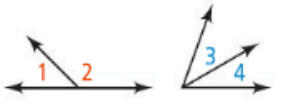
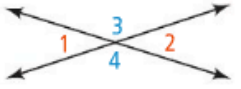
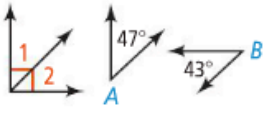
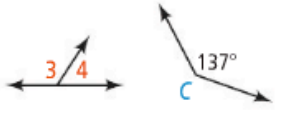
1-5 Exploring Angle Pairs

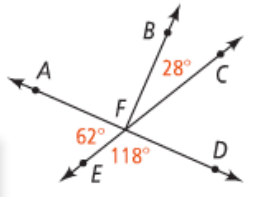
take note

Key Concept Types of Angle Pairs

Definition	Example
Adjacent angles are two coplanar angles with a common side, a common vertex, and no common interior points.	$\angle 1$ and $\angle 2$, $\angle 3$ and $\angle 4$ 
Vertical angles are two angles whose sides are opposite rays.	$\angle 1$ and $\angle 2$, $\angle 3$ and $\angle 4$ 
Complementary angles are two angles whose measures have a sum of 90. Each angle is called the *complement* of the other.	$\angle 1$ and $\angle 2$, $\angle A$ and $\angle B$ 
Supplementary angles are two angles whose measures have a sum of 180. Each angle is called the *supplement* of the other.	$\angle 3$ and $\angle 4$, $\angle B$ and $\angle C$ 

Problem 1 Identifying Angle Pairs

Use the diagram at the right. Is the statement true? Explain.



A $\angle BFD$ and $\angle CFD$ are adjacent angles.

B $\angle AFB$ and $\angle EFD$ are vertical angles.

C $\angle AFE$ and $\angle BFC$ are complementary.

take note

Concept Summary Finding Information From a Diagram

There are some relationships you can assume to be true from a diagram that has no marks or measures. There are other relationships you cannot assume directly. For example, you *can* conclude the following from an unmarked diagram.

- Angles are adjacent.
- Angles are adjacent and supplementary.
- Angles are vertical angles.

You *cannot* conclude the following from an unmarked diagram.

- Angles or segments are congruent.
- An angle is a right angle.
- Angles are complementary.

Problem 2 Making Conclusions From a Diagram

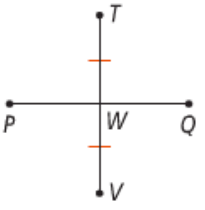
2. Can you make each conclusion from the information in the diagram? Explain.

a. $\overline{TW} \cong \overline{WV}$

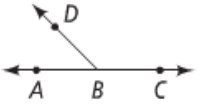
b. $\overline{PW} \cong \overline{WQ}$

c. $\angle TWQ$ is a right angle.

d. $\overline{TV}$ bisects $\overline{PQ}$.



A **linear pair** is a pair of adjacent angles whose noncommon sides are opposite rays. The angles of a linear pair form a straight angle.



take note

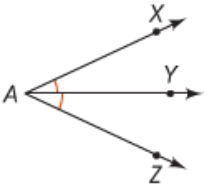
Postulate 1-9 Linear Pair Postulate

If two angles form a linear pair, then they are supplementary.

Problem 3 **Finding Missing Angle Measures**

Algebra $\angle KPL$ and $\angle JPL$ are a linear pair, $m\angle KPL = 2x + 24$, and $m\angle JPL = 4x + 36$. What are the measures of $\angle KPL$ and $\angle JPL$?

An **angle bisector** is a ray that divides an angle into two congruent angles. Its endpoint is at the angle vertex.



Problem 4 Using an Angle Bisector to Find Angle Measures

Multiple Choice $\overrightarrow{AC}$ bisects $\angle DAB$. If $m\angle DAC = 58$, what is $m\angle DAB$?

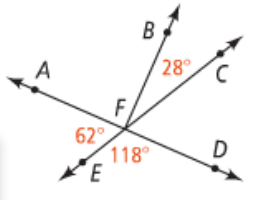
(A) 29 (B) 58 (C) 87 (D) 116

1. Use the diagram in Problem 1. Is the statement true? Explain.

a. $\angle AFE$ and $\angle CFD$ are vertical angles.

b. $\angle BFC$ and $\angle DFE$ are supplementary.

c. $\angle BFD$ and $\angle AFB$ are adjacent angles.



b. $\angle ADB$ and $\angle BDC$ are a linear pair. $m\angle ADB = 3x + 14$ and $m\angle BDC = 5x - 2$. What are $m\angle ADB$ and $m\angle BDC$?