

Pairs of Lines and Angles

Lesson Objective IWBAT identify $\parallel$, $\perp$, and skew lines; identify pairs of angles formed by 2 lines and a transversal

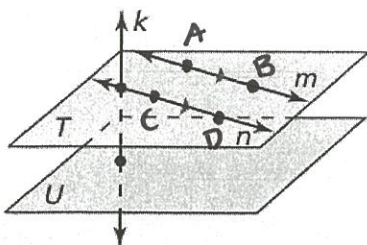
Two lines that do NOT intersect are either **parallel** lines or **skew** lines.

Parallel Lines: two lines are parallel lines when they do **NOT** intersect and are **coplanar**

Skew Lines: two lines are skew lines when they do **NOT** intersect and are **NOT coplanar**

Parallel Planes: two planes are parallel planes if they do **NOT** intersect.

Example:



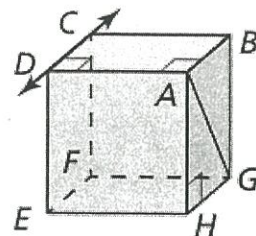
- Which lines are parallel?
 → Small directed arrows (usually red in color) are used to show lines are parallel.
 → The symbol $\parallel$ means "is parallel to" $m \parallel n$
- Which lines are skew? k and m are skew
- Which planes are parallel? plane $T \parallel$ plane U
- Name the line(s) parallel to plane U . lines m and n

****Segments and rays that are within parallel lines are also parallel!**

Example:

5. Think of each segment in the figure as part of a line. Which line(s) or plane(s) appear to fit the description?

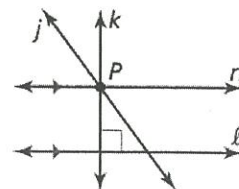
- Line(s) parallel to $\overleftrightarrow{CD}$ and containing point A $\overleftrightarrow{AB}$
- Line(s) skew to $\overleftrightarrow{CD}$ and containing point A $\overleftrightarrow{AG}, \overleftrightarrow{AH}$
- Line(s) perpendicular to $\overleftrightarrow{CD}$ and containing point A $\overleftrightarrow{AD}$
- Plane(s) parallel to plane EFG and containing point A plane ACD



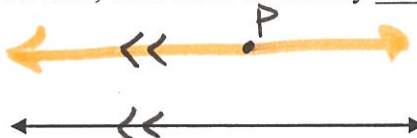
- Two distinct lines in the same plane are either parallel (like n and l) or intersect in a point (like j and k).

Think About It...

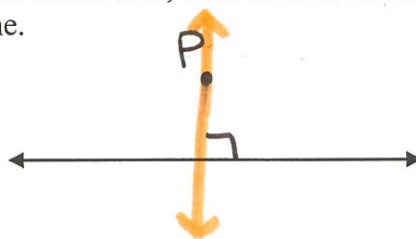
- How many through point P are parallel to line l ? one
- How many through point P are perpendicular to line l ? one



Parallel Postulate: If there is a line and a point not on the line, then there is exactly one line through the point that is // to the given line.

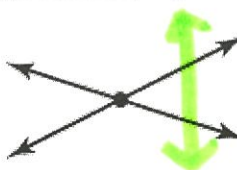
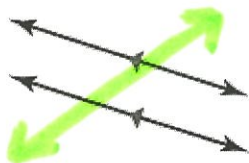


Perpendicular Postulate: If there is a line and a point not on the line, then there is exactly one line through the point that is ⊥ to the given line.



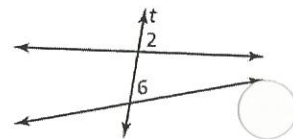
Identifying Pairs of Angles

Transversal: A transversal is a line that intersects 2 or more coplanar lines at different points.

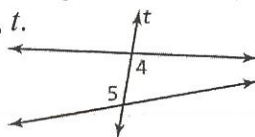


Corresponding Angles: two angles are corresponding when they have corresponding positions.

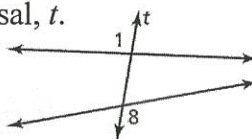
→ $\angle 2$ and $\angle 6$ are above the lines and to the right of the transversal



Alternate Interior Angles: two angles are alternate interior angles when they lie between the two lines and on opposite sides of the transversal, t .

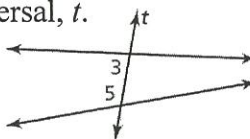


Alternate Exterior Angles: two angles are alternate exterior angles when they lie outside the two lines and on opposite sides of the transversal, t .



Consecutive Interior Angles: two angles are consecutive interior angles when they lie between the two lines and on the same-side side of the transversal, t .

→ Also called Same-Side Interior Angles



Example:

6. Identify all pairs of angles of the given type.

a. Corresponding with transversal l

$\angle 4$ and $\angle 8$; $\angle 2$ and $\angle 6$; $\angle 1$ and $\angle 5$;

b. Alternate Interior with transversal m $\angle 3$ and $\angle 7$

$\angle 4$ and $\angle 9$; $\angle 3$ and $\angle 10$

c. Alternate Exterior with transversal n

$\angle 5$ and $\angle 11$; $\angle 6$ and $\angle 9$

d. Consecutive Interior with transversal m

$\angle 4$ and $\angle 10$; $\angle 3$ and $\angle 9$

