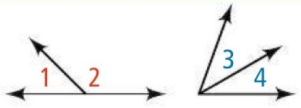
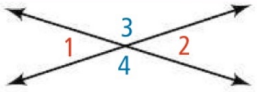
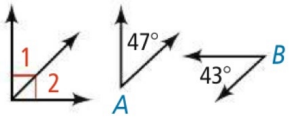
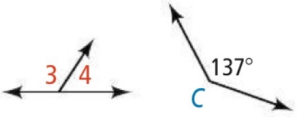
Exploring Angle Pairs

Goal: To learn how to describe different angle pairs, identify geometric relationships, and use these angle pairs to find angle measures.

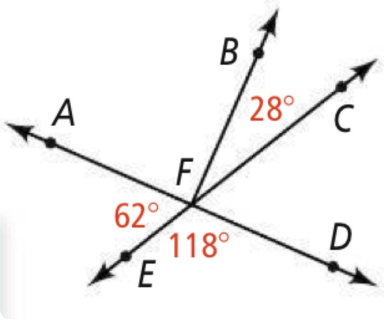
take note

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 $\angle C$ 

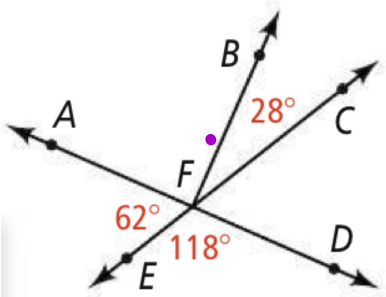
Use the diagram to determine if the statement is true or false. Explain.

Ex 1a) ∠BFD and ∠CFD are adjacent angles.



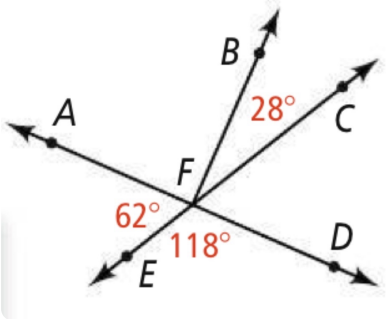
Ex 1b) $\angle AFB$ and $\angle EFD$ are vertical angles.

Ex 1c) $\angle AFE$ and $\angle BFC$ are complementary.



Ex 1d) $\angle AFE$ and $\angle CFD$ are vertical angles.

Ex 1e) $\angle BFC$ and $\angle DFE$ are supplementary.



Ex 1f) $\angle BFD$ and $\angle AFB$ are adjacent angles.

take note

Concept Summary **Finding Information From a Diagram**

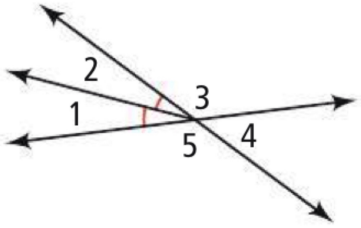
There are some relationships you can assume to be true from a diagram that has no marks or measures. There are other relationships you cannot assume directly. For example, you *can* conclude the following from an unmarked diagram.

- 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.

Ex 2a) What can you conclude from the information in the diagram?



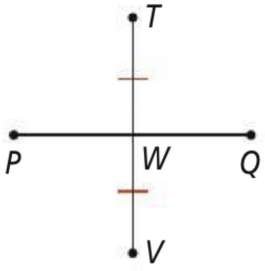
Ex 2b) What can you conclude from the information in the diagram? Circle all that apply.

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

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

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

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



Def: A linear pair is a pair of adjacent angles whose no common sides are opposite rays.

take note

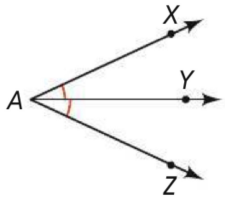
Postulate 1-9 Linear Pair Postulate

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

Ex 3a) $\angle KPL$ 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 $\angle JPL$?

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

Def: An angle bisector is a ray that divides an angle into two congruent angles.



Ex 4a) $\overrightarrow{AC}$ bisects $\angle DAB$. If $m\angle DAC = 58$, what is $m\angle DAB$?

Ex 4b) $\overrightarrow{KM}$ bisects $\angle JKL$. If $m\angle JKL = 72$, what is $m\angle JKM$?

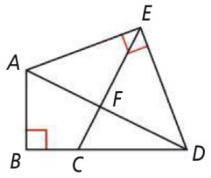
Lesson Check:

Lesson Check

Do you know HOW?

Name a pair of the following types of angle pairs.

1. vertical angles
2. complementary angles
3. linear pair



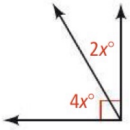
4. $\overrightarrow{PB}$ bisects $\angle RPT$ so that $m\angle RPB = x + 2$ and $m\angle TPB = 2x - 6$. What is $m\angle RPT$?

Do you UNDERSTAND? MATHEMATICAL PRACTICES

5. **Vocabulary** How does the term *linear pair* describe how the angle pair looks?

6. **Error Analysis** Your friend calculated the value of x below. What is her error?

$$4x + 2x = 180$$
$$6x = 180$$
$$x = 30$$



Homework:

Textbook p. 38-39 #7-26, 29-30, 32-37

(28 problems total)