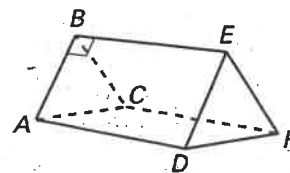


Exercises for Example 1

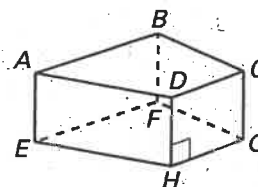
Think of each segment in the diagram as part of a line.
Fill in the blank with *parallel*, *skew*, or *perpendicular*.

- \overleftrightarrow{DE} and \overleftrightarrow{CF} are _____.
- \overleftrightarrow{AD} , \overleftrightarrow{BE} , and \overleftrightarrow{CF} are _____.
- Plane ABC and plane DEF are _____.
- \overleftrightarrow{BE} and \overleftrightarrow{AB} are _____.



Think of each segment in the diagram as part of a line.
There may be more than one right answer.

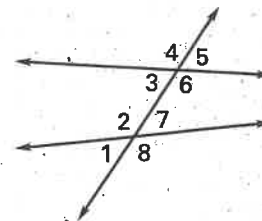
- Name a line perpendicular to \overleftrightarrow{HD} .
- Name a plane parallel to DCH .
- Name a line parallel to \overleftrightarrow{BC} .
- Name a line skew to \overleftrightarrow{FG} .



EXAMPLE 2 *Identifying Angle Relationships*

List all pairs of angles that fit the description.

- corresponding
- alternate exterior
- alternate interior
- consecutive interior



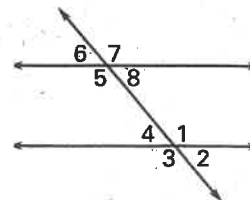
SOLUTION

- | | | | |
|------------------------------|------------------------------|------------------------------|------------------------------|
| a. $\angle 1$ and $\angle 3$ | b. $\angle 1$ and $\angle 5$ | c. $\angle 2$ and $\angle 6$ | d. $\angle 2$ and $\angle 3$ |
| $\angle 2$ and $\angle 4$ | $\angle 8$ and $\angle 4$ | $\angle 7$ and $\angle 3$ | $\angle 7$ and $\angle 6$ |
| $\angle 8$ and $\angle 6$ | | | |
| $\angle 7$ and $\angle 5$ | | | |

Exercises for Example 2

Complete the statement with *corresponding*, *alternate interior*, *alternate exterior*, or *consecutive interior*.

- $\angle 4$ and $\angle 8$ are _____ angles.
- $\angle 2$ and $\angle 6$ are _____ angles.
- $\angle 1$ and $\angle 8$ are _____ angles.
- $\angle 8$ and $\angle 2$ are _____ angles.
- $\angle 4$ and $\angle 5$ are _____ angles.
- $\angle 5$ and $\angle 1$ are _____ angles.

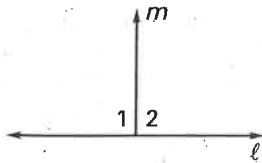


Practice C

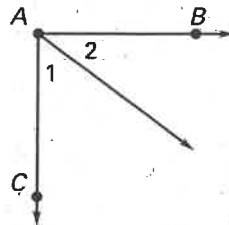
For use with pages 136–141

What can you conclude from the given information?
State the reason for your conclusion.

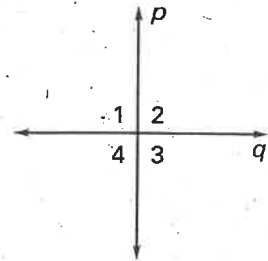
1. $\angle 1 \cong \angle 2$



2. $\vec{AB} \perp \vec{AC}$

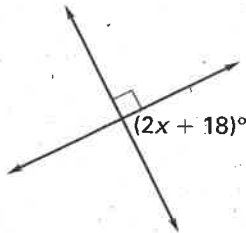


3. $p \perp q$

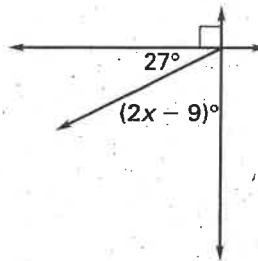


Find the value of x .

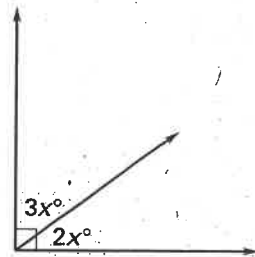
4.



5.



6.

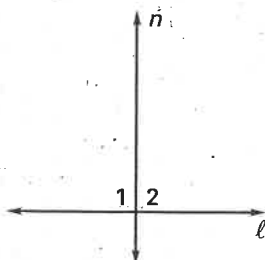


Lesson 3.2

7. Complete the two-column proof of Theorem 3.1.

Given: $\angle 1 \cong \angle 2$; $\angle 1$ and $\angle 2$ are a linear pair

Prove: $\ell \perp n$



Statements

1. $\angle 1 \cong \angle 2$
2. $m\angle 1 = m\angle 2$
3. $\angle 1$ and $\angle 2$ are a linear pair
4. $\angle 1$ and $\angle 2$ are supplementary
5. $m\angle 1 + m\angle 2 = 180^\circ$
6. $m\angle 1 + m\angle 1 = 180^\circ$
7. $2(m\angle 1) = 180^\circ$
8. $m\angle 1 = 90^\circ$
9. $\angle 1$ is a right \angle
10. $\ell \perp n$

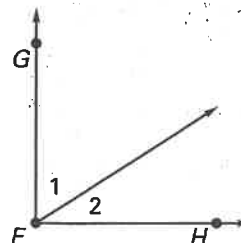
Reasons

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

8. Write a paragraph proof of Theorem 3.2.

Given: $\vec{FG} \perp \vec{FH}$

Prove: $\angle 1$ and $\angle 2$ are complementary

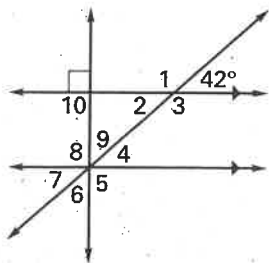


Practice C

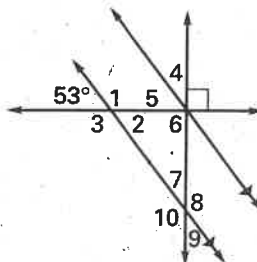
For use with pages 143-149

Find the measure of all labeled angles in the diagram.

1.

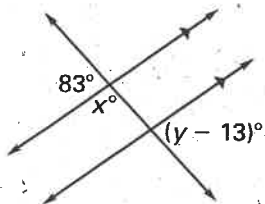


2.

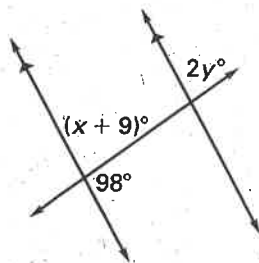


Find the value of x and y .

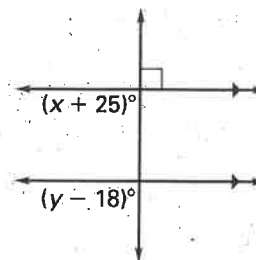
3.



4.

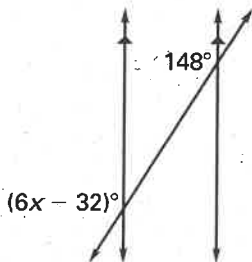


5.

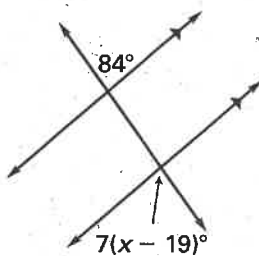


Find the value of x .

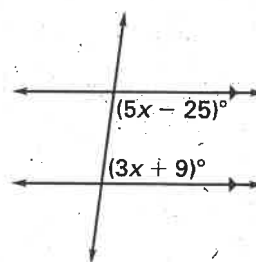
6.



7.



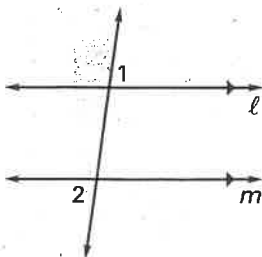
8.



9. Write a proof of the Alternate Exterior Angles Theorem.

Given: $\ell \parallel m$

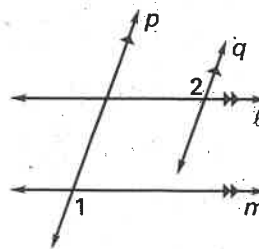
Prove: $\angle 1 \cong \angle 2$



10. Write a proof.

Given: $\ell \parallel m, p \parallel q$

Prove: $\angle 1 \cong \angle 2$

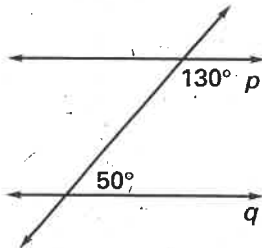


Practice A

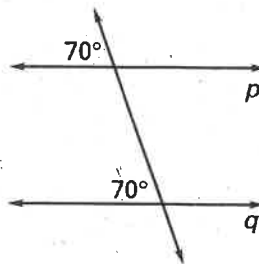
For use with pages 150–156

Is it possible to prove that lines p and q are parallel? If so, explain how.

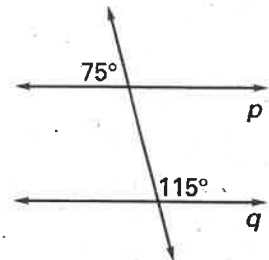
1.



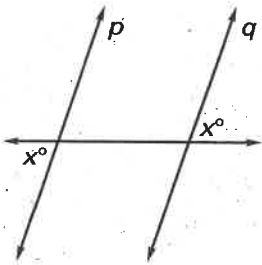
2.



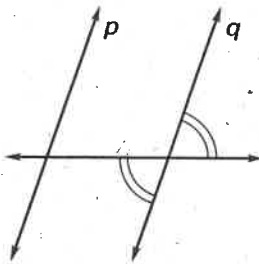
3.



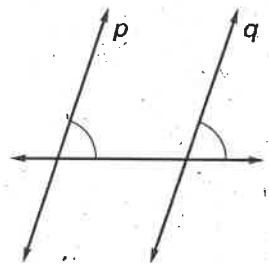
4.



5.

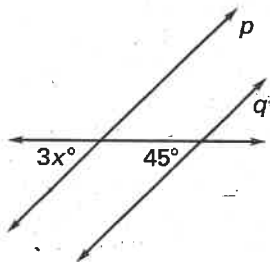


6.

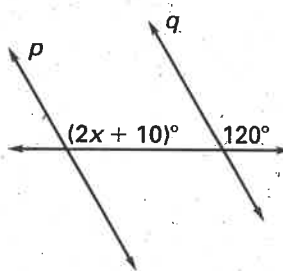


Find the value of x that makes $p \parallel q$.

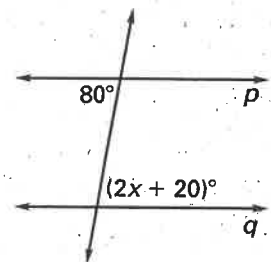
7.



8.



9.



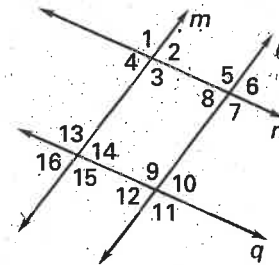
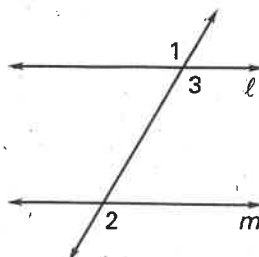
Use the diagram and the given information to determine which lines are parallel.

10. $\angle 13 \cong \angle 11$
11. $\angle 4 \cong \angle 8$
12. $\angle 16 \cong \angle 2$
13. $\angle 7 \cong \angle 9$

14. Complete the two-column proof of the Alternate Exterior Angles Converse Theorem.

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

Prove: $\ell \parallel m$



Statements

Reasons

1. $\angle 1 \cong \angle 2$
2. $\angle 1 \cong \angle 3$
3. $\angle 2 \cong \angle 3$
4. $\ell \parallel m$

1. _____
2. _____
3. _____
4. _____

3.1

Reteaching with Practice

1. skew 2. parallel 3. parallel
4. perpendicular 5. $\overleftrightarrow{AD}, \overleftrightarrow{EH}, \overleftrightarrow{DC}, \overleftrightarrow{HG}$
6. \overleftrightarrow{ABE} 7. \overleftrightarrow{FG} 8. $\overleftrightarrow{AE}, \overleftrightarrow{DH}, \overleftrightarrow{AD}, \overleftrightarrow{AB}, \overleftrightarrow{DC}$
9. alternate interior 10. alternate exterior
11. consecutive interior 12. corresponding
13. consecutive interior 14. alternate interior

3.2

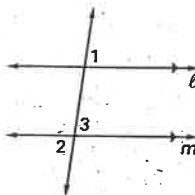
Practice C

1. $\ell \perp m$; Theorem 3.1 2. $\angle 1$ and $\angle 2$ are complementary angles; Theorem 3.2 3. $\angle 1, \angle 2, \angle 3$, and $\angle 4$ are right angles; Theorem 3.3 4. 36
5. 36 6. 18 7. 1. given 2. definition of congruent angles 3. given 4. Linear Pair Postulate 5. definition of supplementary
6. Substitution Property of Equality
7. Distributive Property 8. Division Property of Equality 9. definition of right angle 10. definition of perpendicular
8. Because $\overleftrightarrow{FG} \perp \overleftrightarrow{FH}$, $\angle GFH$ is a right angle and $m\angle GFH = 90^\circ$. According to the Angle Addition Postulate, $m\angle 1 + m\angle 2 = m\angle GFH$. So, by the Substitution Property of Equality, $m\angle 1 + m\angle 2 = 90^\circ$. By definition, $\angle 1$ and $\angle 2$ are complementary.

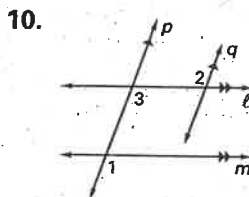
3.3

Practice C

1. $m\angle 1 = 138^\circ, m\angle 2 = 42^\circ, m\angle 3 = 138^\circ, m\angle 4 = 42^\circ, m\angle 5 = 90^\circ, m\angle 6 = 48^\circ, m\angle 7 = 42^\circ, m\angle 8 = 90^\circ, m\angle 9 = 48^\circ, m\angle 10 = 90^\circ$
2. $m\angle 1 = 127^\circ, m\angle 2 = 53^\circ, m\angle 3 = 127^\circ, m\angle 4 = 37^\circ, m\angle 5 = 53^\circ, m\angle 6 = 90^\circ, m\angle 7 = 37^\circ, m\angle 8 = 143^\circ, m\angle 9 = 37^\circ, m\angle 10 = 143^\circ$
3. $x = 97, y = 96$
4. $x = 73, y = 41$ 5. $x = 65, y = 108$
6. 30 7. 31 8. 24.5



Statements	Reasons
1. $\ell \parallel m$	1. Given
2. $\angle 1 \cong \angle 3$	2. Corr. \angle Post.
3. $\angle 3 \cong \angle 2$	3. Vert. \angle Thm.
4. $\angle 1 \cong \angle 2$	4. Transitive Prop. of \cong



Statements	Reasons
1. $\ell \parallel m, p \parallel q$	1. Given
2. $\angle 1 \cong \angle 3$	2. Corr. \angle Post.
3. $\angle 3 \cong \angle 2$	3. Alt. Int. \angle Thm.
4. $\angle 1 \cong \angle 2$	4. Transitive Prop. of \cong

3.4

Practice A

1. yes; Consecutive Interior Angles Converse Theorem 2. yes; Corresponding Angles Converse Postulate 3. yes; *Sample answer:* Linear Pair Postulate and Corresponding Angles Converse Postulate 4. yes; Alternate Exterior Angles Converse Theorem 5. no
6. yes; Corresponding Angles Converse Postulate
7. 15 8. 55 9. 30 10. $m \parallel \ell$ 11. $m \parallel \ell$ 12. $n \parallel q$ 13. $n \parallel q$ 14. 1. given 2. Vertical Angles Theorem 3. Transitive Property of Congruency 4. Corresponding Angles Converse Postulate