Identify Pairs of Lines and Angles

Unit 3 Lesson 1

IDENTIFYING PAIRS OF LINES AND ANGLES

Students will be able to:

identify pairs of lines and angles and use them to find different angle measures.

Key Vocabulary

- **Parallel, Perpendicular, Intersecting lines**
- **Complementary, Supplementary and Linear Pair of angles**
- **Vertical, Alternate (exterior and interior) and Corresponding angles**

IDENTIFYING PAIRS OF LINES AND ANGLES

What is a line?

A line is set of points and extends in both directions without ending.

It is represented by an arrowhead on the letter like $\overleftrightarrow{l}$ or if the points are mentioned then it is written as $\overleftrightarrow{AB}$. There are three different types of lines:

1. **Parallel lines**
2. **Intersecting lines**
3. **Perpendicular lines**

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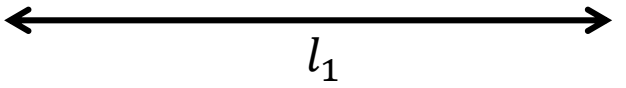
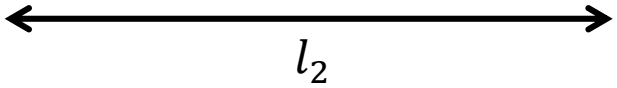
IDENTIFYING PAIRS OF LINES AND ANGLES

Parallel lines:

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



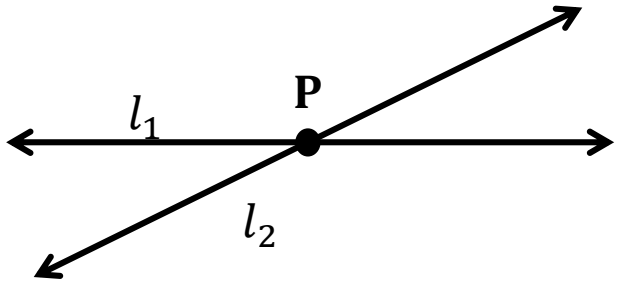


$\overleftrightarrow{l_1} \parallel \overleftrightarrow{l_2}$

IDENTIFYING PAIRS OF LINES AND ANGLES

Intersecting lines:

Two lines are intersecting if they meet (or cut or cross) each other at some point.

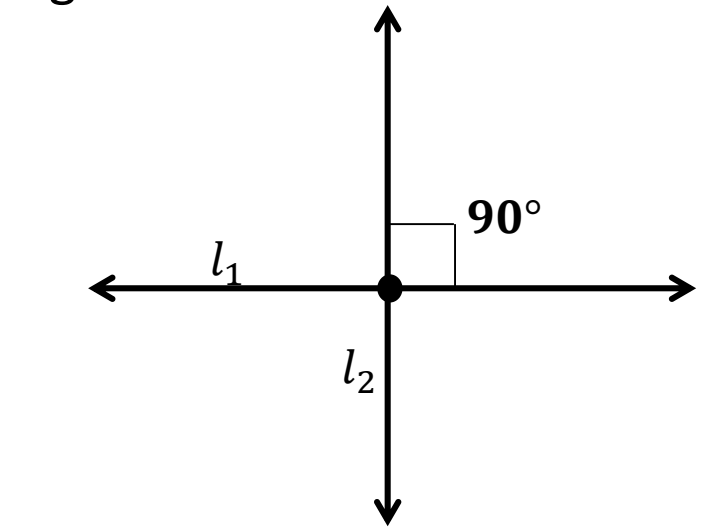


$\overleftrightarrow{l_1}$ **is intersecting** $\overleftrightarrow{l_2}$ **at point P**

IDENTIFYING PAIRS OF LINES AND ANGLES

Perpendicular lines:

Two lines are perpendicular if they meet (or cut or cross) each other at an angle of 90 degrees.

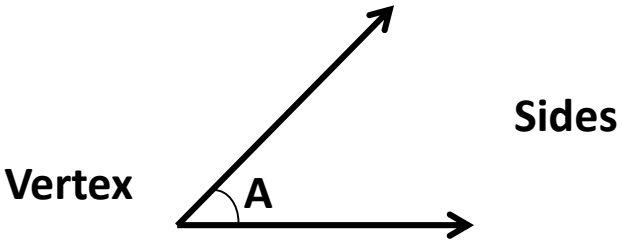


$\overleftrightarrow{l_1}$ is perpendicular to $\overleftrightarrow{l_2}$

IDENTIFYING PAIRS OF LINES AND ANGLES

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

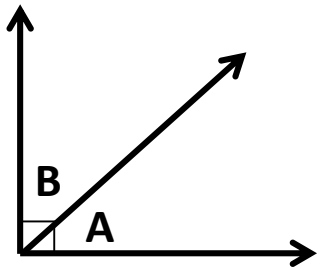
- The two lines form the sides of an angle.
- The point where two lines are meeting is called the **vertex.**
- The angle is represented by a $\angle$ symbol along with a letter.



IDENTIFYING PAIRS OF LINES AND 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°.

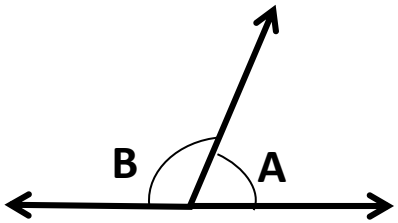


$$\angle A + \angle B = 90°$$

IDENTIFYING PAIRS OF LINES AND 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°.

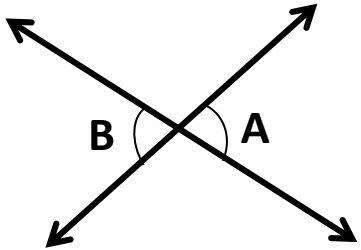


$$\angle A + \angle B = 180°$$

IDENTIFYING PAIRS OF LINES AND ANGLES

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.

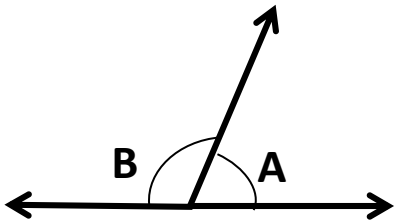


$$\angle A \cong \angle B$$

IDENTIFYING PAIRS OF LINES AND ANGLES

A **linear pair** of angle 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.

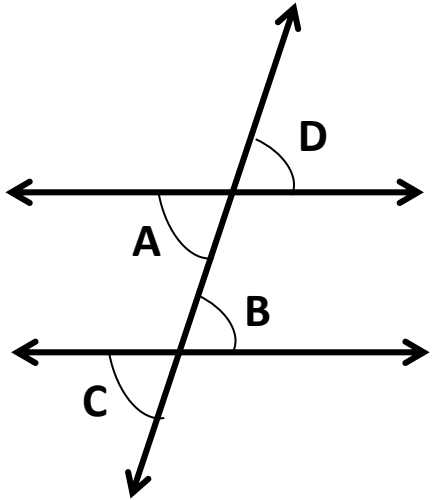


∠ A and ∠B are linear

IDENTIFYING PAIRS OF LINES AND ANGLES

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.

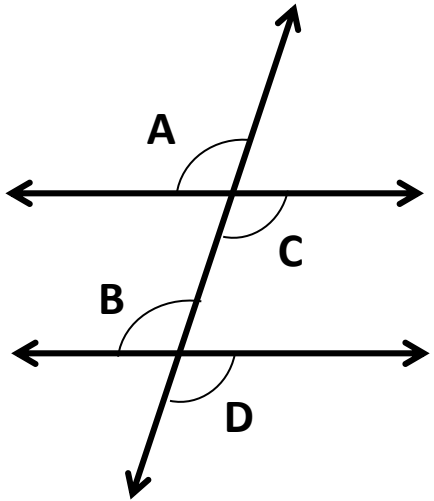


$\angle A \cong \angle B$ **and** $\angle C \cong \angle D$

IDENTIFYING PAIRS OF LINES AND ANGLES

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.

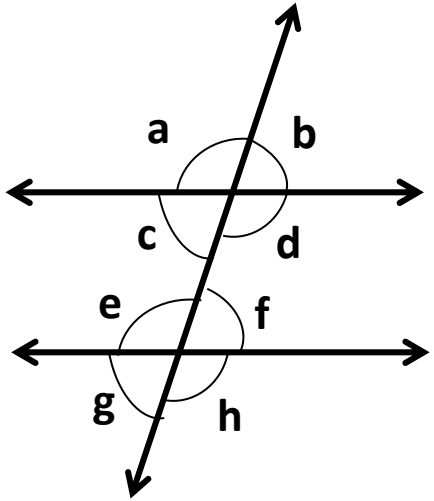


$\angle A \cong \angle B$ **and** $\angle C \cong \angle D$

IDENTIFYING PAIRS OF LINES AND ANGLES

Problem 1:

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



Alternate angles:

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

Vertical angles:

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

Corresponding angles:

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