3.3 Start Thinking

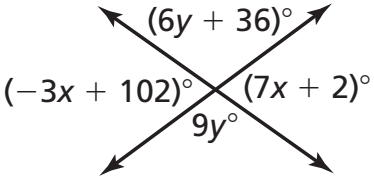
You are designing a new shopping mall. The mall will be surrounded by four walkways. The north and south walkways are parallel, as are the east and west walkways. The southwest and northeast corners are $60°$ angles.

Sketch the mall and its walkways. What are the angles of the other two corners? The mall's walkways are running parallel with streets on all four sides. Add these streets to your sketch. What angles do the centers of the intersecting streets create? Explain your reasoning.

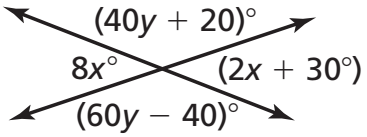
3.3 Warm Up

Find the values of *x* and *y*.

1.



2.



3.3 Cumulative Review Warm Up

Use the property to copy and complete the statement.

1. Symmetric Property of Equality:
If $m\angle 1 = m\angle 2$, then _____.

2. Addition Property of Equality:
If $EF = GH$, then $EF + HJ =$ _____.

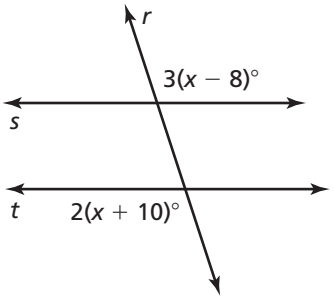
3. Multiplication Property of Equality:
If $EF = GH$, then $4 \bullet EF =$ _____.

Name_____ Date _____

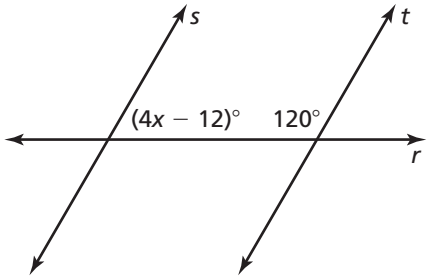
3.3 Practice A

In Exercises 1 and 2, find the value of x that makes $s \parallel t$. Explain your reasoning.

1.

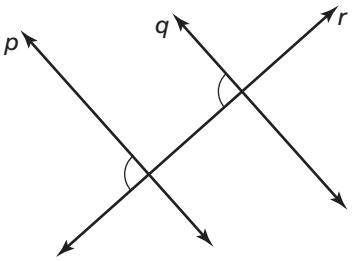


2.

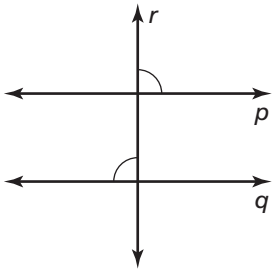


In Exercises 3 and 4, decide whether there is enough information to prove that $p \parallel q$. If so, state the theorem you would use.

3.

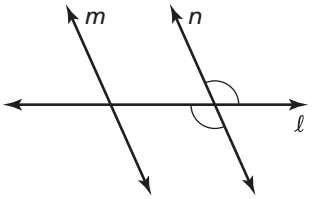


4.



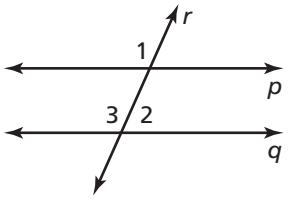
5. Describe and correct the error in the reasoning.

Conclusion: $m \parallel n$

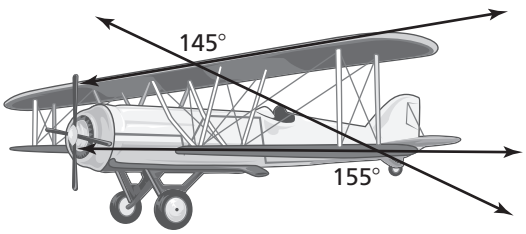


6. **Given:** $\angle 1$ and $\angle 2$ are supplementary

Prove: $p \parallel q$



7. The angles formed between the braces and the wings of a biplane are shown in the figure. Are the top and bottom wings of a biplane parallel? Explain your reasoning.

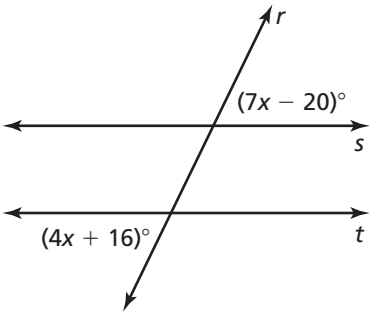


Name _____ Date _____

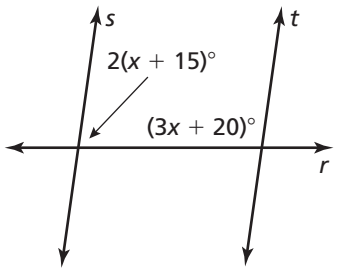
3.3 Practice B

In Exercises 1 and 2, find the value of x that makes $s \parallel t$. Explain your reasoning.

1.

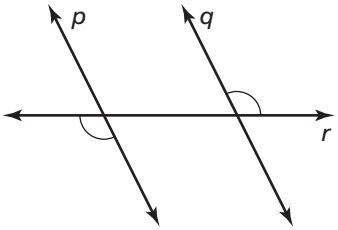


2.

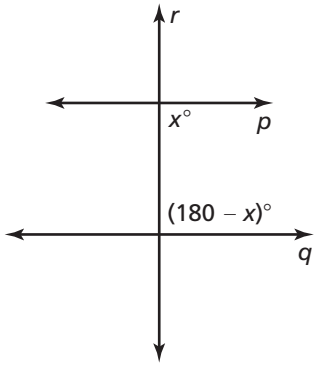


In Exercises 3 and 4, decide whether there is enough information to prove that $p \parallel q$. If so, state the theorem you would use.

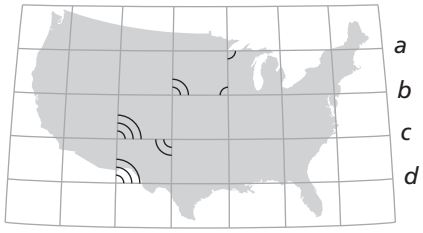
3.



4.



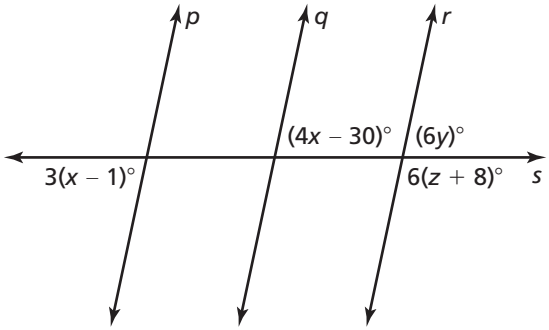
5. The map of the United States shows the lines of latitude and longitude. The lines of latitude run horizontally and the lines of longitude run vertically.



a. Are the lines of latitude parallel? Explain.

b. Are the lines of longitude parallel? Explain.

6. Use the diagram to answer the following.

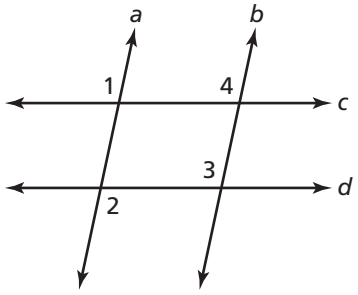


a. Find the values of x, y, and z that makes $p \parallel q$ and $q \parallel r$. Explain your reasoning.

b. Is $p \parallel r$? Explain your reasoning.

7. **Given:** $\angle 1 \cong \angle 2$ and $\angle 2 \cong \angle 3$

Prove: $\angle 1 \cong \angle 4$

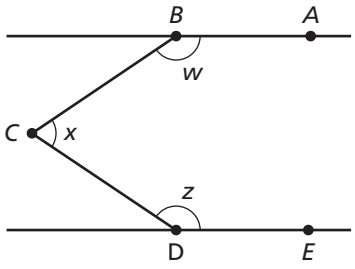


Name_____ Date _____

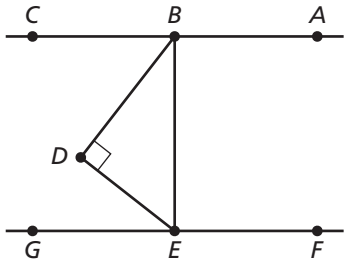
3.3 Enrichment and Extension

Proofs with Parallel Lines

1. $\overline{AB}$ is parallel to $\overline{DE}$, $m\angle w = 135°$, and $m\angle z = 147°$. Find $m\angle BCD$.



2. $\overline{AC}$ is parallel to $\overline{FG}$. $\overline{BD}$ is the bisector of $\angle CBE$ and $\overline{DE}$ is the bisector of $\angle BEG$. Write a two-column proof that shows $m\angle BDE = 90°$.



3. Point R is not in plane ABC.

a. How many lines through R are perpendicular to plane ABC?

b. How many lines through R are parallel to plane ABC?

c. How many planes through R are parallel to plane ABC?

4. In the diagram to the right, $e \parallel d$, $g \parallel f$, and $a \parallel b \parallel c$. Find the following.

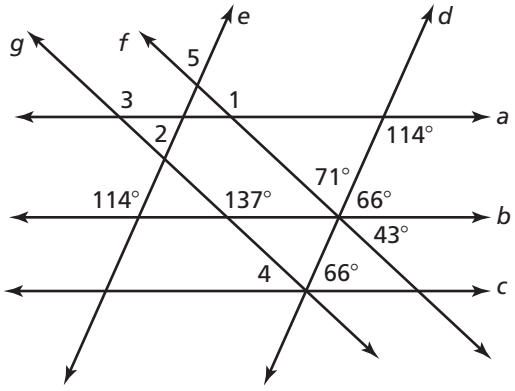
a. $m\angle 1$

b. $m\angle 2$

c. $m\angle 3$

d. $m\angle 4$

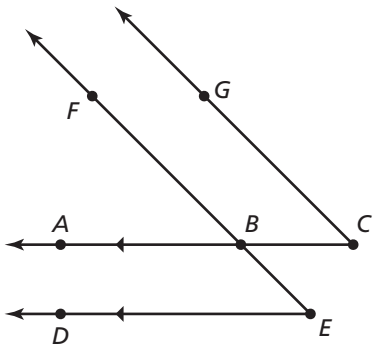
e. $m\angle 5$



5. Write a two-column proof.

Given: $\overrightarrow{CA} \parallel \overrightarrow{ED}$, $m\angle FED = m\angle GCA = 45°$

Prove: $\overrightarrow{EF} \parallel \overrightarrow{CG}$



Name _____ Date _____

3.3 Puzzle Time

Why Did The Boy Throw His Clock Out The Window?

A	B	C	D	E	F
G					

Complete each exercise. Find the answer in the answer column. Write the word under the answer in the box containing the exercise letter.

11 TO	7 FLY
13 PLANE	3 TIME
77 BREAK	30 WANTED
6 SEE	1 TAKE
4 AN	2 FOREVER
5 BIRD	10 BECAUSE
70 THE	$34\frac{1}{2}$ SOUND
12 HE	9 HOLD

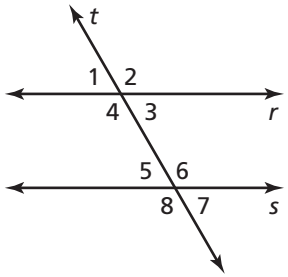
Using the diagram, find the value of *x* that makes *r* parallel to *s*.

A. $m\angle 1 = 30°$ and $m\angle 7 = (2x + 10)°$

B. $m\angle 4 = 135°$ and $m\angle 5 = (4x - 3)°$

C. $m\angle 2 = 124°$ and $m\angle 6 = (4x + 4)°$

D. $m\angle 3 = 24°$ and $m\angle 5 = (2x + 2)°$



Use the diagram to complete the proof. Use the chart to identify the reasons.

Given: $\angle 2 \cong \angle 8$ **Prove:** $r \parallel s$

STATEMENTS	REASONS
$\angle 2 \cong \angle 8$	Given
$\angle 4 \cong \angle 2$	**E.**
$\angle 4 \cong \angle 8$	**F.**
$r \parallel s$	**G.**

1. Consecutive Interior Angles Converse (Theorem 3.8)
2. Alternate Interior Angles Converse (Theorem 3.6)
3. Transitive Property of Congruence
4. Transitive Property of Parallel Lines (Theorem 3.9)
5. Alternate Exterior Angles Converse (Theorem 3.7)
6. Vertical Angles Congruence Theorem (Theorem 2.6)
7. Corresponding Angles Converse (Theorem 3.5)