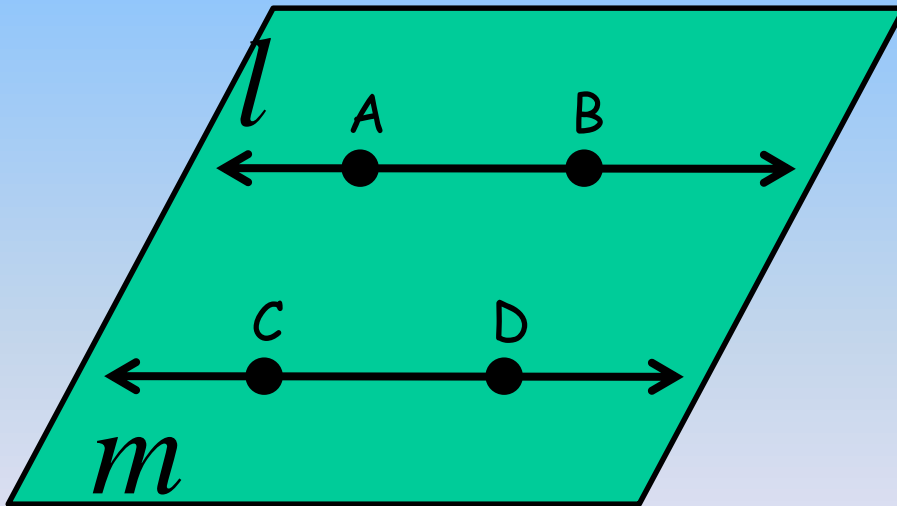


SECTION 3-1
DEFINITIONS:
PARALLEL LINES
AND ANGLES

Parallel Lines

Definition - Coplanar lines that do not intersect

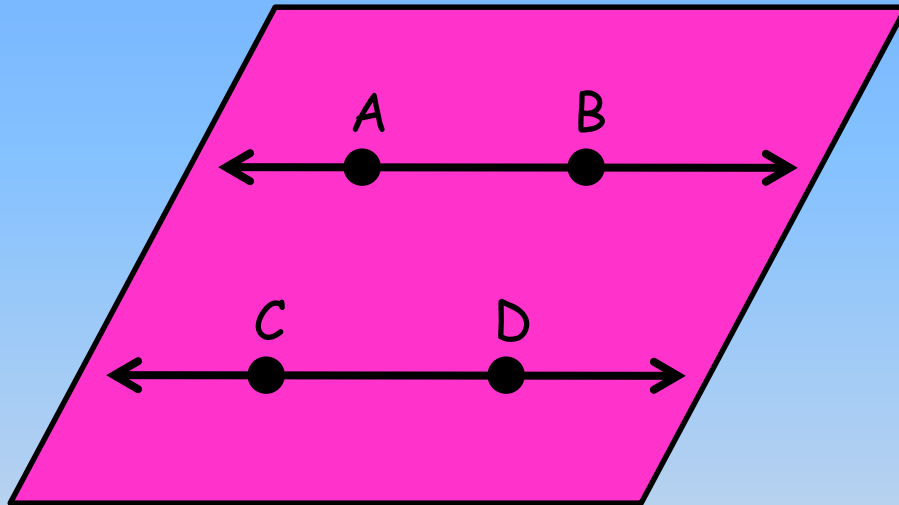


Symbol: \parallel

Notation:

Line $l \parallel$ line m

Segments and Rays contained in parallel lines are also parallel.

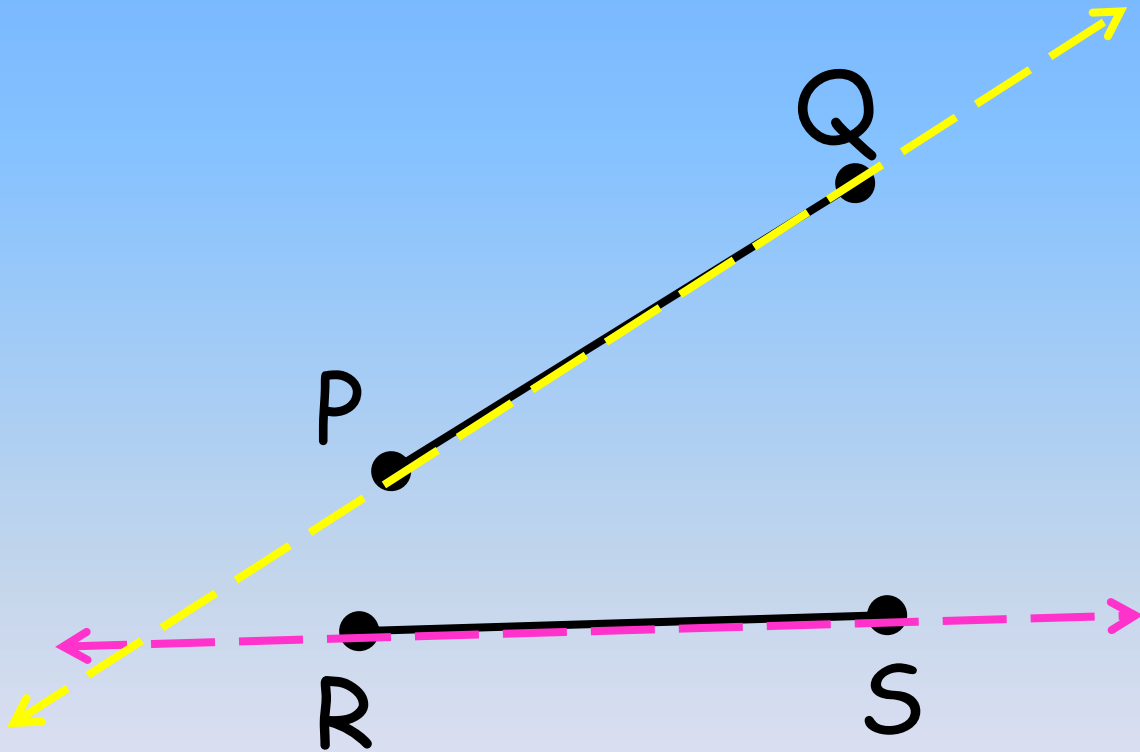


$$\overline{AB} \parallel \overline{CD}$$

$$\overrightarrow{AB} \parallel \overleftarrow{CD}$$

In the diagram, \overline{PQ} and \overline{RS} do not intersect.

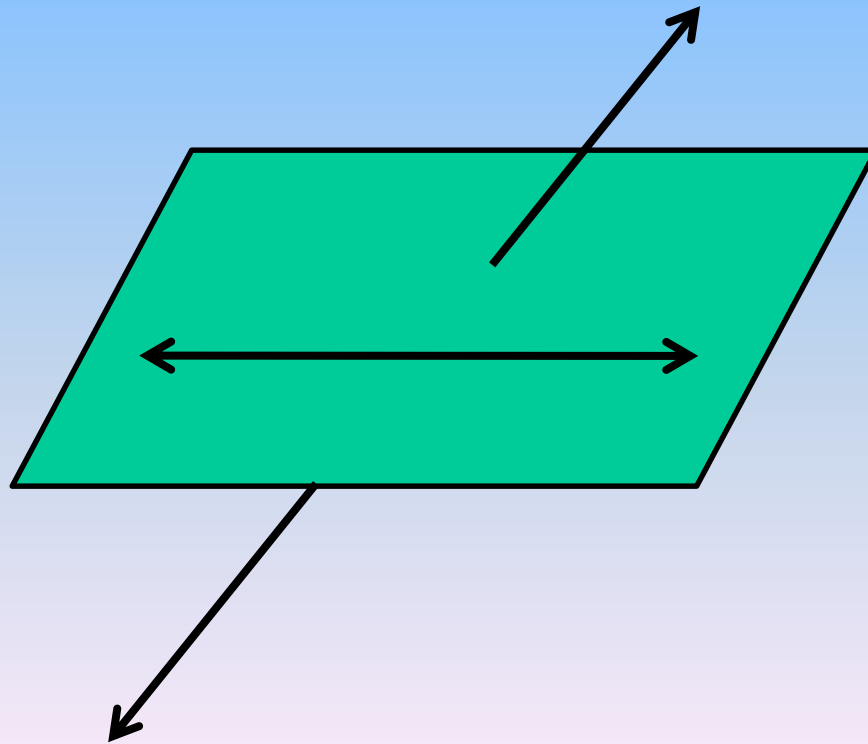
But they are NOT parallel.



Since they are parts of lines, they will eventually intersect.

Skew Lines

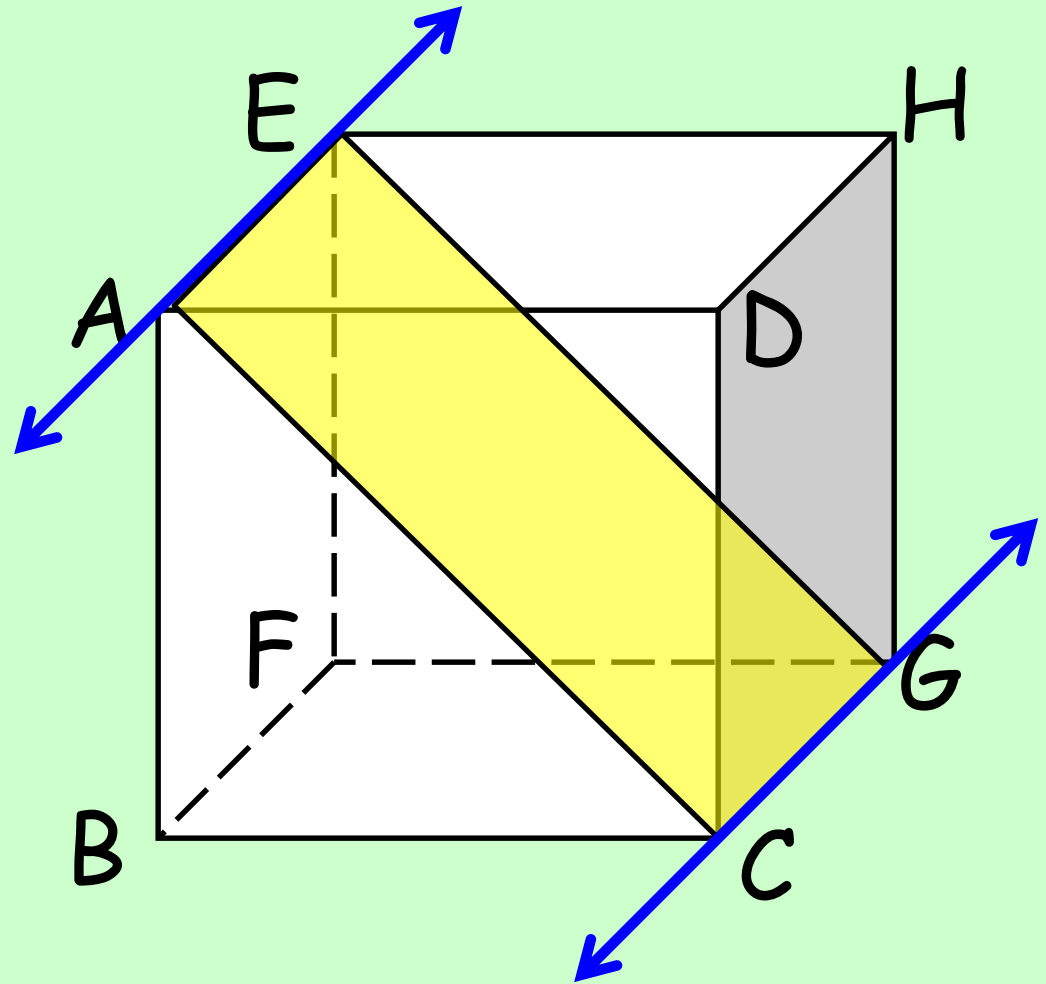
Definition - Non-coplanar lines
that do not intersect



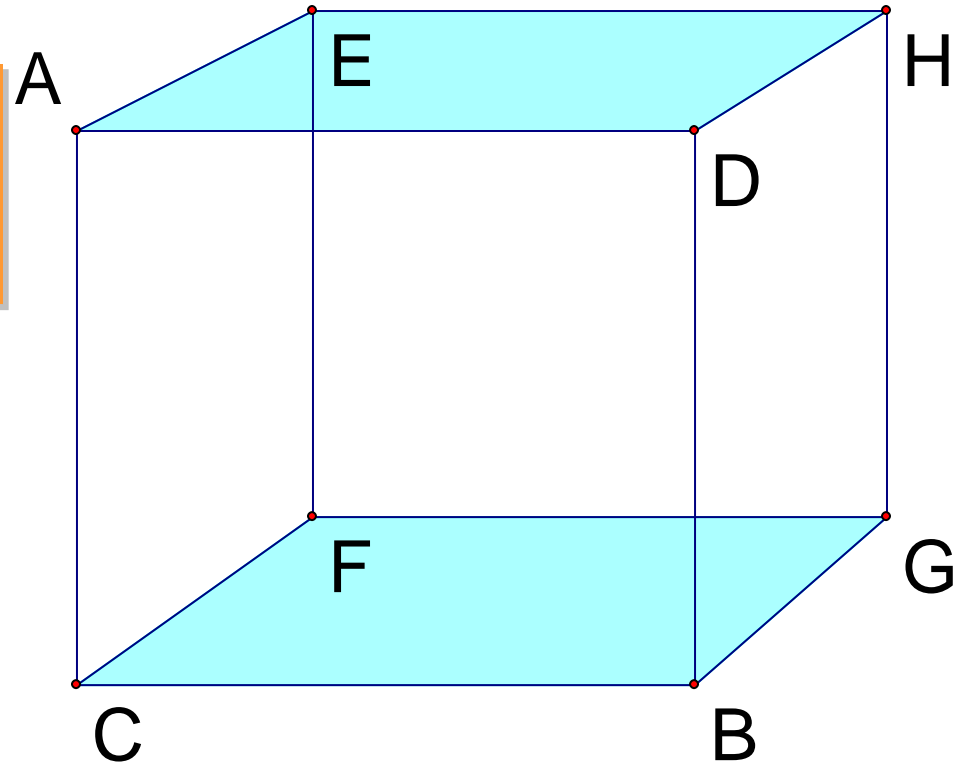
\overleftrightarrow{AE} and \overleftrightarrow{CG} are not skew, they are parallel.

Why??

Plane AEGC can be created, so \overleftrightarrow{AE} and \overleftrightarrow{CG} are considered coplanar lines that never intersect.



Parallel Planes



Definition - planes that do not intersect

Plane $AEHD \parallel$ Plane $CFGB$

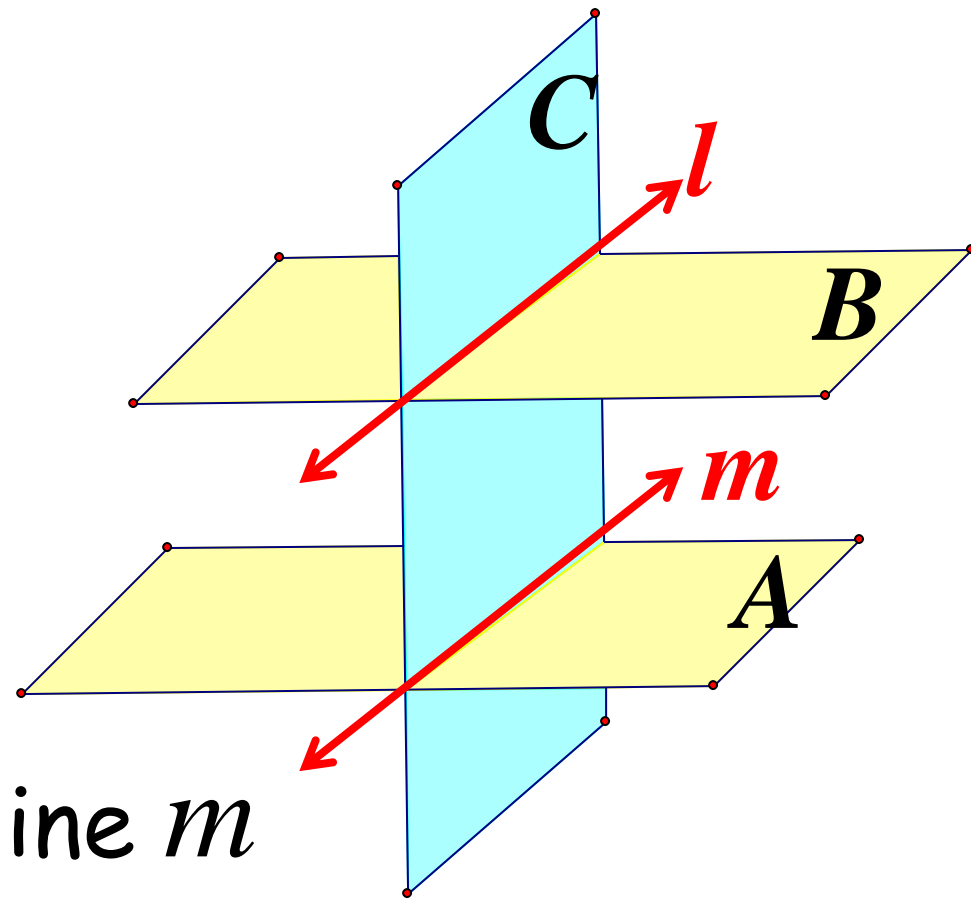
Theorem 3-1: If two parallel planes (A and B) are cut by a third plane (C), then the lines of intersection are parallel.

Plane B \cap Plane C

line l

Plane A \cap Plane C

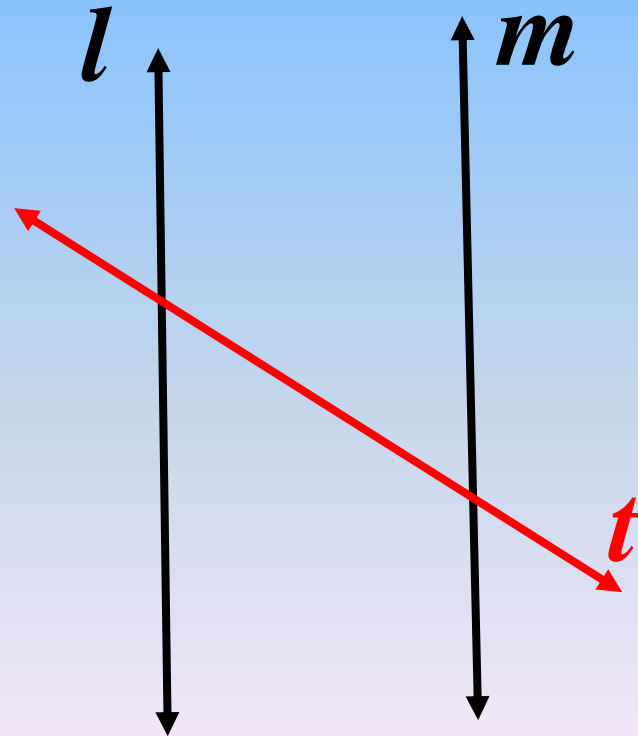
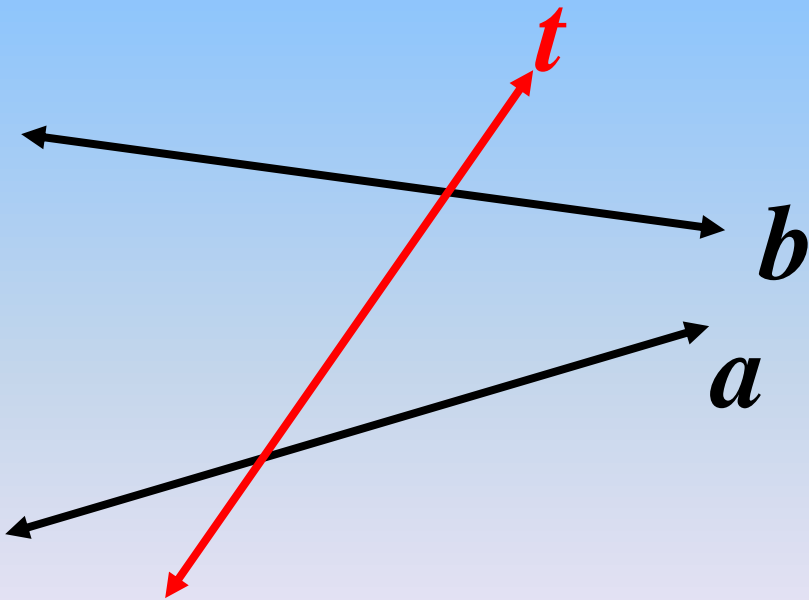
line m



Therefore, line $l \parallel$ line m

Transversal

A line that intersects two or more coplanar lines in different points.



Alternate Interior Angles

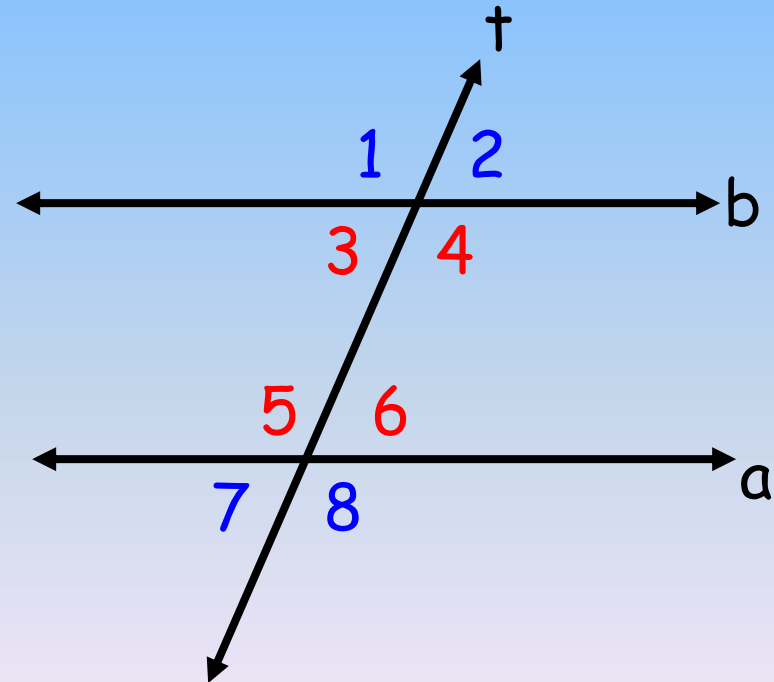
Definition: Two nonadjacent interior angles on opposite sides of the transversal.

Alternate Interior Angles

$\angle 3$ & $\angle 6$ $\angle 4$ & $\angle 5$

Alternate Exterior Angles

$\angle 1$ & $\angle 8$ $\angle 2$ & $\angle 7$



Same-Side Interior Angles

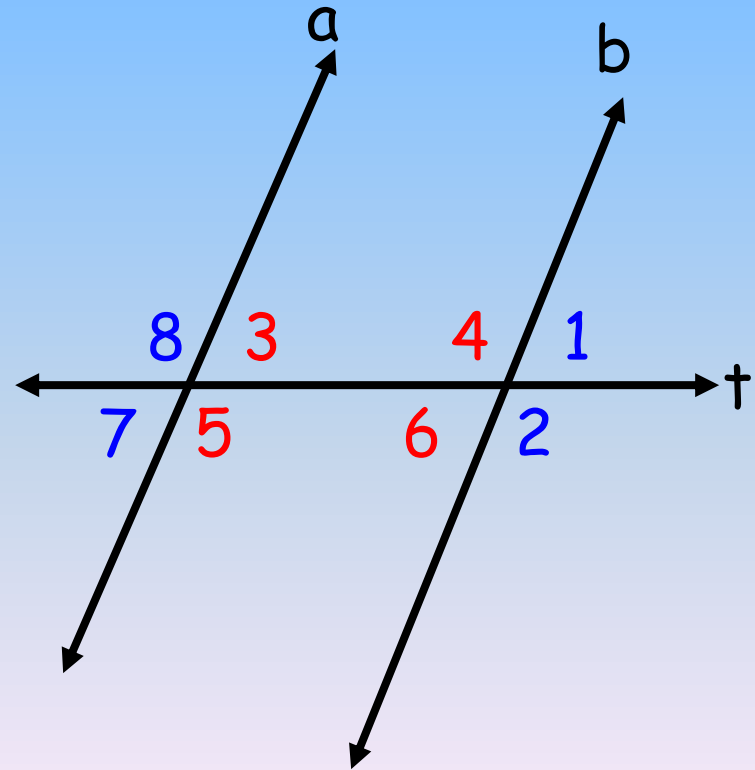
Definition: Two interior angles on the same side of the transversal.

Same-Side Interior Angles

$\angle 3$ & $\angle 4$ $\angle 5$ & $\angle 6$

Same-Side Exterior Angles

$\angle 1$ & $\angle 8$ $\angle 2$ & $\angle 7$



Corresponding Angles

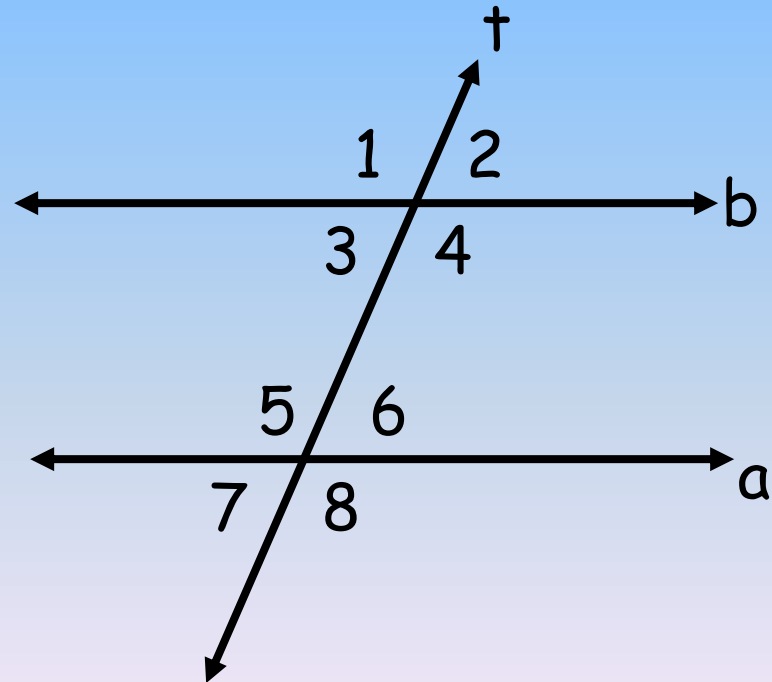
Definition: Two angles in corresponding positions relative to the two lines.

$\angle 1$ & $\angle 5$

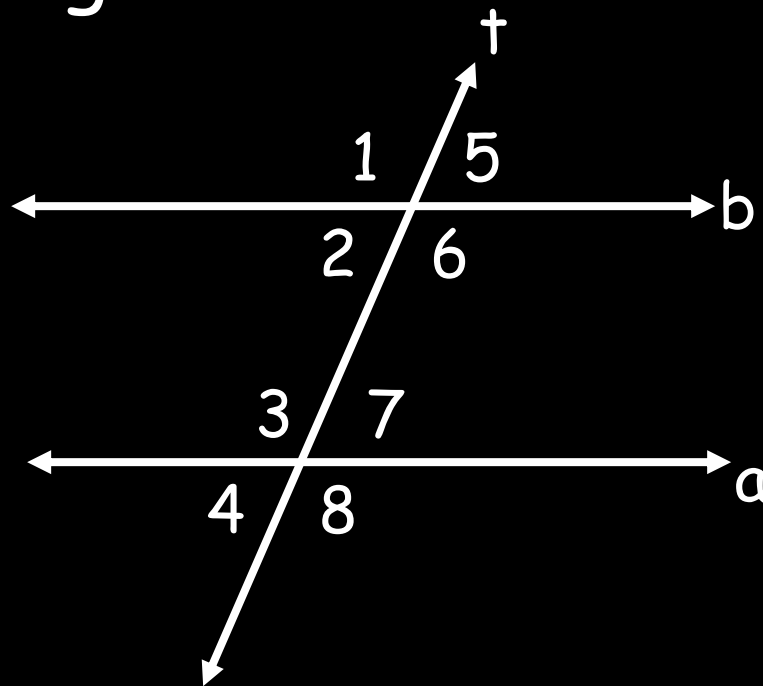
$\angle 2$ & $\angle 6$

$\angle 3$ & $\angle 7$

$\angle 4$ & $\angle 8$



Identify the types of angles.



- 1) $\angle 1$ & $\angle 3$ Corresponding \angle s
- 2) $\angle 3$ & $\angle 6$ Alternate Interior \angle s
- 3) $\angle 8$ & $\angle 5$ Same-Side Exterior \angle s
- 4) $\angle 2$ & $\angle 1$ Linear Pair
- 5) $\angle 1$ & $\angle 8$ Alternate Exterior \angle s
- 6) $\angle 2$ & $\angle 4$ Corresponding \angle s
- 7) $\angle 5$ & $\angle 3$ NO RELATIONSHIP
- 8) $\angle 3$ & $\angle 7$ Linear Pair
- 9) $\angle 6$ & $\angle 7$ Same-Side Interior
- 10) $\angle 2$ & $\angle 5$ Vertical Angles
- 11) $\angle 2$ & $\angle 3$ Same-Side Interior
- 12) $\angle 4$ & $\angle 5$ Alternate Exterior

13) $\angle 4$ & $\angle 12$

Corresponding \angle s

14) $\angle 6$ & $\angle 11$

No Relationship

15) $\angle 5$ & $\angle 10$

Alternate Interior \angle s

16) $\angle 10$ & $\angle 13$

Vertical Angles

17) $\angle 15$ & $\angle 16$

Linear Pair

18) $\angle 1$ & $\angle 14$

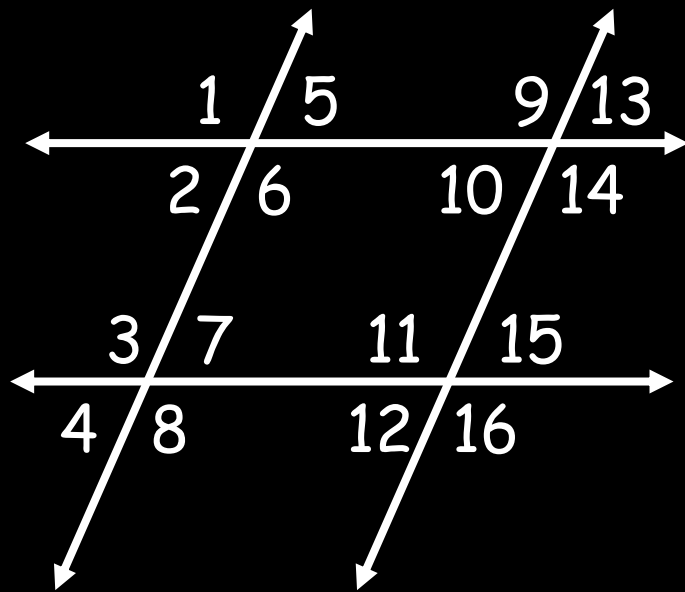
Alternate Exterior Angles

19) $\angle 7$ & $\angle 11$

Same-Side Interior \angle s

20) $\angle 3$ & $\angle 15$

Same-Side Exterior \angle s



Identify the
types of
angles.

HOMework

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