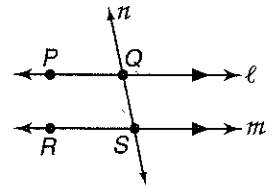


# 3-1 Study Guide and Intervention

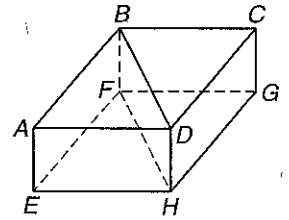
## Parallel Lines and Transversals

**Relationships Between Lines and Planes** When two lines lie in the same plane and do not intersect, they are **parallel**. Lines that do not intersect and are not coplanar are **skew lines**. In the figure,  $\ell$  is parallel to  $m$ , or  $\ell \parallel m$ . You can also write  $\overleftrightarrow{PQ} \parallel \overleftrightarrow{RS}$ . Similarly, if two planes do not intersect, they are **parallel planes**.



### Example

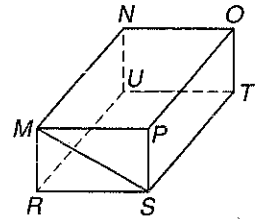
- Name all planes that are parallel to plane  $ABD$ .  
plane  $EFH$
- Name all segments that are parallel to  $\overline{CG}$ .  
 $\overline{BF}$ ,  $\overline{DH}$ , and  $\overline{AE}$
- Name all segments that are skew to  $\overline{EH}$ .  
 $\overline{BF}$ ,  $\overline{CG}$ ,  $\overline{BD}$ ,  $\overline{CD}$ , and  $\overline{AB}$



### Exercises

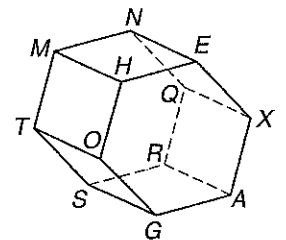
For Exercises 1–3, refer to the figure at the right.

- Name all planes that intersect plane  $OPT$ .
- Name all segments that are parallel to  $\overline{NU}$ .
- Name all segments that intersect  $\overline{MP}$ .



For Exercises 4–7, refer to the figure at the right.

- Name all segments parallel to  $\overline{QX}$ .
- Name all planes that intersect plane  $MHE$ .
- Name all segments parallel to  $\overline{QR}$ .
- Name all segments skew to  $\overline{AG}$ .

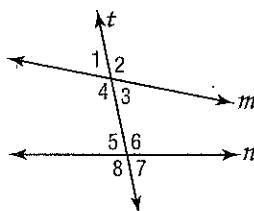


# 3-1 Study Guide and Intervention *(continued)*

## Parallel Lines and Transversals

**Angle Relationships** A line that intersects two or more other lines in a plane is called a **transversal**. In the figure below,  $t$  is a transversal. Two lines and a transversal form eight angles. Some pairs of the angles have special names. The following chart lists the pairs of angles and their names.

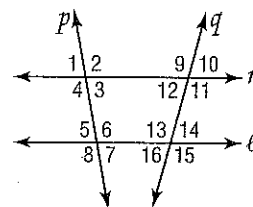
Angle Pairs	Name
$\angle 3, \angle 4, \angle 5,$ and $\angle 6$	interior angles
$\angle 3$ and $\angle 5$ ; $\angle 4$ and $\angle 6$	alternate interior angles
$\angle 3$ and $\angle 6$ ; $\angle 4$ and $\angle 5$	consecutive interior angles
$\angle 1, \angle 2, \angle 7,$ and $\angle 8$	exterior angles
$\angle 1$ and $\angle 7$ ; $\angle 2$ and $\angle 8$	alternate exterior angles
$\angle 1$ and $\angle 5$ ; $\angle 2$ and $\angle 6$ ; $\angle 3$ and $\angle 7$ ; $\angle 4$ and $\angle 8$	corresponding angles



### Example

Identify each pair of angles as *alternate interior*, *alternate exterior*, *corresponding*, or *consecutive interior* angles.

- |   |   |
|---|---|
| a. $\angle 10$ and $\angle 16$<br>alternate exterior angles   | b. $\angle 4$ and $\angle 12$<br>corresponding angles     |
| c. $\angle 12$ and $\angle 13$<br>consecutive interior angles | d. $\angle 3$ and $\angle 9$<br>alternate interior angles |



### Exercises

Use the figure in the Example for Exercises 1-12.

Name the transversal that forms each pair of angles.

- |                               |                               |                              |
|-------------------------------|-------------------------------|------------------------------|
| 1. $\angle 9$ and $\angle 13$ | 2. $\angle 5$ and $\angle 14$ | 3. $\angle 4$ and $\angle 6$ |
|-------------------------------|-------------------------------|------------------------------|

Identify each pair of angles as *alternate interior*, *alternate exterior*, *corresponding*, or *consecutive interior* angles.

- |                                |                                 |                                 |
|--------------------------------|---------------------------------|---------------------------------|
| 4. $\angle 1$ and $\angle 5$   | 5. $\angle 6$ and $\angle 14$   | 6. $\angle 2$ and $\angle 8$    |
| 7. $\angle 3$ and $\angle 11$  | 8. $\angle 12$ and $\angle 3$   | 9. $\angle 4$ and $\angle 6$    |
| 10. $\angle 6$ and $\angle 16$ | 11. $\angle 11$ and $\angle 14$ | 12. $\angle 10$ and $\angle 16$ |

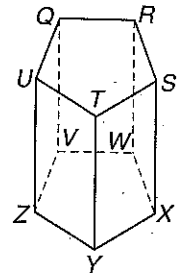
## 3-1

## Practice

## Parallel Lines and Transversals

For Exercises 1–4, refer to the figure at the right.

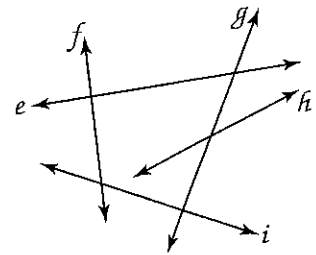
1. Name all planes that intersect plane  $STX$ .
2. Name all segments that intersect  $\overline{QU}$ .
3. Name all segments that are parallel to  $\overline{XY}$ .
4. Name all segments that are skew to  $\overline{VW}$ .



Identify the sets of lines to which each given line is a transversal.

5.  $e$

6.  $h$



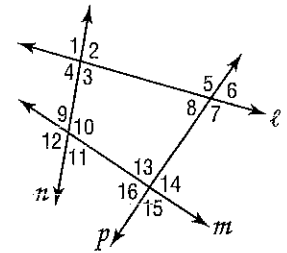
Identify each pair of angles as *alternate interior*, *alternate exterior*, *corresponding*, or *consecutive interior* angles.

7.  $\angle 9$  and  $\angle 13$

8.  $\angle 6$  and  $\angle 16$

9.  $\angle 3$  and  $\angle 10$

10.  $\angle 8$  and  $\angle 14$



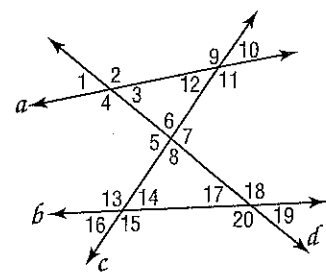
Name the transversal that forms each pair of angles. Then identify the special name for the angle pair.

11.  $\angle 2$  and  $\angle 12$

12.  $\angle 6$  and  $\angle 18$

13.  $\angle 13$  and  $\angle 19$

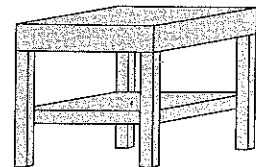
14.  $\angle 11$  and  $\angle 7$



**FURNITURE** For Exercises 15–16, refer to the drawing of the end table.

15. Find an example of parallel planes.

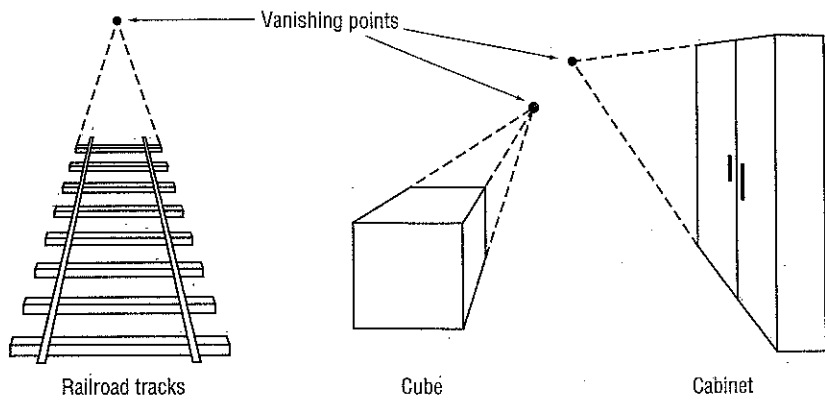
16. Find an example of parallel lines.



# 3-1 Enrichment

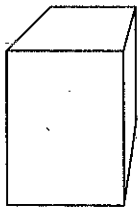
## Perspective Drawings

To draw three-dimensional objects, artists make **perspective drawings** such as the ones shown. To indicate depth in a perspective drawing, some parallel lines are drawn as converging lines. The dotted lines in the figures below each extend to a **vanishing point**, or spot where parallel lines appear to meet.

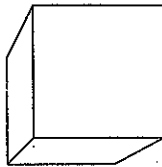


Draw lines to locate the vanishing point in each drawing of a box.

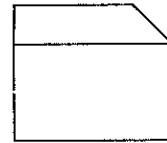
1.



2.

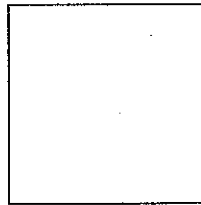
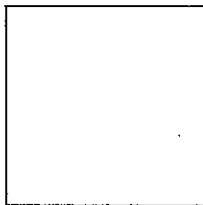


3.



4. The fronts of two cubes are shown below. Using point *P* as the vanishing point for both cubes, complete the perspective drawings of the cubes.

*P*



5. Find an example of a perspective drawing in a newspaper or magazine. Trace the drawing and locate a vanishing point.