

Two lines that **do not** intersect are either parallel lines or skew lines.

Two lines are parallel if they do not intersect and are coplanar.

Two lines are skew if they do not intersect and are not coplanar.

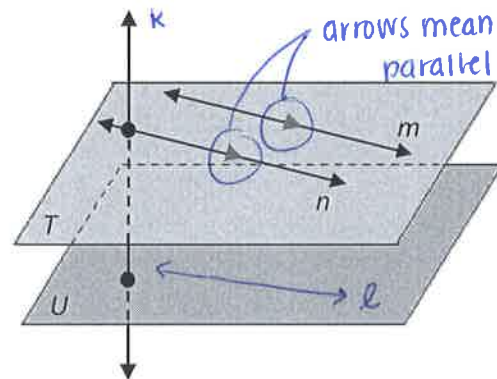
Two planes that do not intersect are parallel planes.

Ex: lines $m \parallel n$ are parallel ($m \parallel n$)

Ex: lines $l \parallel m$ are skew

Ex: planes $T \parallel U$ are parallel ($T \parallel U$)

Ex: lines $k \perp n$ are intersecting

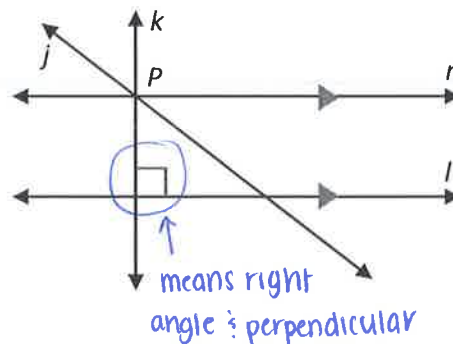


Parallel and Perpendicular lines

Two lines in the same plane are either parallel or intersect at a point.

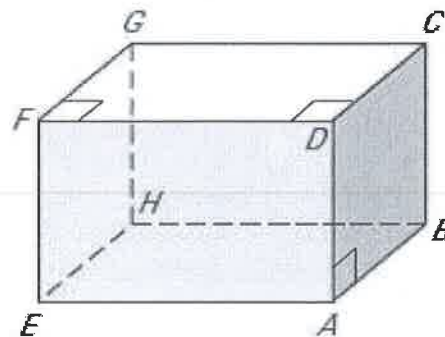
Ex: lines $n \parallel l$ are parallel ($n \parallel l$)

Ex: lines $k \perp l$ are perpendicular ($k \perp l$)
 ↑
 lines meet at a 90° angle



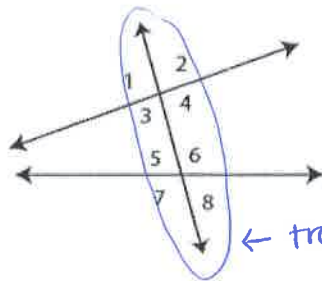
Practice: Think of each segment in the figure as part of a line (e.g., think of \overline{FG} as \overleftrightarrow{FG}). Which line(s) or plane(s) in the figure fit each description?

- a) Line(s) **parallel** to \overleftrightarrow{FG} . $\overleftrightarrow{HE}, \overleftrightarrow{CD}, \overleftrightarrow{AB}$
- b) Line(s) **parallel** to \overleftrightarrow{FG} and contain point D . \overleftrightarrow{CD}
- c) Line(s) **skew** to \overleftrightarrow{AB} . $\overleftrightarrow{FD}, \overleftrightarrow{GC}, \overleftrightarrow{FG}$
- d) Line(s) **skew** to \overleftrightarrow{AB} and contain point G . $\overleftrightarrow{FG}, \overleftrightarrow{GC}$
- e) Line(s) **perpendicular** to \overleftrightarrow{FG} and contain point E . \overleftrightarrow{FE}
- f) Plane(s) **parallel** to plane GHB . plane FED



Angles and Transversals.

A transversal is a line that intersects two or more lines at different points.



Angles formed by Transversals

| Definition | Example |
|--|--|
| Two angles are <u>corresponding</u> if they are on the same side of the transversal \therefore are in "matching positions" | <p>$1 \hat{=} 5, 4 \hat{=} 8$</p> |
| Two angles are <u>alternate interior</u> if they are <u>inside</u> the two lines and are diagonal from each other | <p>$3 \hat{=} 6$</p> |
| Two angles are <u>alternate exterior</u> if they are <u>outside</u> the two lines and are diagonal from each other | <p>$1 \hat{=} 8$</p> |
| Two angles are <u>consecutive interior angles</u> if they are inside the two lines on the same side of the transversal | <p>$3 \hat{=} 5$</p> |

Practice: Identify the relationship between each pair of angles.

a) $\angle 1$ and $\angle 7$
alt. exterior

b) $\angle 3$ and $\angle 6$
consecutive interior

c) $\angle 8$ and $\angle 7$
linear pair

d) $\angle 4$ and $\angle 8$
corresponding

e) $\angle 3$ and $\angle 5$
alt. interior

d) $\angle 2$ and $\angle 4$
vertical

