Geometry
4.1-4.2 Proofs

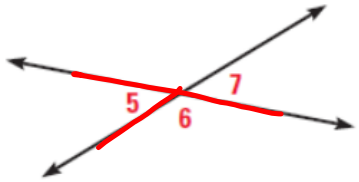
Linear Pair Thm: If linear pr then supp & add up to 180°

EXAMPLE 3 Prove the Vertical Angles Congruence Theorem

Prove vertical angles are congruent.

GIVEN ▶ $\angle 5$ and $\angle 7$ are vertical angles.

PROVE ▶ $\angle 5 \cong \angle 7$

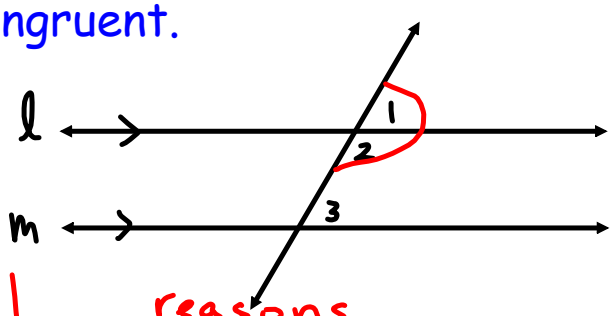


Statements	reasons
① ∡5 & ∡7 are vert. ∡'s	① Given
② ∡5 & ∡6 form a linear pr	② def of linear pr
③ $m\angle 5 + m\angle 6 = 180°$	③ Linear Pair thm
④ ∡6 & ∡7 form a linear pr	④ def of linear pr
⑤ $m\angle 6 + m\angle 7 = 180°$	⑤ Linear Pair Thm
⑥ $m\angle 5 + m\angle 6 = m\angle 6 + m\angle 7$ (−m∡6, −m∡6)	⑥ Transitive Prop.
⑦ $m\angle 5 = m\angle 7$	⑦ Subtraction Prop
⑧ $\angle 5 \cong \angle 7$	⑧ Def of ≅

Corresponding Angles Postulate

If a transversal intersects 2 parallel lines, then the corresponding angles are congruent.

Prove using the Consecutive Interior Angles Thm



Given : $l \parallel m$

Prove: $\angle 1 \cong \angle 3$

Statements	reasons
① $l \parallel m$	① Given
② $m\angle 2 + m\angle 3 = 180^\circ$	② Consec. Int $\angle$'s Thm
③ $m\angle 1 + m\angle 2 = 180^\circ$	③ Linear Pr Thm
④ $m\angle 2 + m\angle 3 = m\angle 1 + m\angle 2$ (subtract $m\angle 2$ from both sides)	④ Transitive
⑤ $m\angle 3 = m\angle 1$	⑤ Subtraction Prop
⑥ $\angle 3 \cong \angle 1$	⑥ Def of $\cong$
⑦ $\angle 1 \cong \angle 3$	⑦ Symmetric Prop.

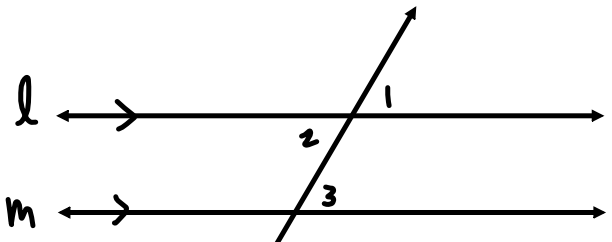
Alternate Interior Angles Theorem

If 2 parallel lines are cut by a transversal then the alternate interior angles are congruent.

Prove using the Corresponding Angles Postulate

Given: $l \parallel m$

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

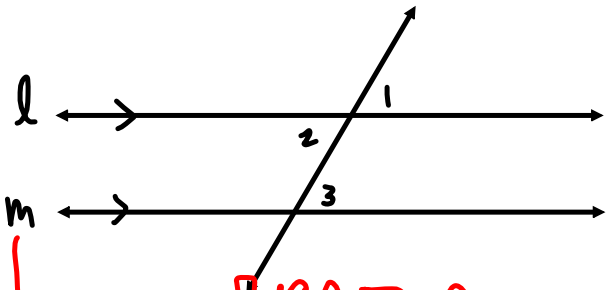


Statements	Reasons
① $l \parallel m$	① Given
② $\angle 1 \cong \angle 2$	② Vert $\angle$'s $\cong$ Thm
③ $\angle 1 \cong \angle 3$	③ Corresp. $\angle$'s Post
④ $\angle 2 \cong \angle 3$	④ Transitive Prop.

Corresponding Angles Postulate

If a transversal intersects 2 parallel lines, then the corresponding angles are congruent.

Prove using the Alternate Interior Angles Thm



Given: $l \parallel m$

Prove: $\angle 1 \cong \angle 3$

Statements	Reasons
1) $l \parallel m$	1) Given
2) $\angle 1 \cong \angle 2$	2) Vert $\angle$'s $\cong$ Thm
3) $\angle 2 \cong \angle 3$	3) Alt. Int. $\angle$'s Thm
4) $\angle 1 \cong \angle 3$	4) Transitive Prop.

Geometry

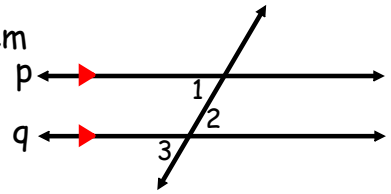
4.1-4.2 Proofs

Name: _____ Date: _____ Hour: ___

1) Prove the Alternative Interior Angles Theorem

Given: p||q

Prove: ∠1 ≅ ∠2

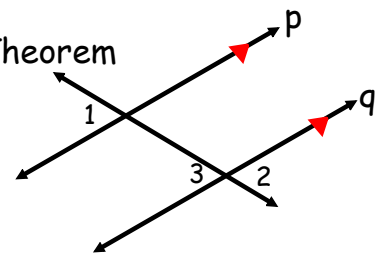


statements	reasons

2) Prove the Alternate Exterior Angles Theorem

Given: p||q

Prove: ∠1 ≅ ∠2

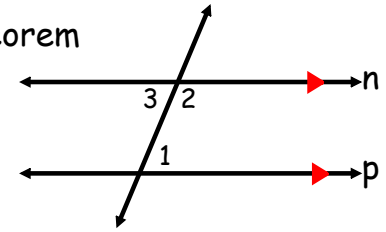


statements	reasons

3) Prove the Consecutive Interior Angles Theorem

Given: n||p

Prove: ∠1 and ∠2 are supplementary



statements	reasons