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Use Parallel Lines and Transversals

Unit 3 Lesson 2

USE PARALLEL LINES AND TRANSVERSALS

Students will be able to:

identify pairs of angles formed when parallel lines are cut by a transversal.

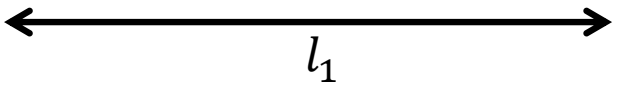
Key Vocabulary

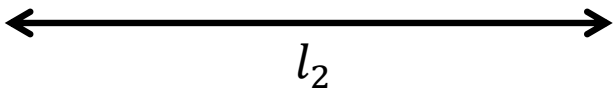
- **Parallel lines**
- **Transversal**
- **Interior and exterior**
- **Vertical, Alternate (exterior and interior) and Corresponding angles**

USE PARALLEL LINES AND TRANSVERSALS

Parallel lines:

Two lines are parallel to each other if they are the same distant apart on each point and never intersect each other.



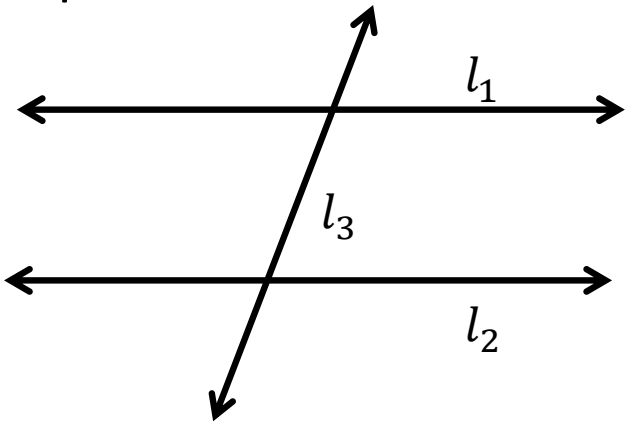


$\overleftrightarrow{l_1} \parallel \overleftrightarrow{l_2}$

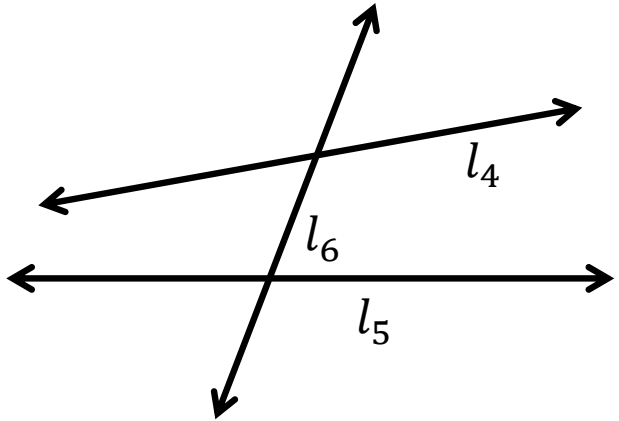
USE PARALLEL LINES AND TRANSVERSALS

Transversal:

A transversal is a line (or a line segment or a ray) that cuts two or more lines (or a line segment or a ray). The lines can be parallel or non-parallel.



l_1 || l_2 and l_3 is a transversal

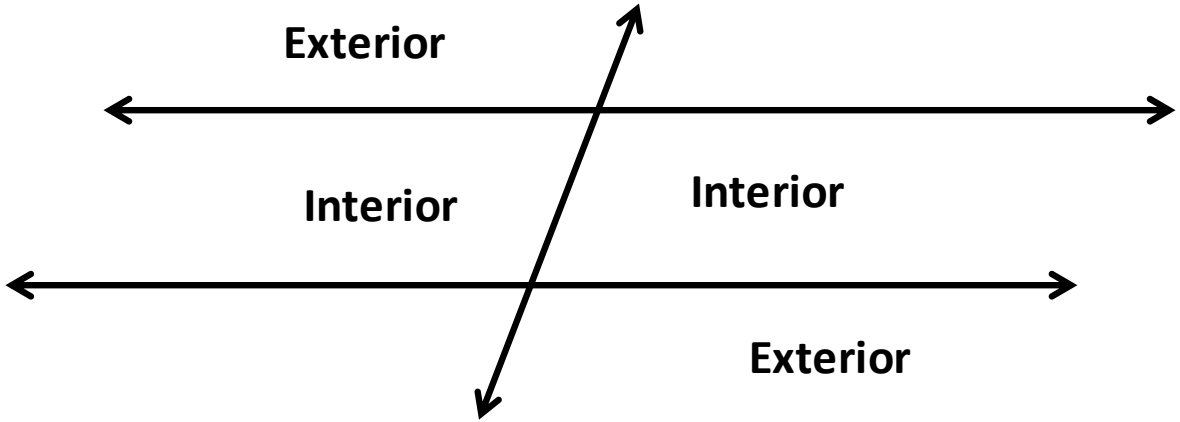


l_4 is not parallel to l_5 and l_6 is a transversal

USE PARALLEL LINES AND TRANSVERSALS

Interior and Exterior:

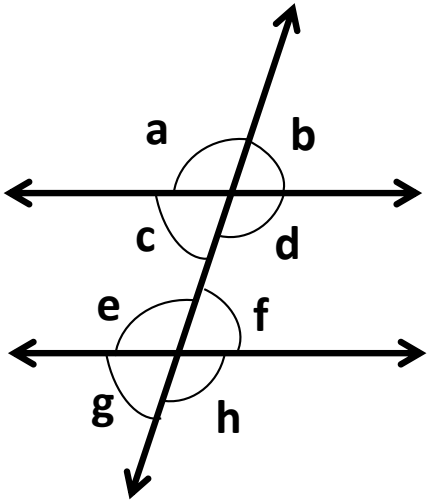
When a transversal intersects two parallel (or non-parallel) lines, exterior and interior regions are formed. Interior refers to the inner area and exterior refers to the outer area in the parallel lines.



USE PARALLEL LINES AND TRANSVERSALS

When two parallel (or non-parallel) lines are cut by a transversal, then there are special pair of exterior and interior angles formed.

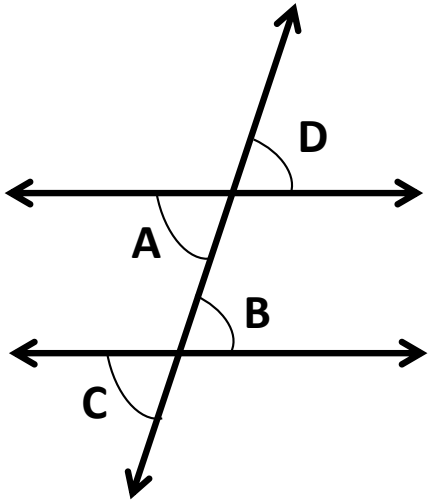
- Angle a, b, g and h are **exterior** angles.
- Angle c, d, e and f are **interior** angles.
- The sum of interior angles on the same side of the transversal is **180°**.
- The sum of exterior angles on the same side of the transversal is **180°**.



USE PARALLEL LINES AND TRANSVERSALS

When two coplanar lines are crossed by a 3rd line (called the transversal), then the angles formed on the opposite sides of the transversal are called **alternate angles.**

- The pair of angles on the opposite side of the transversal but inside the two coplanar lines are **alternate interior angles (angles A** and **B** in the figure**).**
- The pair of angles on the opposite side of the transversal but outside the two coplanar lines are **alternate exterior angles (angles C** and **D** in the figure**).**
- If a transversal intersects two **parallel** lines, then the alternate angles are congruent.



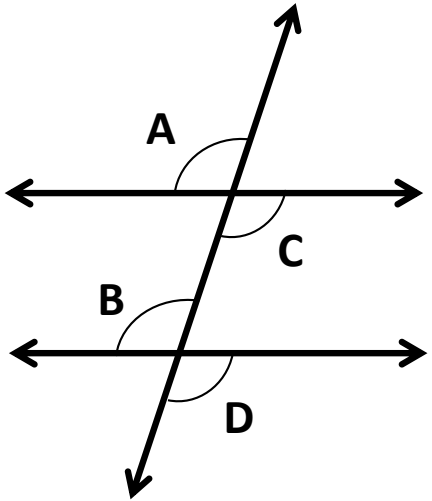
$\angle A \cong \angle B$ **and** $\angle C \cong \angle D$

USE PARALLEL LINES AND TRANSVERSALS

When two coplanar lines are crossed by a 3rd line (called the transversal), then the angles formed on the same sides of the transversal are called **corresponding angles.**

- The angles **A** and **B,** and angles **C** and **D** are the pair of corresponding angles.
- If a transversal intersects two **parallel** lines, then the corresponding angles are congruent.

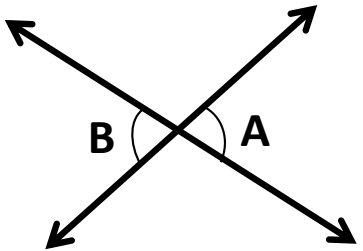
$\angle A \cong \angle B$ **and** $\angle C \cong \angle D$



USE PARALLEL LINES AND TRANSVERSALS

Vertical angles are the angles opposite to each to each when two lines are crossed. The two vertical angles are congruent.

The angles **A** and **B** shown in the figure are vertical angles and are congruent.

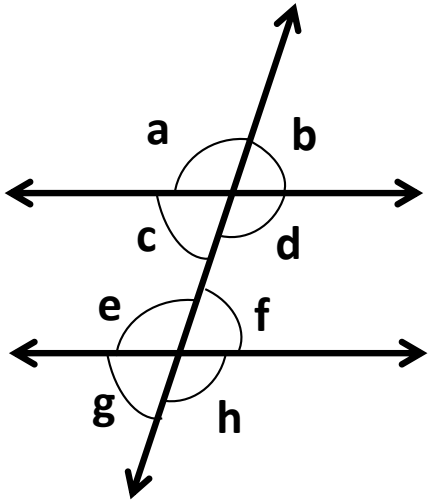


$$\angle A \cong \angle B$$

USE PARALLEL LINES AND TRANSVERSALS

Problem 1:

Identify all the pair of **alternate, vertical** and **corresponding** angles in the figure shown below.



Alternate angles:

angles a and **h, b** and **g, c** and **f, d** and **e**

Vertical angles:

angles a and **d, b** and **c, e** and **h, g** and **f**

Corresponding angles:

angles a and **e, c** and **g, b** and **f, d** and **h**