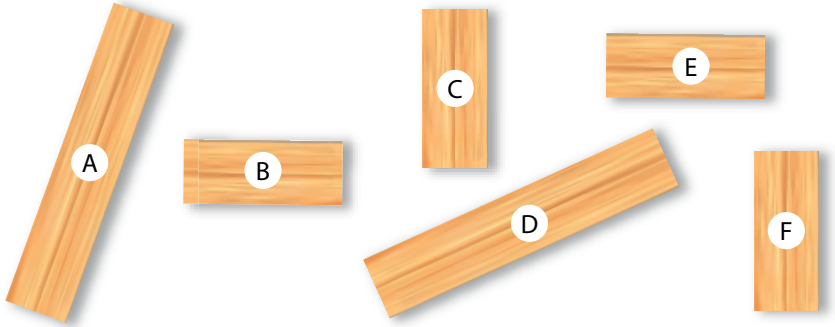
Name _____

3-8 Lines and Angles GEO

OBJECTIVE: **I can identify relationships between figures in space to identify angles formed by two lines and a transversal**

Warm-Up

You want to assemble a bookcase. You have all the pieces, but you misplaced the instructions that came with the box. How would you write the instructions?

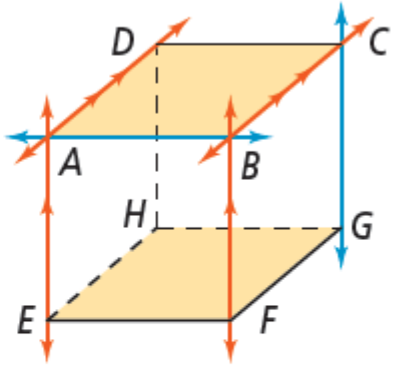


Essential Understanding

Essential Understanding Not all lines and not all planes intersect.

Concept Understanding

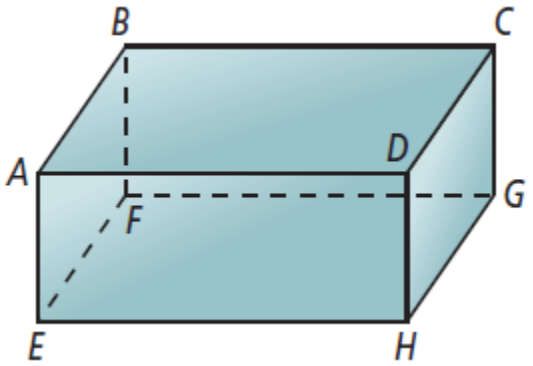
Key Concept:

Definition	Symbols	Diagram
Parallel lines are coplanar lines that do not intersect. The symbol ∥ means "is parallel to."	$\overleftrightarrow{AE} \parallel \overleftrightarrow{BF}$ $\overleftrightarrow{AD} \parallel \overleftrightarrow{BC}$	 Use arrows to show $\overleftrightarrow{AE} \parallel \overleftrightarrow{BF}$ and $\overleftrightarrow{AD} \parallel \overleftrightarrow{BC}$.
Skew lines are noncoplanar; they are not parallel and do not intersect.	$\overleftrightarrow{AB}$ and $\overleftrightarrow{CG}$ are skew.	
Parallel planes are planes that do not intersect.	plane $ABCD \parallel$ plane $EFGH$	

Example #1 Identifying Nonintersecting Lines and Planes

A line and a plane that do not intersect are parallel. Segments and rays can also be parallel or skew. They are parallel if they lie in parallel lines and skew if they lie in skew lines.

In the figure, assume that lines and planes that appear to be parallel are parallel.



A Which segments are parallel to $\overline{AB}$?

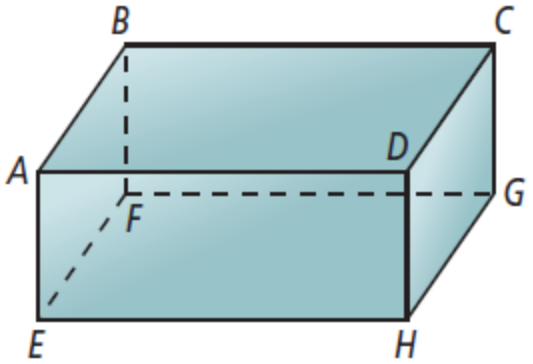
B Which segments are skew to $\overline{CD}$?

C What are two pairs of parallel planes?

D What are two segments parallel to plane BCGF?

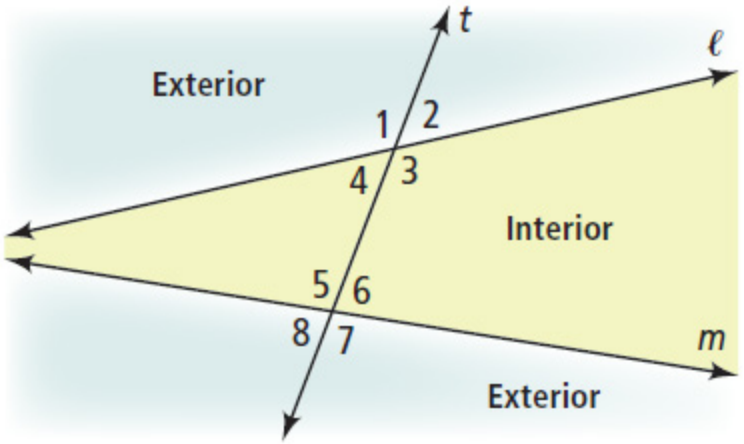
Your Turn to Work it Out

Which segments are parallel to $\overline{AB}$?



Concept Understanding

A **transversal** is a line that intersects two or more coplanar lines at distinct points. The diagram below shows the eight angles formed by a transversal t and two lines ℓ and m.



Notice that angles 3, 4, 5, and 6 lie between ℓ and m. They are interior angles. Angles 1, 2, 7, and 8 lie outside of ℓ and m. They are exterior angles.

Concept Understanding

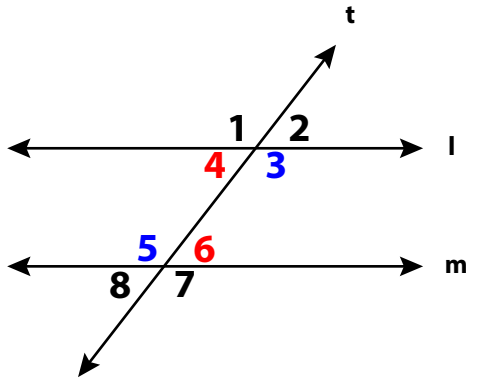
Key Concept: Angle Pairs Formed by Transversals

Definition

Alternate interior angles are nonadjacent interior angles that lie on opposite sides of the transversal.

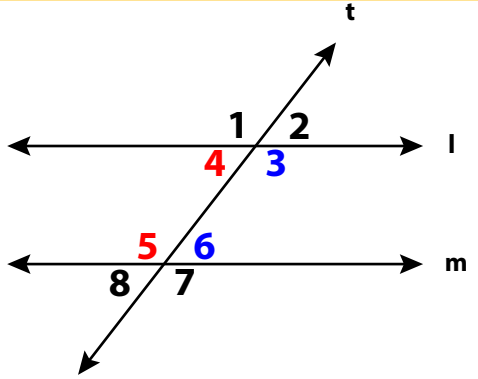
Example

∠4 and ∠6
∠3 and ∠5



Same-side interior angles are interior angles that lie on the same side of the transversal.

∠4 and ∠5
∠3 and ∠6

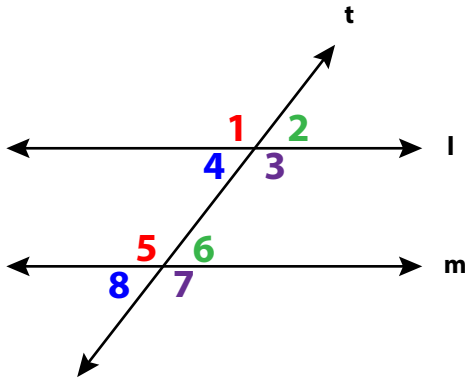


Concept Understanding

Key Concept: Angle Pairs Formed by Transversals

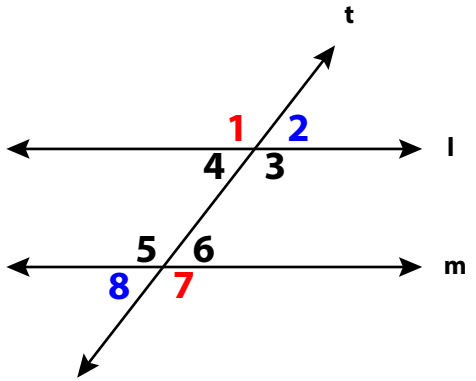
Corresponding angles lie on the same side of the transversal *t* and in corresponding positions.

∠1 and ∠5
∠4 and ∠8
∠2 and ∠6
∠3 and ∠7



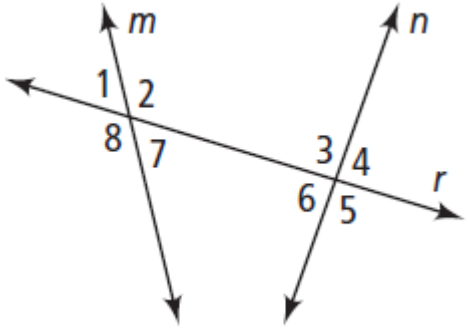
Alternate exterior angles are nonadjacent exterior angles that lie on opposite sides of the transversal.

∠1 and ∠7
∠2 and ∠8



Example #2 Identifying an Angle Pair

Multiple Choice Which is a pair of alternate interior angles?



A ∠1 and ∠3

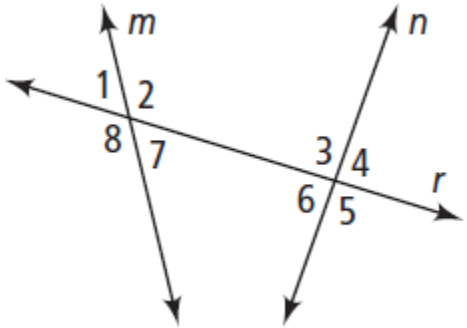
C ∠2 and ∠6

B ∠6 and ∠7

D ∠4 and ∠8

Your Turn to Work it Out

2. What are three pairs of corresponding angles?



Example #3 Classifying Angles

Architecture The photo below shows the Royal Ontario Museum in Toronto, Canada. Are angles 2 and 4 alternate interior angles, same-side interior angles, corresponding angles, or alternate exterior angles?

Your Turn to Work it Out

3. In Example 3, are angles 1 and 3 alternate interior angles, same-side interior angles, corresponding angles, or alternate exterior angles?