# Practice with Examples

**For use with pages 150–156**

**GOAL** **Prove that two lines are parallel and use properties of parallel lines to solve problems**

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**VOCABULARY**

**Postulate 16** *Corresponding Angles Converse* If two lines are cut by a transversal so that corresponding angles are congruent, then the lines are parallel.

**Theorem 3.8** *Alternate Interior Angles Converse* If two lines are cut by a transversal so that alternate interior angles are congruent, then the lines are parallel.

**Theorem 3.9** *Consecutive Interior Angles Converse* If two lines are cut by a transversal so that consecutive interior angles are supplementary, then the lines are parallel.

**Theorem 3.10** *Alternate Exterior Angles Converse* If two lines are cut by a transversal so that alternate exterior angles are congruent, then the lines are parallel.

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**EXAMPLE 1** *Proving that Two Lines are Parallel*

Prove that lines $j$ and $k$ are parallel.
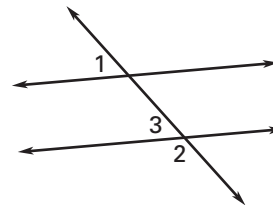


**SOLUTION**

**Given:** $m\angle 1 = 53°$

$\qquad m\angle 2 = 127°$

**Prove:** $j \parallel k$

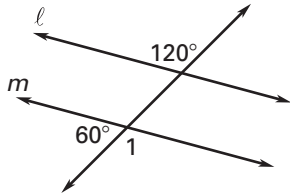| Statements | Reasons |
|---|---|
| **1.** $m\angle 1 = 53°$ | **1.** Given |
| $\quad m\angle 2 = 127°$ | |
| **2.** $m\angle 3 + m\angle 2 = 180°$ | **2.** Linear Pair Postulate |
| **3.** $m\angle 3 + 127° = 180°$ | **3.** Substitute. |
| **4.** $m\angle 3 = 53°$ | **4.** Subtract. |
| **5.** $\angle 3 \cong \angle 1$ | **5.** Substitute. |
| **6.** $j \parallel k$ | **6.** Corresponding Angles Converse |

NAME _____ DATE _____

# *Practice with Examples*

**For use with pages 150–156**

## *Exercises for Example 1*

**Prove the statement from the given information.**
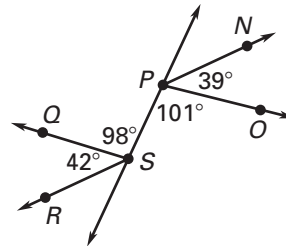
**1.** Prove: $\ell \parallel m$

$\ell$

120°

$m$

60°
1

**2.** Prove: $n \parallel o$

135°
2                    $n$

45°
$o$

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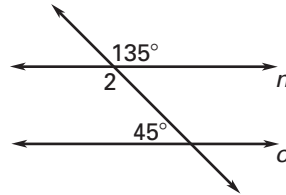
**EXAMPLE 2** *Identifying Parallel Lines*

Determine which rays are parallel.

**a.** Is $\overrightarrow{PN}$ parallel to $\overrightarrow{SR}$?

**b.** Is $\overrightarrow{PO}$ parallel to $\overrightarrow{SQ}$?

N
P    39°
101°
Q         O
98°
42°  S
R

### SOLUTION

**a.** Decide whether $\overrightarrow{PN} \parallel \overrightarrow{SR}$.

$m\angle NPS = 39° + 101°$

$\qquad = 140°$

$m\angle RSP = 42° + 98°$

$\qquad = 140°$

$\angle NPS$ and $\angle RSP$ are congruent alternate interior angles, so $\overrightarrow{PN} \parallel \overrightarrow{SR}$.

**b.** Decide whether $\overrightarrow{PO} \parallel \overrightarrow{SQ}$.

$m\angle OPS = 101°$

$m\angle PSQ = 98°$

$\angle OPS$ and $\angle PSQ$ are alternate interior angles, but they are not

congruent, so $\overrightarrow{PO} \parallel \overrightarrow{SQ}$ are not parallel.

*Chapter 3*

NAME _____ DATE _____

# *Practice with Examples*

**For use with pages 150–156**

## *Exercises for Example 2*

**Find the value of *x* that makes  *a* ∥ *b*.**

**3.**



**4.**



**5.**