

3.1 Lines and Angles

Learning Targets for today

- ① To be able to describe the relationship between skewed, parallel, and perpendicular lines.
- ① To be able to define and sketch a transversal.
- ① To be able to identify the corresponding angles, alternate interior angles, alternate exterior angles and consecutive interior angles.
- ① To be able to represent a three-dimensional object with two-dimensional figure.

Key Concepts

Parallel Lines – coplanar lines that do not intersect

Ex:

$\overleftrightarrow{AE} / \overleftrightarrow{BF} / \overleftrightarrow{DH} / \overleftrightarrow{CG}$

Skew Lines – noncoplanar lines that are not parallel and do not intersect.

Ex:

$\overleftrightarrow{AB} / \overleftrightarrow{CG}$ $\overleftrightarrow{AB} / \overleftrightarrow{DH}$

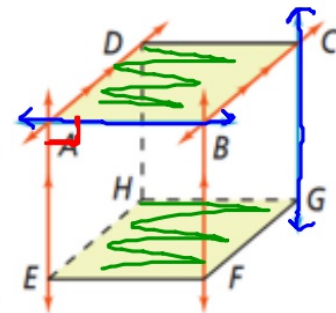
Parallel planes – planes that do not intersect.

Ex:

ABC / EFG

*Perpendicular Lines

Ex: $\overleftrightarrow{AE} \perp \overleftrightarrow{AB}$



Identifying Nonintersecting Lines and Planes

Example for you...

Use the figure to answer the following questions.

1. Name a line(s) that is parallel to line AB.

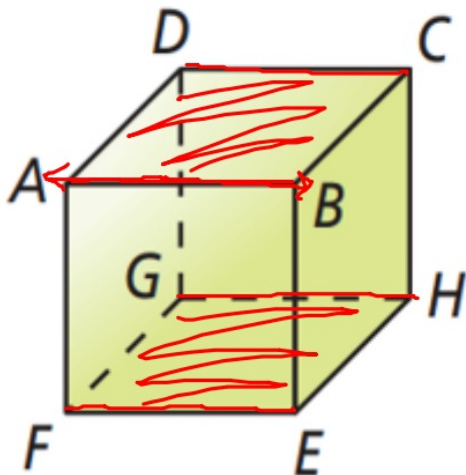
$\overleftrightarrow{DC} / \overleftrightarrow{FE} / \overleftrightarrow{GH}$

2. Name a line(s) that is skew to AB.

$\overleftrightarrow{CH} / \overleftrightarrow{DG} / \overleftrightarrow{HE} / \overleftrightarrow{GF}$

3. Name the plane that is parallel to ABC.

FEH



Your turn to try...

Use the figure to answer the following questions.

1. Name a line that is parallel to line CG.

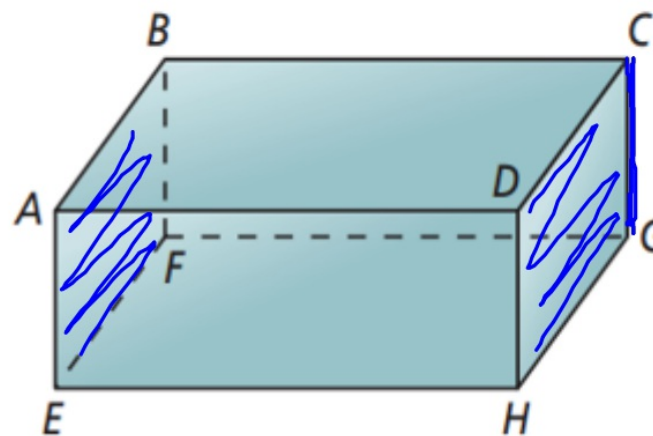
$\overleftrightarrow{DH} / \overleftrightarrow{BF} / \overleftrightarrow{AE}$

2. Name a line that is skew to CG.

$\overleftrightarrow{EF} / \overleftrightarrow{AB} / \overleftrightarrow{AD} / \overleftrightarrow{EH}$

3. Name a plane that is parallel to CGH.

BFE



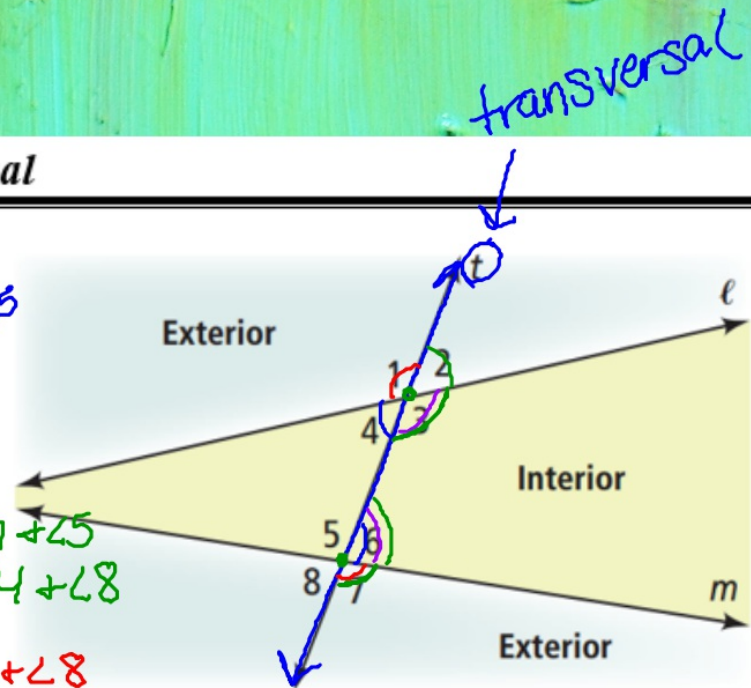
Key Concepts – Angle Pairs Formed by a Transversal

* **Alternate interior angles** are nonadjacent interior angles that lie on opposite sides of the transversal. $\angle 4 + \angle 6$ / $\angle 3 + \angle 5$

* **Same-side interior angles** are interior angles that lie on the same side of the transversal. $\angle 3 + \angle 6$ / $\angle 4 + \angle 5$

* **Corresponding angles** lie on the same side of a transversal t and in corresponding positions. $\angle 3 + \angle 7$ / $\angle 1 + \angle 5$
 $\angle 2 + \angle 6$ / $\angle 4 + \angle 8$

* **Alternate exterior angles** are nonadjacent exterior angles that lie on opposite sides of the transversal. $\angle 1 + \angle 7$ / $\angle 2 + \angle 8$

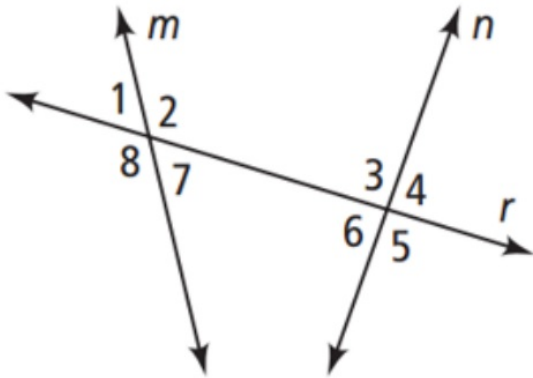


Identifying Angle Pairs

Example for you...

Use the diagram below to name the following angle pairs.

1. Corresponding Angles $\frac{\angle 1 + \angle 3}{\angle 7 + \angle 5} / \frac{\angle 2 + \angle 4}{\angle 8 + \angle 6}$
2. Alternate Interior Angles $\frac{\angle 2 + \angle 6}{\angle 7 + \angle 3}$
3. Same Side Interior Angles $\frac{\angle 2 + \angle 3}{\angle 7 + \angle 6}$
4. Alternate Exterior Angles $\frac{\angle 1 + \angle 5}{\angle 4 + \angle 8}$

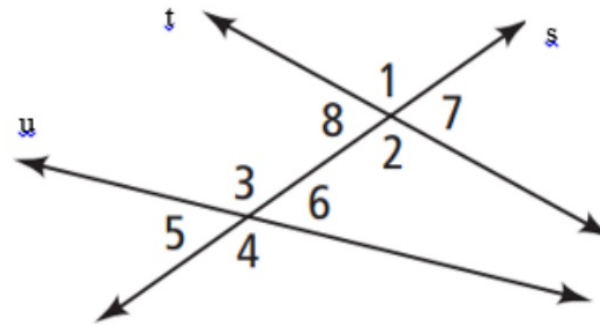


* The transversal is line r.

Your turn to try...

Use the diagram below to name the following angle pairs.

1. Corresponding Angles $\frac{\angle 1 + \angle 3}{\angle 2 + \angle 4} / \frac{\angle 7 + \angle 6}{\angle 8 + \angle 5}$
2. Alternate Interior Angles $\frac{\angle 8 + \angle 6}{\angle 2 + \angle 3}$
3. Same Side Interior Angles $\frac{\angle 8 + \angle 3}{\angle 2 + \angle 6}$
4. Alternate Exterior Angles $\frac{\angle 1 + \angle 4}{\angle 7 + \angle 5}$



* The transversal is line u.