

Acc Geo Section 3.5  
Proving Lines Parallel

Name \_\_\_\_\_ Date \_\_\_\_\_

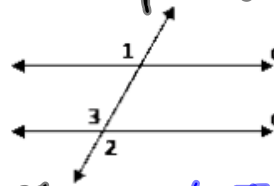
Corresponding Angles Converse Postulate:

- If corresponding angles are  $\cong$  then the lines are parallel \*

Proof of the Alternate Exterior Angles Converse Theorem:

- If alternate exterior angles are  $\cong$  then the lines are parallel.

Given:  $\angle 1 \cong \angle 2$   
Prove:  $c \parallel d$



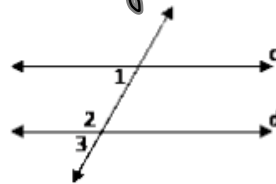
WTS:  $\angle 1 \cong \angle 3$

Statements	Justification
① $\angle 1 \cong \angle 2$	① given
② $\angle 2 \cong \angle 3$	② Vertical $\angle$ s are $\cong$
③ $\angle 1 \cong \angle 3$	③ Transitive
④ $c \parallel d$	④ When corr $\angle$ s are $\cong$ then they form $\parallel$ lines.

Proof of the Consecutive Interior Angles Converse Theorem:

- If consecutive interior angles are supplementary then the lines are parallel.

Given:  $\angle 1$  &  $\angle 2$  are supplementary  
Prove:  $c \parallel d$



WTS:  $\angle 1 \cong \angle 3$

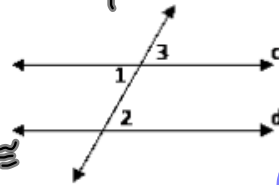
Statements	Justifications
① $\angle 1 + \angle 2$ are supp	① Given
② $\angle 1 + \angle 3$ are supp	② Linear pairs form supp $\angle$ s
③ $\angle 1 \cong \angle 3$	③ $\angle$ s that sup to same $\angle$ are $\cong$ .
④ $c \parallel d$	④ $\cong$ corr $\angle$ s form $\parallel$ lines.

**Proof of the Alternate Interior Angles Converse Theorem:**

• If alternate interior angles are  $\cong$  then the lines are parallel.

Given:  $\angle 1 \cong \angle 2$

Prove:  $c \parallel d$



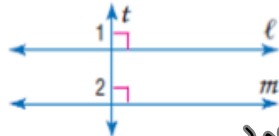
Statements	Justifications
① $\angle 1 \cong \angle 2$	① given
② $\angle 1 \cong \angle 3$	② Vertical $\angle$ s are $\cong$
③ $\angle 2 \cong \angle 3$	③ Substitution
④ $c \parallel d$	④ $\cong$ corr $\angle$ s form $\parallel$ lines

WTS:  $\angle 2 \cong \angle 3$

**Proof of:** If two lines are  $\perp$  to the same line, then they are parallel.

Given:  $l \perp t$  and  $m \perp t$

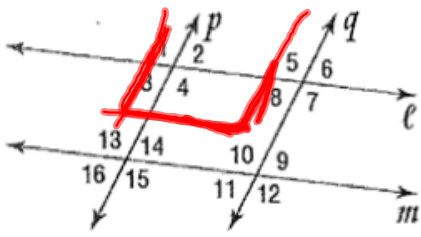
Prove:  $l \parallel m$



Statements	Justifications
① $l \perp t + m \perp t$	① given
② $m\angle 1 = 90^\circ$ $m\angle 2 = 90^\circ$	② Def of $\perp$
③ $m\angle 1 = m\angle 2$	③ Substitution
④ $l \parallel m$	④ $\cong$ corr $\angle$ s form $\parallel$ lines.

WTS:  $\angle 1 \cong \angle 2$

**Example 1:** Determine which lines, if any, are parallel. State which postulate or theorem that justifies your answer.



$\angle 16 \cong \angle 3 \cong$  corr  $\angle$ s form  $\parallel$  lines

$m\angle 14 + m\angle 10 = 180^\circ$  supp const int  $\angle$ s form  $\parallel$  lines

pg 176 8-19, 23-26, 37