Find the value of each variable.

1.

$(4n + 5)°$ $(8n - 5)°$

2.

$(9x - 6)°$

$(8.5x + 2)°$

3.

$4z°$

$(3z + 6)°$
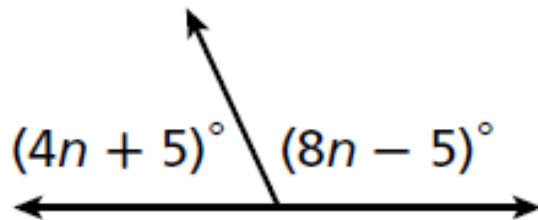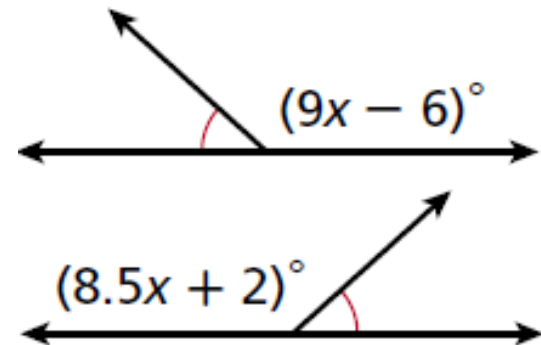
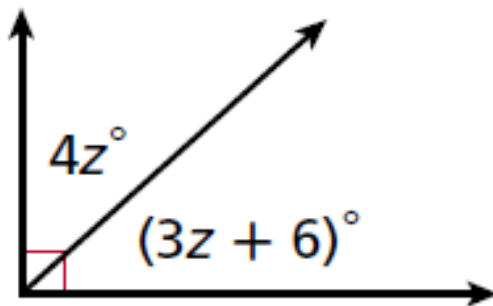# *Objectives*
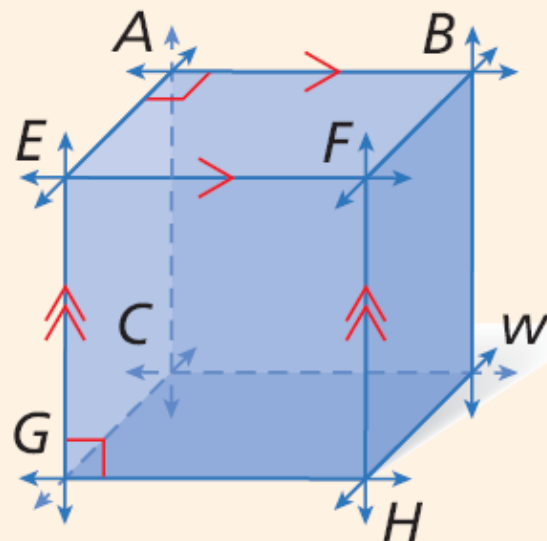
Identify parallel, perpendicular, and skew lines.

Identify the angles formed by two lines and a transversal.

Parallel, Perpendicular, and Skew Lines

Parallel lines (∥) are coplanar and do not intersect. In the figure, $\overleftrightarrow{AB} \parallel \overleftrightarrow{EF}$, and $\overleftrightarrow{EG} \parallel \overleftrightarrow{FH}$.

Arrows are used to show that $\overleftrightarrow{AB} \parallel \overleftrightarrow{EF}$ and $\overleftrightarrow{EG} \parallel \overleftrightarrow{FH}$.

Parallel, Perpendicular, and Skew Lines

Parallel lines (∥) are coplanar and do not intersect. In the figure, $\overleftrightarrow{AB} \parallel \overleftrightarrow{EF}$, and $\overleftrightarrow{EG} \parallel \overleftrightarrow{FH}$.

Perpendicular lines (⊥) intersect at 90° angles. In the figure, $\overleftrightarrow{AB} \perp \overleftrightarrow{AE}$, and $\overleftrightarrow{EG} \perp \overleftrightarrow{GH}$.
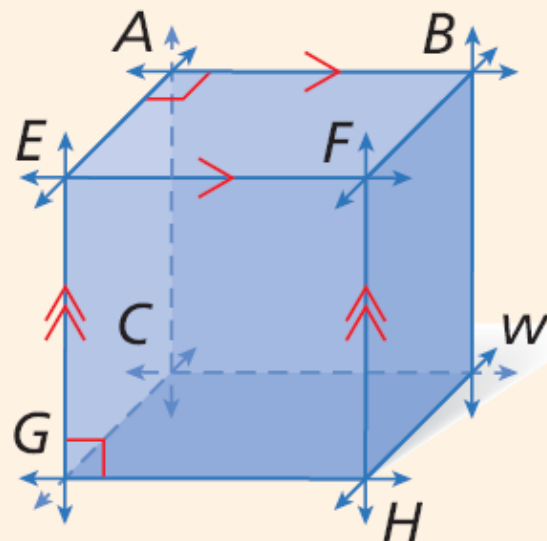
Arrows are used to show that $\overleftrightarrow{AB} \parallel \overleftrightarrow{EF}$ and $\overleftrightarrow{EG} \parallel \overleftrightarrow{FH}$.

Parallel, Perpendicular, and Skew Lines

Parallel lines ($\parallel$) are coplanar and do not intersect. In the figure, $\overleftrightarrow{AB} \parallel \overleftrightarrow{EF}$, and $\overleftrightarrow{EG} \parallel \overleftrightarrow{FH}$.

Perpendicular lines ($\perp$) intersect at 90° angles. In the figure, $\overleftrightarrow{AB} \perp \overleftrightarrow{AE}$, and $\overleftrightarrow{EG} \perp \overleftrightarrow{GH}$.

Skew lines are not coplanar. Skew lines are not parallel and do not intersect. In the figure, $\overleftrightarrow{AB}$ and $\overleftrightarrow{EG}$ are skew.

Arrows are used to show that $\overleftrightarrow{AB} \parallel \overleftrightarrow{EF}$ and $\overleftrightarrow{EG} \parallel \overleftrightarrow{FH}$.
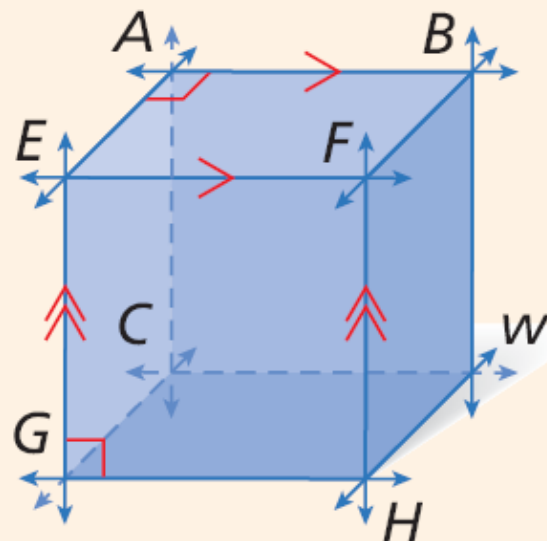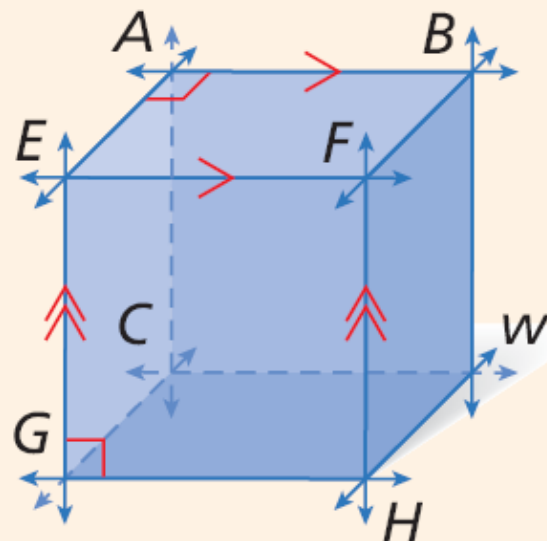
Parallel, Perpendicular, and Skew Lines

Parallel lines (‖) are coplanar and do not intersect. In the figure, $\overleftrightarrow{AB} \parallel \overleftrightarrow{EF}$, and $\overleftrightarrow{EG} \parallel \overleftrightarrow{FH}$.

Perpendicular lines (⊥) intersect at 90° angles. In the figure, $\overleftrightarrow{AB} \perp \overleftrightarrow{AE}$, and $\overleftrightarrow{EG} \perp \overleftrightarrow{GH}$.

Skew lines are not coplanar. Skew lines are not parallel and do not intersect. In the figure, $\overleftrightarrow{AB}$ and $\overleftrightarrow{EG}$ are skew.

Parallel planes are planes that do not intersect. In the figure, plane ABE ‖ plane CDG.

Arrows are used to show that $\overleftrightarrow{AB} \parallel \overleftrightarrow{EF}$ and $\overleftrightarrow{EG} \parallel \overleftrightarrow{FH}$.

Example 1: Identifying Types of Lines and Planes

Identify each of the following.

A. a pair of parallel segments

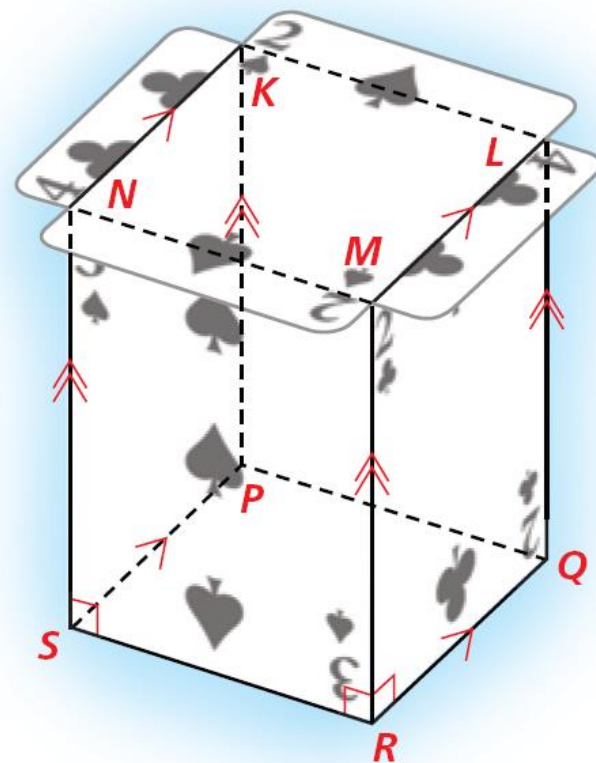$\overline{LM} \parallel \overline{QR}$

B. a pair of skew segments

$\overline{KN}$ and $\overline{PQ}$

C. a pair of perpendicular segmer

$\overline{NS} \perp \overline{SP}$

D. a pair of parallel planes

plane *NMR* || plane *KLQ*

Check It Out! Example 1

Identify each of the following.

a. a pair of parallel segments

$\overline{BF} \parallel \overline{EJ}$
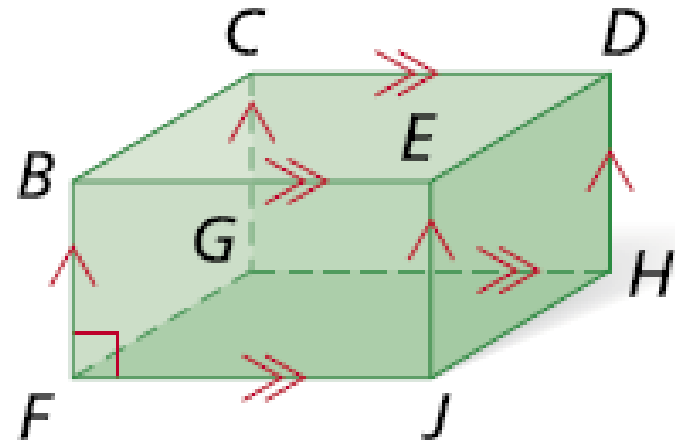
b. a pair of skew segments

$\overline{BF}$ and $\overline{DE}$ are skew.

c. a pair of perpendicular segments

$\overline{BF} \perp \overline{FJ}$
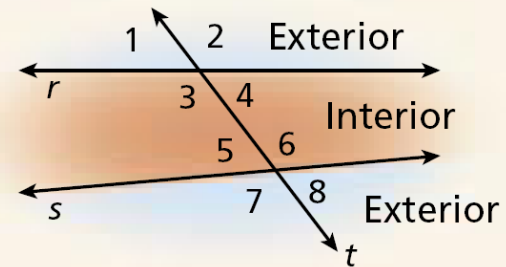
d. a pair of parallel planes

plane *FJH* $\parallel$ plane *BCD*

Angle Pairs Formed by a Transversal

TERM	EXAMPLE
A **transversal** is a line that intersects two coplanar lines at two different points. The transversal t and the other two lines r and s form eight angles.	

Angle Pairs Formed by a Transversal

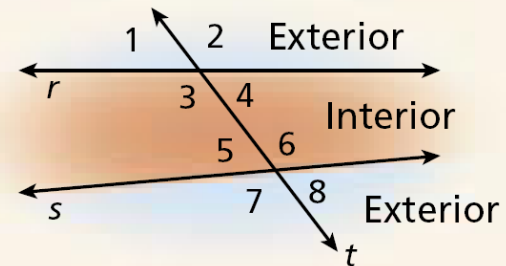| TERM	EXAMPLE
A **transversal** is a line that intersects two coplanar lines at two different points. The transversal *t* and the other two lines *r* and *s* form eight angles.	
Corresponding angles lie on the same side of the transversal *t*, on the same sides of lines *r* and *s*.	∠1 and ∠5

Angle Pairs Formed by a Transversal

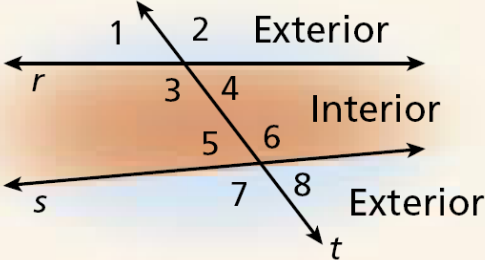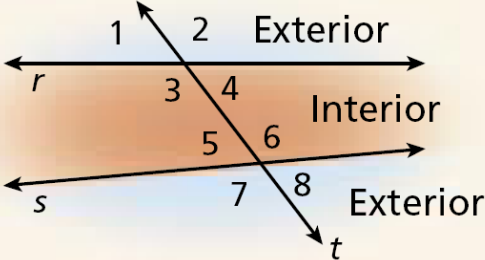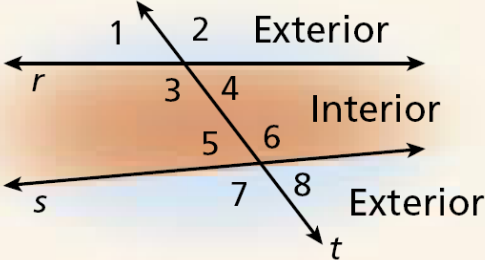| TERM	EXAMPLE
A **transversal** is a line that intersects two coplanar lines at two different points. The transversal *t* and the other two lines *r* and *s* form eight angles.	
Corresponding angles lie on the same side of the transversal *t*, on the same sides of lines *r* and *s*.	$\angle 1$ and $\angle 5$
Alternate interior angles are nonadjacent angles that lie on opposite sides of the transversal *t*, between lines *r* and *s*.	$\angle 3$ and $\angle 6$

Angle Pairs Formed by a Transversal

TERM	EXAMPLE
A **transversal** is a line that intersects two coplanar lines at two different points. The transversal *t* and the other two lines *r* and *s* form eight angles.	
Corresponding angles lie on the same side of the transversal *t*, on the same sides of lines *r* and *s*.	∠1 and ∠5
Alternate interior angles are nonadjacent angles that lie on opposite sides of the transversal *t*, between lines *r* and *s*.	∠3 and ∠6
Alternate exterior angles lie on opposite sides of the transversal *t*, outside lines *r* and *s*.	∠1 and ∠8

Angle Pairs Formed by a Transversal

TERM	EXAMPLE
A **transversal** is a line that intersects two coplanar lines at two different points. The transversal *t* and the other two lines *r* and *s* form eight angles.	
Corresponding angles lie on the same side of the transversal *t*, on the same sides of lines *r* and *s*.	$\angle$1 and $\angle$5
Alternate interior angles are nonadjacent angles that lie on opposite sides of the transversal *t*, between lines *r* and *s*.	$\angle$3 and $\angle$6
Alternate exterior angles lie on opposite sides of the transversal *t*, outside lines *r* and *s*.	$\angle$1 and $\angle$8
Same-side interior angles or *consecutive interior angles* lie on the same side of the transversal *t*, between lines *r* and *s*.	$\angle$3 and $\angle$5

Example 2: Classifying Pairs of Angles

Give an example of each angle pair.

A. corresponding angles

∠1 and ∠5

B. alternate interior angles

∠3 and ∠5

C. alternate exterior angles

∠1 and ∠7

D. same-side interior angles

∠3 and ∠6
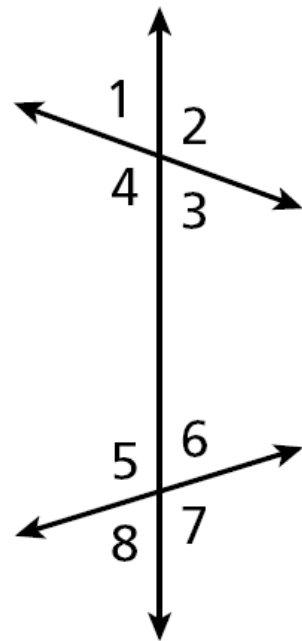
Check It Out! Example 2

Give an example of each angle pair.

A. corresponding angles

∠1 and ∠3

B. alternate interior angles

∠2 and ∠7

C. alternate exterior angles

∠1 and ∠8

D. same-side interior angles

∠2 and ∠3
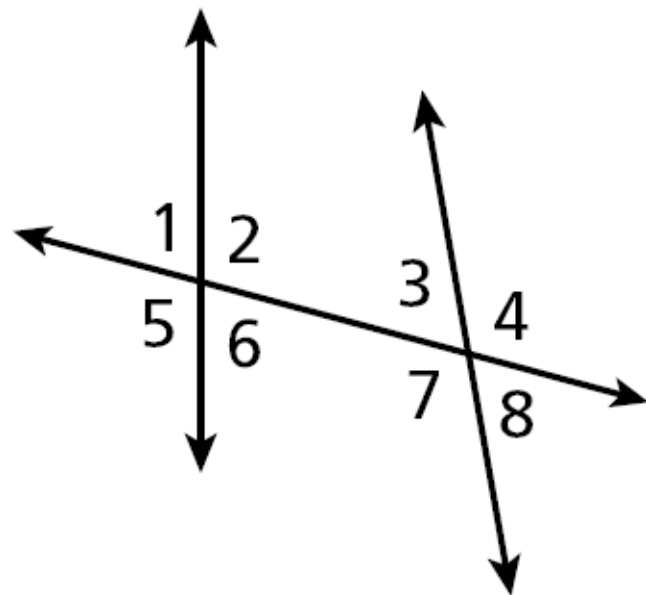
Helpful Hint
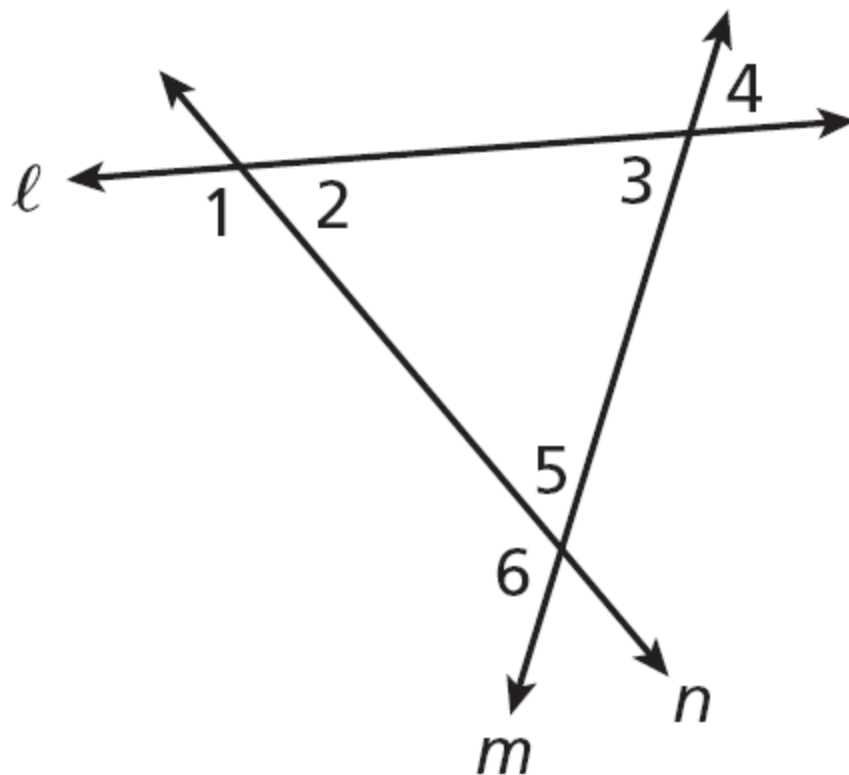
To determine which line is the transversal for a given angle pair, locate the line that connects the vertices.

Example 3: Identifying Angle Pairs and Transversals
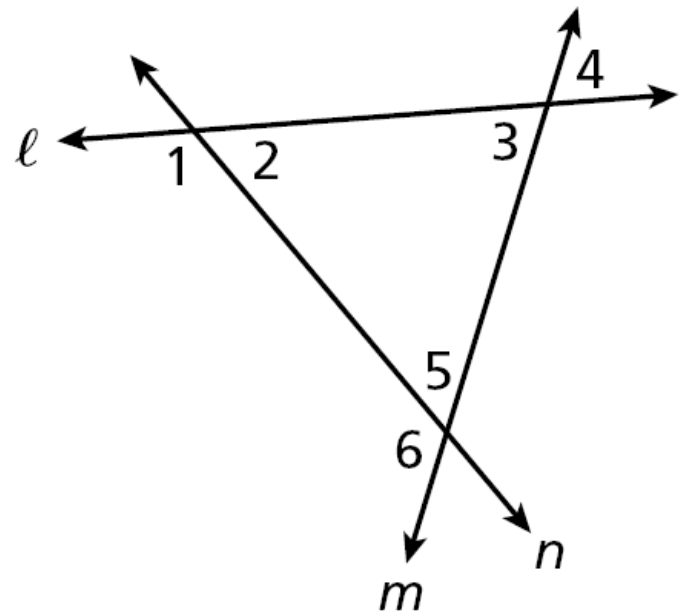
Identify the transversal and classify each angle pair.

A. ∠1 and ∠3
transversal *l*
corr. ∠s

B. ∠2 and ∠6
transversal *n*
alt. int ∠s

C. ∠4 and ∠6
transversal *m*
alt. ext ∠s

Check It Out! Example 3

Identify the transversal and classify the angle pair ∠2 and ∠5 in the diagram.

transversal *n*
same-side int. ∠s.

Lesson Quiz: Part I

Identify each of the following.

1. a pair of parallel segments

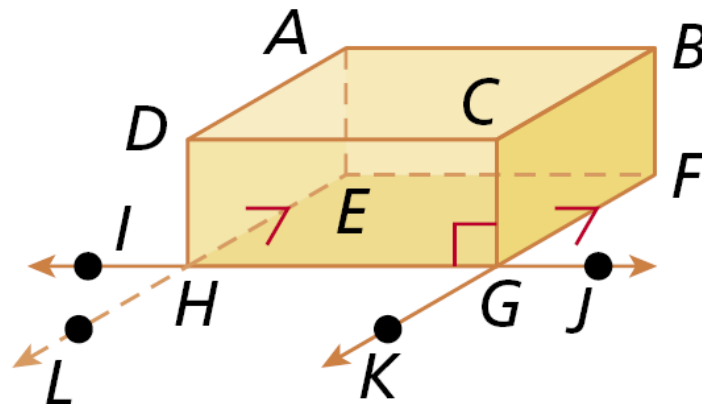$\overline{EH} \parallel \overline{FG}$

2. a pair of skew segments

$\overline{BF}$ and $\overline{EH}$

3. a pair of perpendicular segments

$\overline{CG} \perp \overline{GH}$

4. a pair of parallel planes

ABC and *EFG*

Lesson Quiz: Part II

Identify each of the following.

5. one pair alternate interior angles

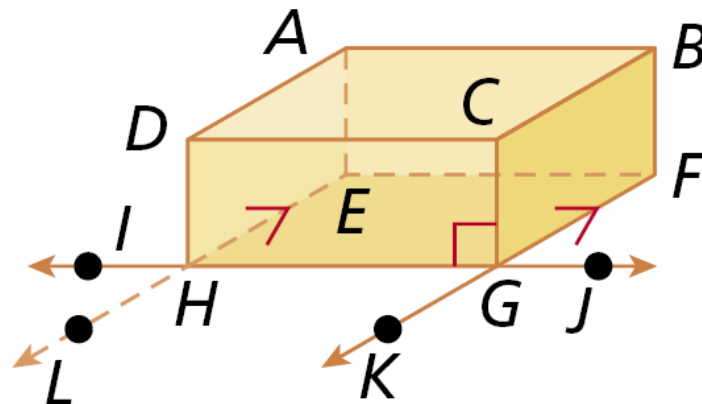∠*EHG* and ∠*HGK*

6. One pair corresponding angles
∠*EHG* and ∠*FGJ*

7. one pair alternate exterior angles

∠*IHE* and ∠*JGK*

8. one pair same-side interior angles

∠*EHG* and ∠*HGF*

Home Work

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