

1-5 Exploring Angle Pairs

Take note

Key Concept Types of Angle Pairs

Definition

Adjacent angles are two coplanar angles with a common side, a common vertex, and no common interior points.

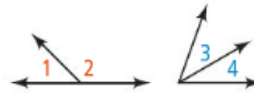
Vertical angles are two angles whose sides are opposite rays.

Complementary angles are two angles whose measures have a sum of 90. Each angle is called the *complement* of the other.

Supplementary angles are two angles whose measures have a sum of 180. Each angle is called the *supplement* of the other.

Example

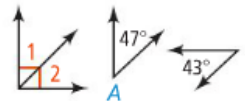
$\angle 1$ and $\angle 2$, $\angle 3$ and $\angle 4$



$\angle 1$ and $\angle 2$, $\angle 3$ and $\angle 4$



$\angle 1$ and $\angle 2$, $\angle A$ and $\angle B$



$\angle 3$ 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.

not adjacent,
because they overlap

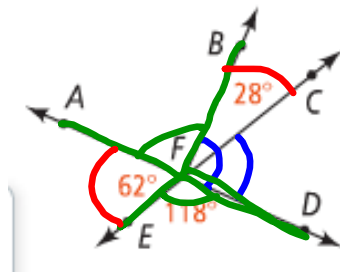
B $\angle AFB$ and $\angle EFD$ are vertical angles.

not vertical,
because both lines are not straight

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

$$62 + 28 = 90$$

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

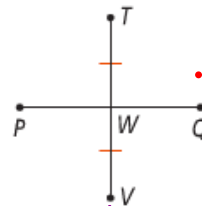
2. Can you make each conclusion from the information in the diagram? Explain.

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

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

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

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



a. yes, marked

b. no, not marked

c. no, not marked

d. no, not marked

e. \overline{PQ} bisect \overline{TV}
yes, marked

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.

$$\underline{+ = 180^\circ}$$



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 $\angle JPL$?

$$\angle KPL + \angle JPL = 180$$

$$\underline{2x + 24} + \underline{4x + 36} = 180$$

$$6x + 60 = 180$$

$$6x = 120$$

$$x = 20$$

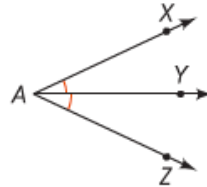
$$2(20) + 24$$

$$m\angle KPL = 64^\circ$$

$$4(20) + 36$$

$$m\angle JPL = 116^\circ$$

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



\vec{AY} bisects $\angle XAZ$



Problem 4 Using an Angle Bisector to Find Angle Measures

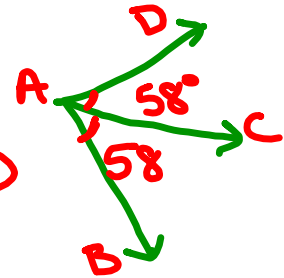
Multiple Choice \vec{AC} bisects $\angle DAB$. If $m\angle DAC = 58$, what is $m\angle DAB$?

(A) 29

(B) 58

(C) 87

(D) 116



$$58 + 58$$

Name

1.5

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Notes 1.7