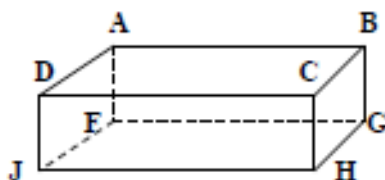


Parallel Lines and Transversals

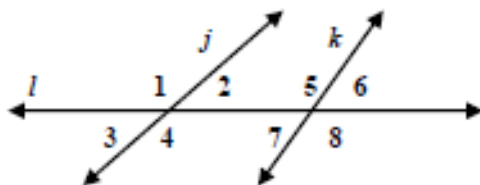
SOL G.2 (2009)

Parallel lines are coplanar lines that never intersect, even if they are extended indefinitely. The fact that two lines do not intersect does *not* mean they are parallel. Consider the figure below.



The symbol $\parallel$ is used to indicate parallel lines. For example, $\overrightarrow{AF} \parallel \overrightarrow{BG}$. Look closely. $\overrightarrow{AF}$ will also never intersect $\overrightarrow{CB}$, but these two lines are not *parallel* because they are not *coplanar*. Noncoplanar lines that never intersect are called *skew lines*.

Likewise, planes can be parallel to each other, just like the floor of a room is parallel to the ceiling. In the figure above, plane ABC is parallel to plane FGH ; plane CBG is parallel to plane DAF ; and plane DCH is parallel to plane ABG .

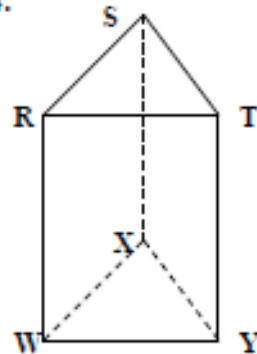


In the figure above, line l is intersecting both line j and line k . Line l is a transversal, a line that intersects two or more other lines. By intersecting lines j and k , the transversal forms eight angles.

Exterior angles	Angles that are on the <i>outside</i> of the intersecting lines	$\angle 1$, $\angle 3$, $\angle 6$, $\angle 8$
Interior angles	Angles that are on the <i>inside</i> of the intersecting lines	$\angle 2$, $\angle 4$, $\angle 5$, $\angle 7$
Corresponding angles	A pair of angles that is in the same position from one line to the other	$\angle 1$ and $\angle 5$ $\angle 2$ and $\angle 6$ $\angle 3$ and $\angle 7$ $\angle 4$ and $\angle 8$
Alternate exterior angles	Pairs of exterior angles that are on <i>opposite</i> sides of the transversal	$\angle 1$ and $\angle 8$ $\angle 3$ and $\angle 6$
Alternate interior angles	Pairs of interior angles that are on <i>opposite</i> sides of the transversal	$\angle 2$ and $\angle 7$ $\angle 4$ and $\angle 5$
Consecutive interior angles	Pairs of interior angles that are on the <i>same</i> side of the transversal	$\angle 2$ and $\angle 5$ $\angle 4$ and $\angle 7$

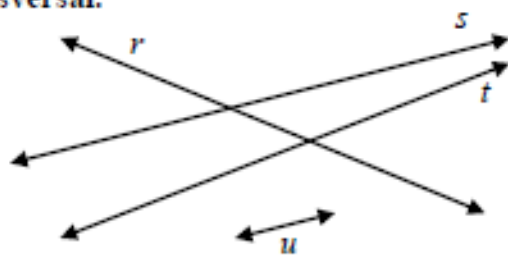
Practice

Use the figure below to answer 1-4.



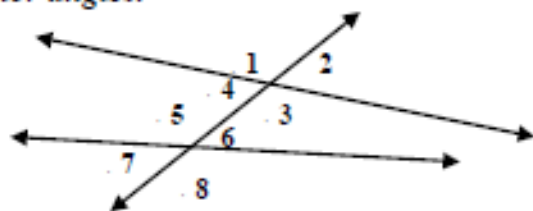
- Name all segments parallel to $\overline{TY}$.
- Name a pair of parallel planes.
- Name all planes intersecting plane WXY .
- Name all segments skew to $\overline{RW}$.

Example 1: Identify the pair lines to which line r is a transversal.



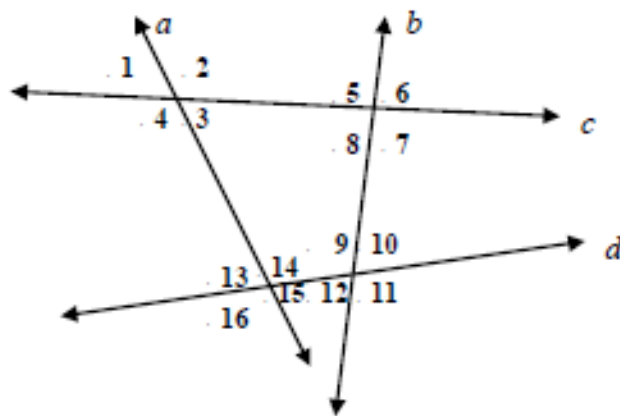
Line r is transversal to s and t ; t and u , and s and u .
(Remember to consider the fully extended form of the line when identifying transversals and intersections!)

Example 2: Identify each pair of angles as *alternate interior*, *alternate exterior*, *corresponding*, or *consecutive interior* angles.



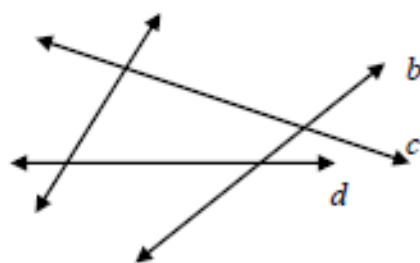
- $\angle 1$ and $\angle 8$ alternate exterior angles
- $\angle 3$ and $\angle 6$ consecutive interior angles
- $\angle 4$ and $\angle 6$ alternate interior angles
- $\angle 2$ and $\angle 6$ corresponding angles

Example 3: Name the transversal that forms each pair of angles. Then identify the special name for the angle pair.



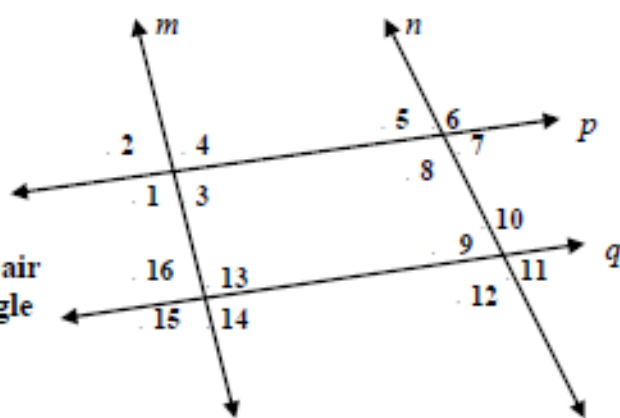
- $\angle 14$ and $\angle 12$ line d ; alt. interior
- $\angle 6$ and $\angle 10$ line b ; corresponding

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



- a
- b
- c
- d

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



- $\angle 7$ and $\angle 11$
- $\angle 3$ and $\angle 13$
- $\angle 2$ and $\angle 14$
- $\angle 6$ and $\angle 12$