} \perp \overline{BC}, \overline{DC} \perp \overline{BC}$

2. $\angle B$ and $\angle C$ are right angles.

3. $\angle B \cong \angle C$

1. _____

2. _____

3. _____

- b) **GIVEN** ▶ $\angle 1$ and $\angle 2$ are supplements.
 $\angle 3$ and $\angle 2$ are supplements.
PROVE ▶ $\angle 1 \cong \angle 3$



1. $\angle 1$ and $\angle 2$ are supplements.
 $\angle 3$ and $\angle 2$ are supplements.
2. $m\angle 1 + m\angle 2 = 180^\circ$
 $m\angle 3 + m\angle 2 = 180^\circ$
3. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$
4. $m\angle 1 = m\angle 3$
5. $\angle 1 \cong \angle 3$

1. _____
2. _____
3. _____
4. _____
5. _____

POSTULATE 12 Linear Pair Postulate

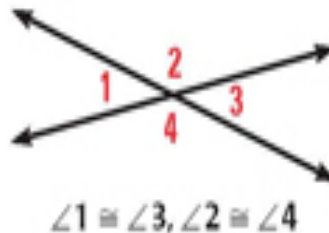
If two angles form a linear pair, then they are supplementary.

$\angle 1$ and $\angle 2$ form a linear pair, so $\angle 1$ and $\angle 2$ are supplementary and $m\angle 1 + m\angle 2 = 180^\circ$.

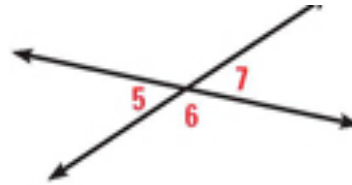


THEOREM 2.6 Vertical Angles Congruence Theorem

Vertical angles are congruent.



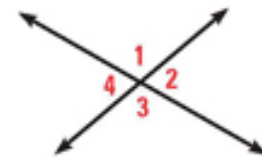
- c) **GIVEN** \triangleright $\angle 5$ and $\angle 7$ are vertical angles.
PROVE \triangleright $\angle 5 \cong \angle 7$



1. $\angle 5$ and $\angle 7$ are vertical angles. 1. _____
2. $\angle 5$ and $\angle 6$ are a linear pair.
 $\angle 6$ and $\angle 7$ are a linear pair. 2. _____
3. $\angle 5$ and $\angle 6$ are supplementary.
 $\angle 6$ and $\angle 7$ are supplementary. 3. _____
4. $\angle 5 \cong \angle 7$ 4. _____

EXAMPLE 2 Find the indicated angles from the diagram.

- a) If $m\angle 1 = 112^\circ$, find $m\angle 2$, $m\angle 3$, and $m\angle 4$.



- b) If $m\angle 2 = 67^\circ$, find $m\angle 1$, $m\angle 3$, and $m\angle 4$.

- c) If $m\angle 4 = 71^\circ$, find $m\angle 1$, $m\angle 2$, and $m\angle 3$.

EXAMPLE 3 Find x and $m\angle TPS$.

