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# Exploring Angle Pairs

Unit 1 Lesson 5

# Exploring Angle Pairs

Students will be able to:

Identify **Special Angle Pairs** and use their relationships to find angle measures.

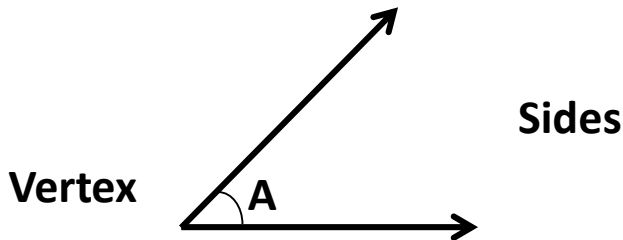
## Key Vocabulary

- **Complementary and Supplementary angles**
- **Vertical Angles**
- **Adjacent Angles**
- **Corresponding Angles**
- **Linear Pair**
- **Alternate Interior and Exterior Angles**

# Measuring Angles

An **angle** is the measure of the turn between two rays that have a common end point. The rotation is measured in the counter-clockwise direction.

- The two rays form the sides of an angle.
- The point where two rays are meeting is called the **vertex**.
- The angle is represented by a  $\sphericalangle$  symbol along with a letter.

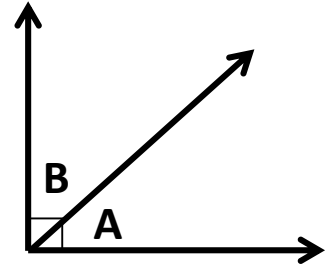


# Measuring Angles

Two angles are said to be **Complementary Angles** if their sum is 90 degrees.

The angles **A** and **B** shown in the figure are complementary since their angle sum is  $90^\circ$ .

$$\angle A + \angle B = 90^\circ$$

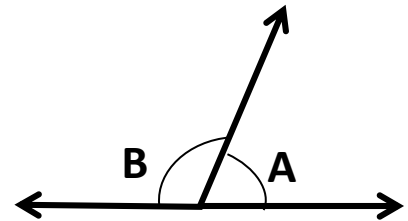


# Measuring Angles

Two angles are said to be **Supplementary Angles** if their sum is 180 degrees.

The angles **A** and **B** shown in the figure are complementary since their angle sum is 180°.

$$\angle A + \angle B = 180^\circ$$

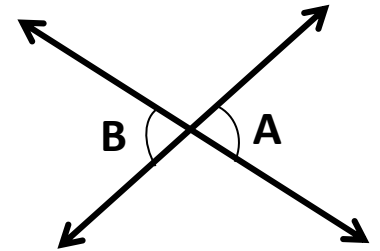


# Measuring Angles

**Vertical Angles** are the angles opposite each other when two lines intersect. The two vertical angles are congruent.

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

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

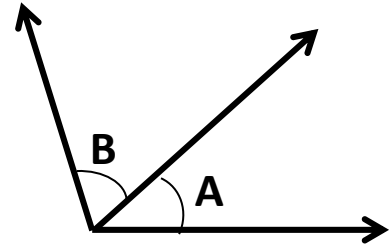


# Measuring Angles

**Adjacent Angles** are the angles having a common side and a common vertex.

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

$\angle A$  is adjacent to  $\angle B$

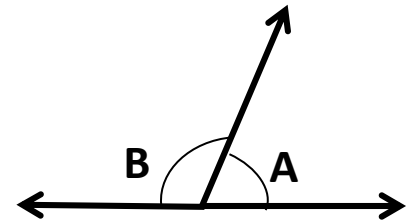


# Measuring Angles

A **Linear Pair** of angles is formed when two lines intersect each other. Two angles are **Linear** if they are adjacent angles formed by two intersecting lines.

The angles **A** and **B** shown in the figure are adjacent angles and also a linear pair.

$\angle A$  and  $\angle B$  are linear



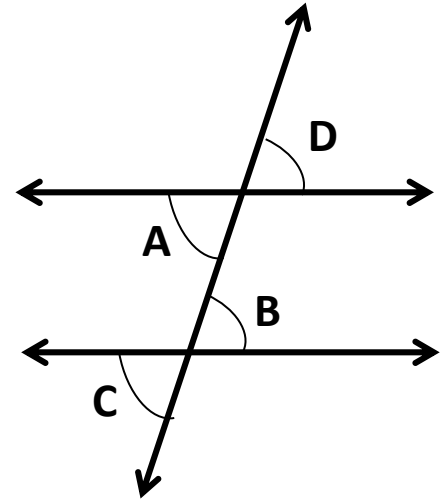


# Measuring Angles

When two coplanar lines are crossed by a 3<sup>rd</sup> 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.

$$\angle A \cong \angle B \quad \text{and} \quad \angle C \cong \angle D$$

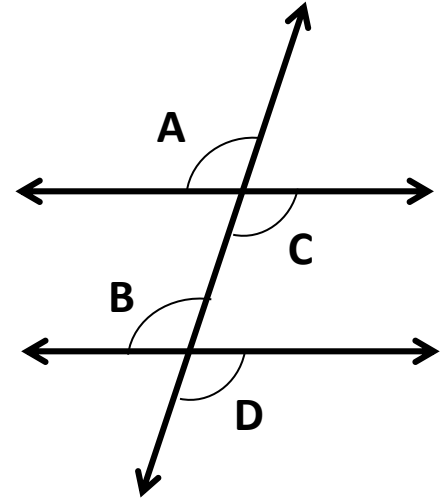


# Measuring Angles

When two coplanar lines are crossed by a 3<sup>rd</sup> 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 pairs of corresponding angles.
- If a transversal intersects two **parallel** lines, then the corresponding angles are congruent.

$$\angle A \cong \angle B \quad \text{and} \quad \angle C \cong \angle D$$



# Measuring Angles

## Problem 1:

Identify all the pairs 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**

