Objective

Students will be able to recognize transversals and parallel lines and be able to identify pairs of angles formed by transversals.

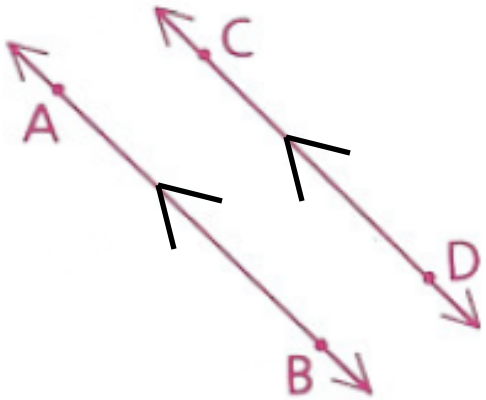
Plane

A plane is a surface such that if any two points on the surface are connected by a line, all points of the line are also on the surface.

If two points, lines, segments, and so forth, lie in the same plane, we call them coplanar. Points, lines, segments, and so forth, that do not lie in the same plane are called noncoplanar.

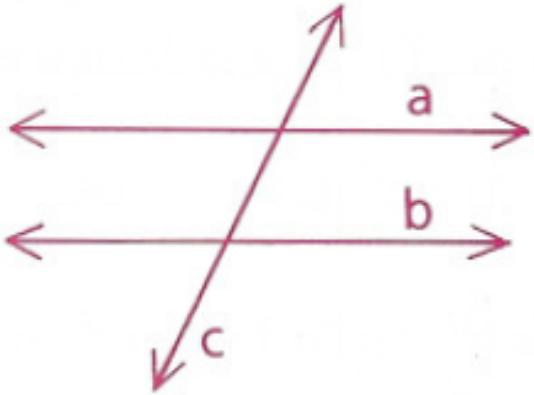
Parallel Lines

Parallel lines are two coplanar lines that do not intersect.



$\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$

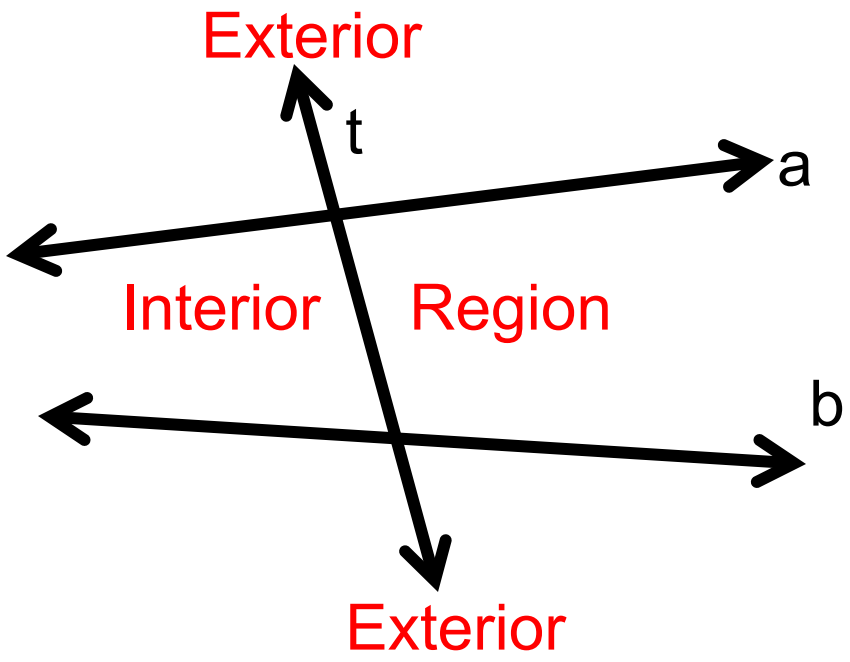
$\overleftrightarrow{EF} \parallel \overleftrightarrow{GH}$



a ∥ b

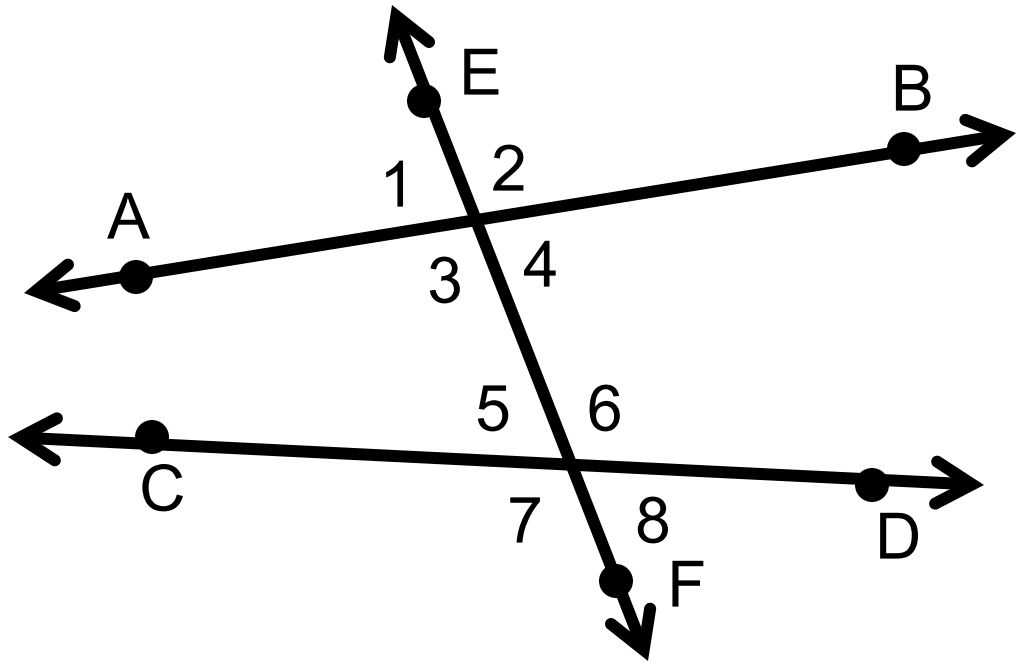
Transversals

A transversal is a line that intersects two coplanar lines in two distinct points.



In the figure, line t is the transversal of lines a and b.

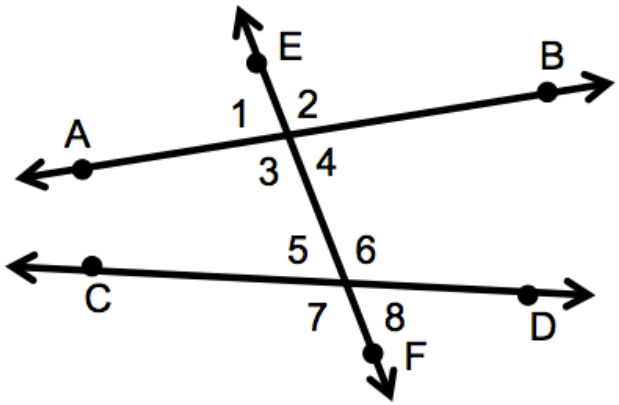
Angle Pairs Formed By Transversals



In the figure, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are cut by transversal $\overleftrightarrow{EF}$.

How many angles are formed?

What angle pair relationships do you already know?



From previous courses can you remember other angle pair relationships?

Pairs of angles formed by two lines and a transversal:

Alternate interior angles lie in the interior region of your lines and are on alternate sides of the transversal (ex: $\angle 3$ and $\angle 6$)

Alternate exterior angles lie in the exterior region of your lines and are on alternate sides of the transversal (ex: $\angle 1$ and $\angle 8$)

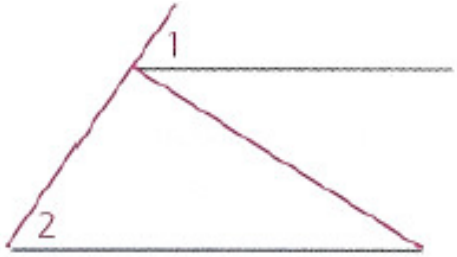
Corresponding angles lie in the same position of your lines and transversal; one in the interior, one in the exterior, same side of transversal (ex: $\angle 4$ and $\angle 8$)

Same-side interior angles lie in the interior region of your lines and are on the same side of the transversal (ex: $\angle 3$ and $\angle 5$)

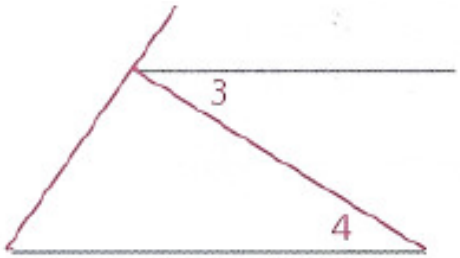
Same-side exterior angles lie in the exterior region of your lines and are on the same side of the transversal (ex: $\angle 1$ and $\angle 7$)

Name the pairs of angles formed by transversals in the figures below.

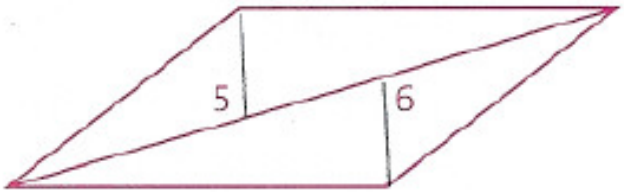
The segment corresponding to the transversal is shown in red and the segments corresponding to the lines it cuts are blue.



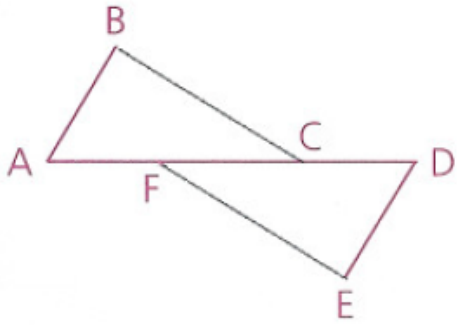
∠1 and ∠2 are corresponding ∠s.



∠3 and ∠4 are alternate interior ∠s.

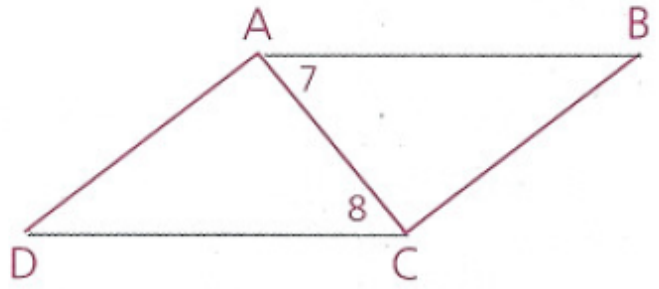


∠5 and ∠6 are alternate exterior ∠s.



∠BCA and ∠DFE are alternate interior ∠s.

∠BCD and ∠EFA are alternate exterior ∠s.

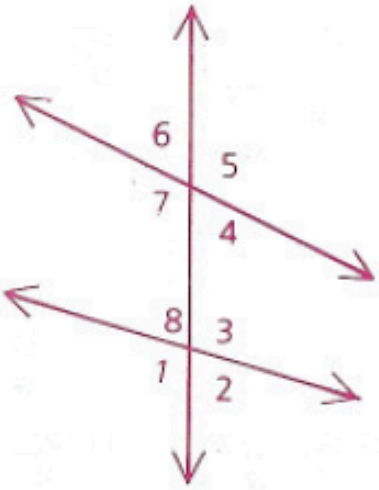


∠7 and ∠8 are alternate interior ∠s.

Homework

p. 196: 1, 2, 3, 4

1 a Name all pairs of alternate interior angles.



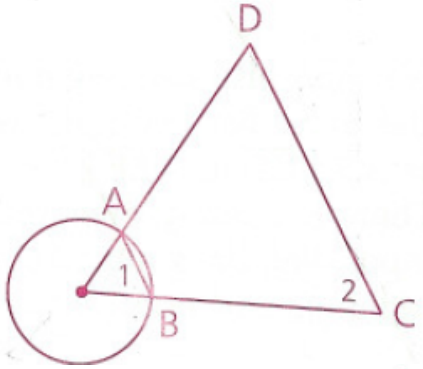
b Name all pairs of alternate exterior angles.

c Name all pairs of corresponding angles.

d Name all pairs of interior angles on the same side of the transversal.

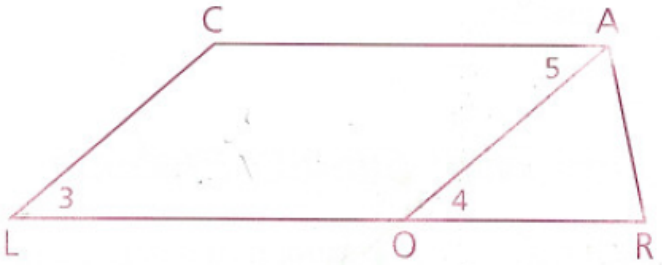
e Name all pairs of exterior angles on the same side of the transversal.

2 a What name is given to $\angle 1$ and $\angle 2$ for $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$? What is the transversal?

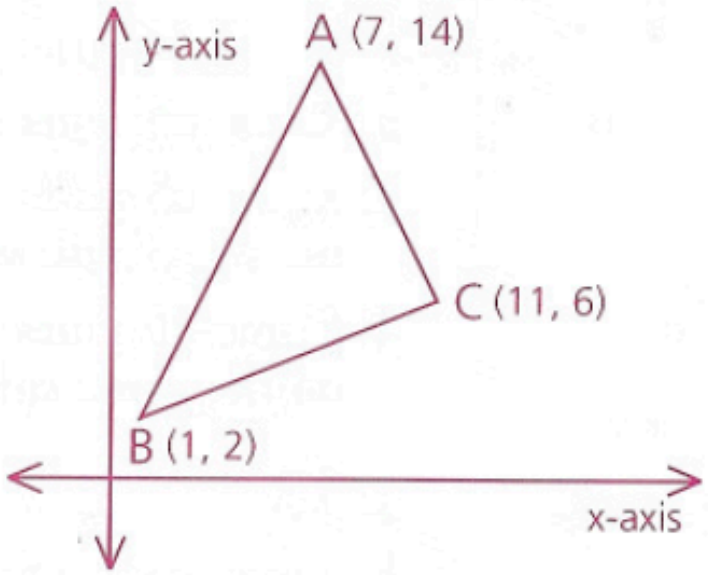


b What type of angles are 3 and 4? Which lines and transversal form them?

c What type of angles are 4 and 5? Which lines and transversal form them?



3 Copy the diagram.



a Find the coordinates of M, the midpoint of $\overline{AB}$.

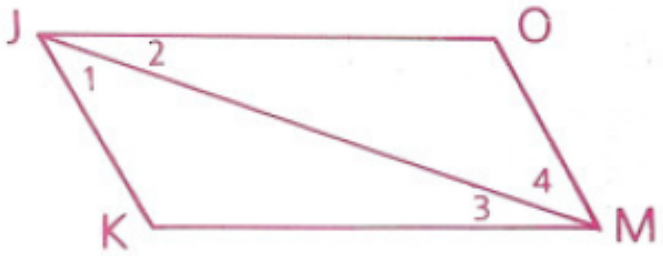
b Find the coordinates of N, the midpoint of $\overline{AC}$.

c Draw $\overleftrightarrow{MN}$. What *appears* to be true about $\overleftrightarrow{MN}$ and $\overleftrightarrow{BC}$?

d What *appears* to be true about $\angle AMN$ and $\angle ABC$?

e Name a pair of corresponding angles formed by $\overleftrightarrow{MN}$ and $\overleftrightarrow{BC}$ with transversal $\overleftrightarrow{AC}$.

4 **a** For which pair of lines are angles 1 and 4 a pair of alternate interior angles?



b For which pair of lines are angles 2 and 3 a pair of alternate interior angles?

c How many transversals of $\overleftrightarrow{JO}$ and $\overleftrightarrow{KM}$ are shown?