

Geometry

Chapter 3

Section 3-3

Theorems

take note

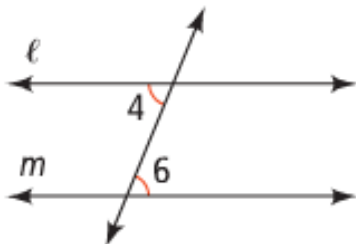
Theorem 3-5 Converse of the Alternate Interior Angles Theorem

Theorem

If two lines and a transversal form alternate interior angles that are congruent, then the two lines are parallel.

If ...

$$\angle 4 \cong \angle 6$$



Then ...

$$l \parallel m$$

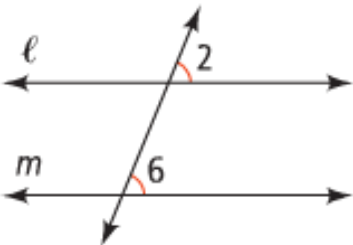
Theorem 3-4 Converse of the Corresponding Angles Theorem

Theorem

If two lines and a transversal form corresponding angles that are congruent, then the lines are parallel.

If ...

$$\angle 2 \cong \angle 6$$



Then ...

$$l \parallel m$$

You will prove Theorem 3-4 in Exercise 29.

More Theorems

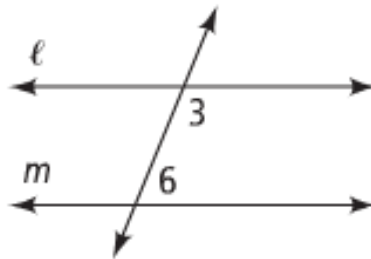
Theorem 3-6 Converse of the Same-Side Interior Angles Postulate

Theorem

If two lines and a transversal form same-side interior angles that are supplementary, then the two lines are parallel.

If ...

$$m\angle 3 + m\angle 6 = 180$$



Then ...

$$\ell \parallel m$$

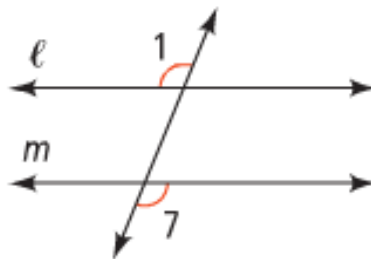
Theorem 3-7 Converse of the Alternate Exterior Angles Theorem

Theorem

If two lines and a transversal form alternate exterior angles that are congruent, then the two lines are parallel.

If ...

$$\angle 1 \cong \angle 7$$



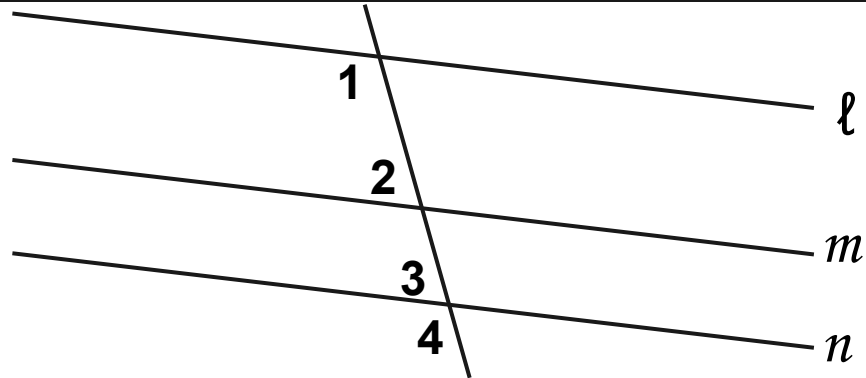
Then ...

$$\ell \parallel m$$

Proof Using the Theorems

Given: $\angle 1 \cong \angle 4$, $\angle 2 \cong \angle 3$

Prove: $l \parallel m$

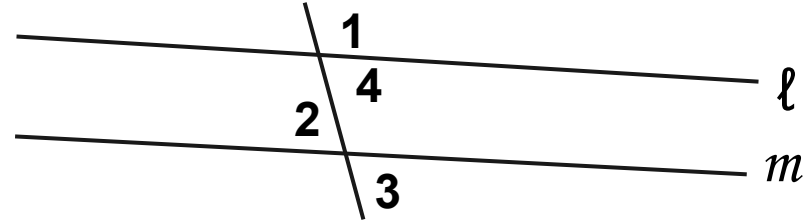


Statements	Reasoning
$\angle 1 \cong \angle 4$, $\angle 2 \cong \angle 3$	Given
$m\angle 1 = m\angle 4$, $m\angle 2 = m\angle 3$	Def of Congruent Angles
$m\angle 3 + m\angle 4 = 180$	Def of Supplementary Angles
$m\angle 2 + m\angle 1 = 180$	Substitution
$l \parallel m$	Converse of Same-Side Interior Angles (3-6)

Proof 2 Using the Theorems

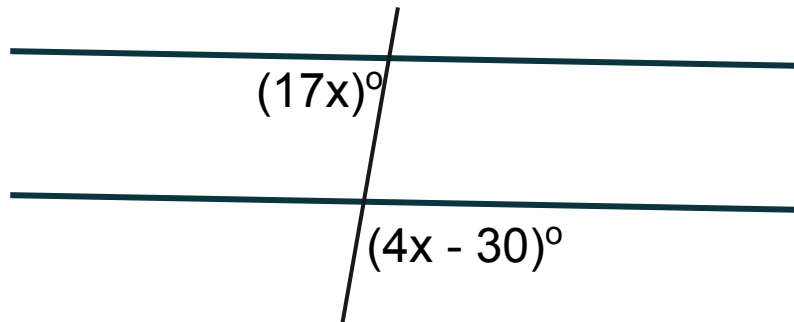
Given: $\angle 1, \angle 3$ supplementary

Prove: $l \parallel m$



Statements	Reasoning
$\angle 1, \angle 3$ supplementary	Given

Finding Angle Measures

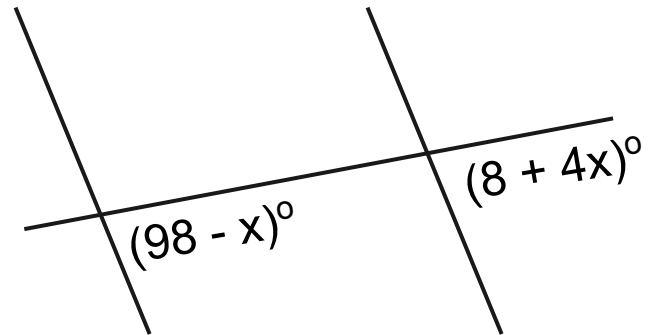


$$17x + 4x - 30 = 180$$

$$21x - 30 = 180$$

$$21x = 210$$

$$x = 10$$



$$98 - x = 8 + 4x$$

$$90 = 5x$$

$$18 = x$$

Homework

Pages 161-162

#29, 40, 41 EC on Quiz