LT 1.1 **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, ℓ is parallel to m, or $\ell \parallel m$. You can also write
$\overline{PQ} \parallel \overline{RS}$. Similarly, if two planes do not intersect, they are
parallel planes.
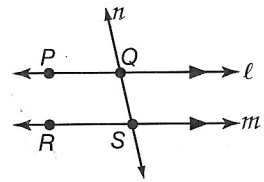
Example Refer to the figure at the right to identify each of the following.
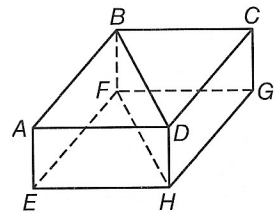
a. **all planes parallel to plane** ABD

   plane EFH

b. **all segments parallel to** $\overline{CG}$

   $\overline{BF}$, $\overline{DH}$, and $\overline{AE}$

c. **all segments skew to** $\overline{EH}$

   $\overline{BF}$, $\overline{CG}$, $\overline{BD}$, $\overline{CD}$, and $\overline{AB}$

Exercises

Refer to the figure at the right to identify each of the following.
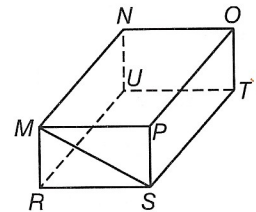
1. all planes that intersect plane OPT

   MNO, MPS, NOT, RST

2. all segments parallel to $\overline{NU}$

   $\overline{OT}$, $\overline{PS}$, $\overline{MR}$

3. all segments that intersect $\overline{MP}$

   $\overline{MR}$, $\overline{MN}$, $\overline{MS}$, $\overline{PS}$, $\overline{PO}$

Refer to the figure at the right to identify each of the following.

4. all segments parallel to $\overline{QX}$

   $\overline{RA}$, $\overline{SG}$, $\overline{TO}$, $\overline{MH}$, $\overline{NE}$
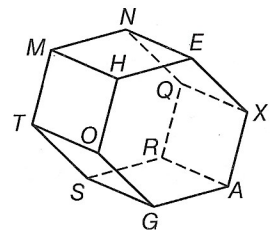
5. all planes that intersect plane MHE

   MHO, NEX, HEX, MNQ, SGO, RAX

6. all segments parallel to $\overline{QR}$

   $\overline{AX}$, $\overline{HO}$, $\overline{MT}$

7. all segments skew to $\overline{AG}$

   $\overline{ST}$, $\overline{TM}$, $\overline{NQ}$, $\overline{QR}$, $\overline{TO}$, $\overline{MH}$, $\overline{NE}$, $\overline{QX}$

LT 1.1 ## Study Guide and Intervention *(continued)*

Parallel Lines and Transversals

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

Notes PG. 7

| Angle Pairs	Name
∠3, ∠4, ∠5, and ∠6	interior angles
∠3 and ∠5; ∠4 and ∠6	alternate interior angles
∠3 and ∠6; ∠4 and ∠5	consecutive interior angles
∠1, ∠2, ∠7, and ∠8	exterior angles
∠1 and ∠7; ∠2 and ∠8;	alternate exterior angles
∠1 and ∠5; ∠2 and ∠6; ∠3 and ∠7; ∠4 and ∠8	corresponding angles
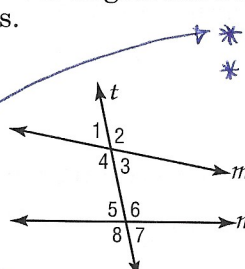
* on opposite sides of the transversal
* inside of the parallel lines

* on opposite sides of the transversal
* outside of parallel lines

Example Classify the relationship between each pair of angles as *alternate interior, alternate exterior, corresponding,* or *consecutive interior* angles. *Justify*
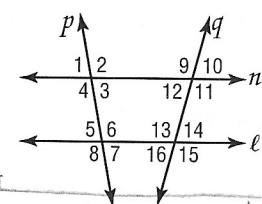
a. ∠10 and ∠16   *Refer to example above*
alternate exterior angles

b. ∠4 and ∠12
corresponding angles
* one + interior, one exterior
* same side of transversal

c. ∠12 and ∠13
consecutive interior angles
* Both interior
* Same side of transversal

d. ∠3 and ∠9
alternate interior angles
* Refer to example above

Exercises

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

Identify the transversal connecting each pair of angles. (Name it)

1. ∠9 and ∠13 **q**

2. ∠5 and ∠14 **ℓ**

3. ∠4 and ∠6 **p**

Classify the relationship between each pair of angles as *alternate interior, alternate exterior, corresponding,* or *consecutive interior* angles. *Justify.* → Refer to examples above for all

4. ∠1 and ∠5
corresponding

5. ∠6 and ∠14
corresponding

6. ∠2 and ∠8
alt. exterior

7. ∠3 and ∠11
corresponding

8. ∠12 and ∠3
consecutive interior

9. ∠4 and ∠6
alt. interior

10. ∠6 and ∠16
alt. interior

11. ∠11 and ∠14
consecutive interior

12. ∠10 and ∠16
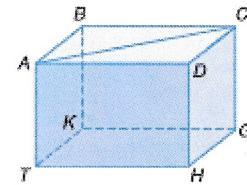alt. exterior

Real-World Example 1: Identify Parallel and Skew Relationships
Identify each of the following using the building block.
a. all planes that are parallel to plane ABC

plane TKG

b. all segments that are skew to $\overline{TK}$

$\overline{CG}$, $\overline{DH}$, $\overline{AD}$, $\overline{AC}$, and $\overline{BC}$

c. all segments that are parallel to $\overline{KG}$

$\overline{BC}$, $\overline{AD}$, and $\overline{TH}$

Example 2: Classify Angle Pair Relationships
Refer to the figure below. Classify the relationship between each pair of angles as *alternate interior*, *alternate exterior*, *corresponding*, or *consecutive interior* angles. Justify your answers.

a. ∠4 and ∠5	b. ∠5 and ∠2
alternate interior	Corresponding
* opposite side of transversal	* one interior, one exterior
* Both inside two lines	* same side of transversal
c. ∠3 and ∠5	d. ∠2 and ∠7
consecutive interior	alternate exterior
* Both inside two lines	* opposite sides of transversal
* on same side of transversal	* Both outside two lines
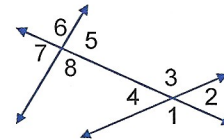
Example 3: Identify Transversals and Classify Angle Pairs
Texas is the leading producer of livestock in the United States. A diagram of a feedlot on a farm is shown below. Identify the transversal connecting each pair of angles in the photo. Then classify the relationship between each pair of angles. Justify your answers.

a. ∠1 and ∠5

The transversal connecting ∠1 and ∠5 is line u.
These are corresponding angles.
* * } Refer to Example 2b

b. ∠4 and ∠8

The transversal connecting ∠1 and ∠3 is line m.
These are alternate exterior angles.
* * } Refer to Example 2d

∠3 and ∠5

The transversal connecting ∠3 and ∠5 is line ℓ.
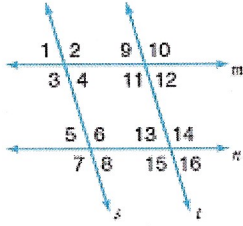These are consecutive interior angles.

* * } Refer to example 3c
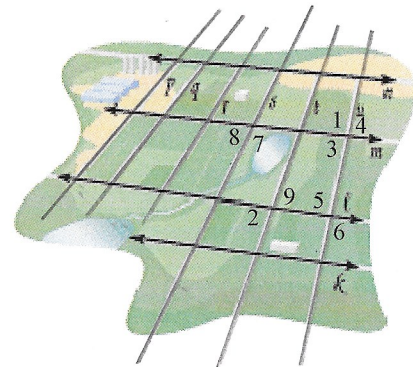
Self-Check Quizzes

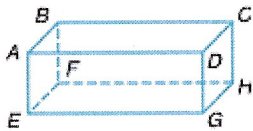## LT 1.1: Parallel Lines and Transversals

1. Refer to the figure below. Which statement is false?

   a) *m* is a transversal for *s* and *t*.

   b) ∠7 and ∠14 are alternate exterior angles.

   c) ∠4 and ∠9 are corresponding angles.

   d) ∠3 and ∠6 are alternate interior angles.
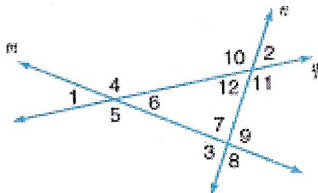
   ∠4 & ∠9 are alternate Interior angles
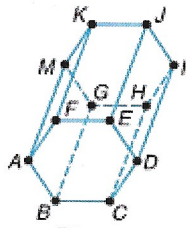
2. Name the plane parallel to plane *AEF*.

   a) plane *CHF*

   b) plane *DBA*

   c) plane *DGH*

   d) plane *EFH*

3. Name a pair of corresponding angles.

   a) ∠4 and ∠7

   b) ∠9 and ∠12

   c) ∠2 and ∠3

   d) ∠1 and ∠6

4. How many segments intersect $\overline{AM}$?

a) 4

b) 3

c) 6

d) 5

5. Which of the following best describes the front and back covers of a notebook when closed?

a) skew planes

b) intersecting planes

c) parallel planes

d) a single plane