

# **SECTION 1 – 4**

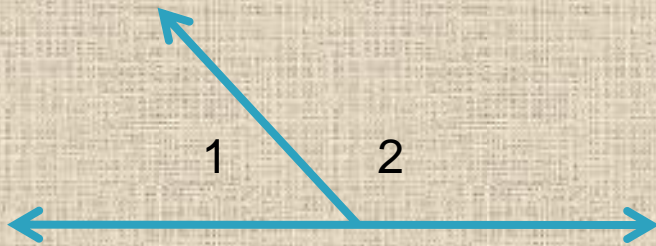
## **Pairs of Angles**

# OBJECTIVES

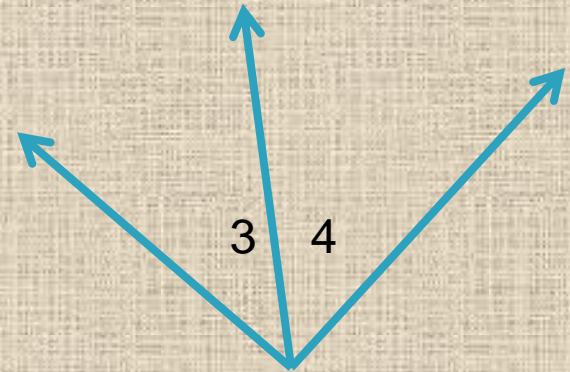
1. to identify adjacent, vertical, complementary, and supplementary angles
2. to find measures of pairs of angles

# ADJACENT ANGLES

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



$\angle 1$  and  $\angle 2$  are adjacent angles.



$\angle 3$  and  $\angle 4$  are adjacent angles.

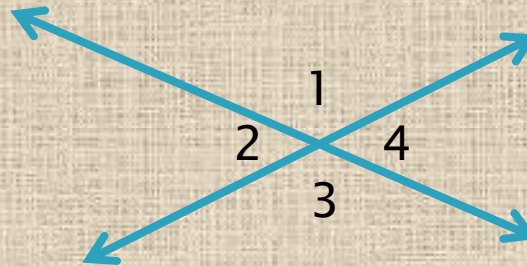
# VERTICAL ANGLES

two nonadjacent angles formed by two intersecting lines

Vertical angle pairs:

$\angle 1$  and  $\angle 3$

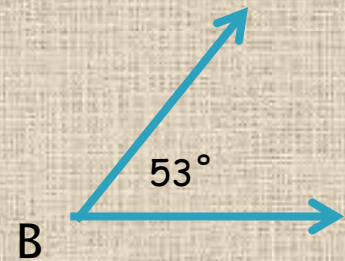
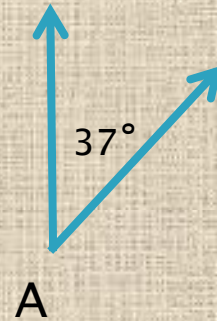
$\angle 2$  and  $\angle 4$



# COMPLEMENTARY ANGLES

two angles whose measures have a sum of  $90^\circ$ . Each angle is called the *complement* of the other.

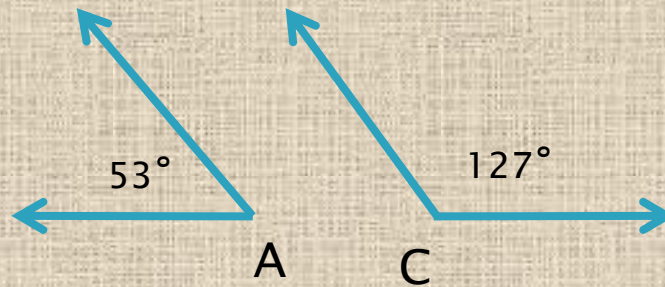
$\angle A$  and  $\angle B$  are a pair of complementary angles.



# SUPPLEMENTARY ANGLES

two angles whose measures have a sum of  $180^\circ$ .  
Each angle is called the *supplement* of the other.

$\angle A$  and  $\angle C$  are a  
pair of  
supplementary  
angles



# LINEAR PAIR

pair of adjacent angles whose non-common sides are opposite rays. The angles of a linear pair form a straight angle.

$\angle 3$  and  $\angle 4$  form a linear pair.



# COMPARE AND CONTRAST

Relationships you can assume true without marks:

- ▶ Angles are adjacent.
- ▶ Angles are adjacent supplementary (form a line).
- ▶ Angles are vertical angles.

Relationships that must be marked:

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



# SUMMARY

Angles pairs with special totals:

1. Complementary angles sum to be  $90^\circ$ .
2. Supplementary angles sum to be  $180^\circ$ .

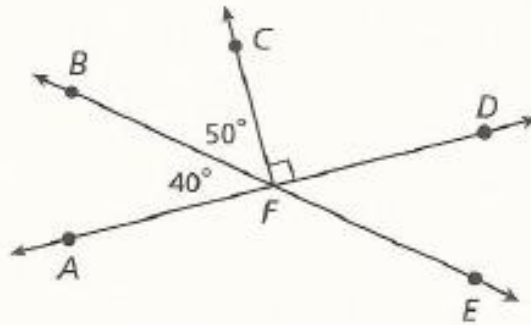
Angle pairs formed by intersecting lines.

3. Linear pairs are adjacent angles that are supplementary.
4. Vertical angles are opposite angles that are congruent.



# CLASS WORK

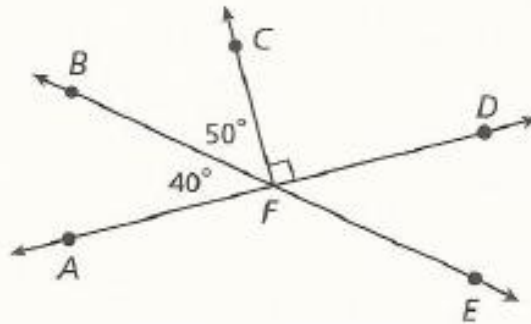
Use the diagram below.



- A** Name a pair of adjacent angles. \_\_\_\_\_
- B** Name a pair of vertical angles. \_\_\_\_\_
- C** Name a pair of complementary angles. \_\_\_\_\_
- D** Name an angle that is supplementary to  $\angle CFE$ . \_\_\_\_\_
- E** Name an angle that is supplementary to  $\angle BFD$ . \_\_\_\_\_
- F** Name an angle that is supplementary to  $\angle CFD$ . \_\_\_\_\_
- G** Name a pair of non-adjacent angles that are complementary. \_\_\_\_\_

# CLASS WORK

Use the diagram below.

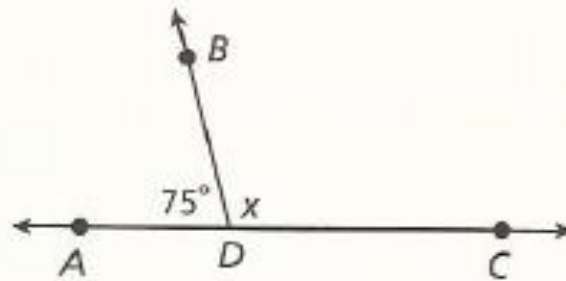


- A** Name a pair of adjacent angles.  $\angle AFB$  and  $\angle BFC$
- B** Name a pair of vertical angles.  $\angle AFB$  and  $\angle DFE$
- C** Name a pair of complementary angles.  $\angle AFB$  and  $\angle BFC$
- D** Name an angle that is supplementary to  $\angle CFE$ .  $\angle BFC$
- E** Name an angle that is supplementary to  $\angle BFD$ .  $\angle DFE$
- F** Name an angle that is supplementary to  $\angle CFD$ .  $\angle CFA$
- G** Name a pair of non-adjacent angles that are complementary.  $\angle BFC$  and  $\angle DFE$

# CLASS WORK

Find the measure of each angle.

**A**  $\angle BDC$



$\angle BDC$  and \_\_\_\_\_ are \_\_\_\_\_ angles.

The sum of their measures is \_\_\_\_\_.

Write an equation to help you find the measure of  $\angle BDC$ .

$$75 + x = \underline{\hspace{2cm}}$$

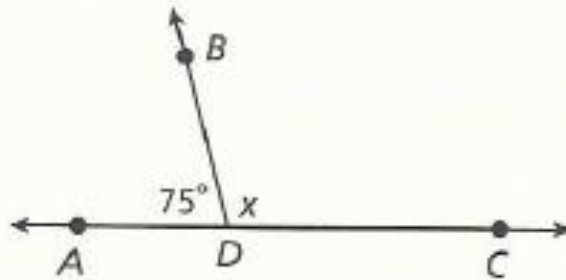
solve the equation for  $x$ .

$$m\angle BDC = \underline{\hspace{2cm}}.$$

# CLASS WORK

Find the measure of each angle.

**A**  $\angle BDC$



$\angle BDC$  and  $\angle BDA$  are supplementary angles.

The sum of their measures is  $180^\circ$ .

Write an equation to help you find the measure of  $\angle BDC$ .

$$75 + x = \underline{180}$$

solve the equation for  $x$ .

$$m\angle BDC = \underline{105^\circ}$$

# CLASS WORK

Find the measure of each angle in the angle pair described.

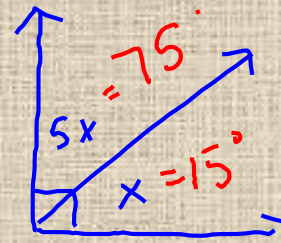
1. The measure of one angle is 5 times the measure of its complement.
2.  $\angle ABC$  and  $\angle CBD$  are supplementary. If  $m\angle ABC = 4x + 73$ , and  $m\angle CBD = 7x - 25$ , find the measures of both angles.

# CLASS WORK

Find the measure of each angle in the angle pair described.

1. The measure of one angle is 5 times the measure of its complement.

$$\begin{aligned}x + 5x &= 90 \\6x &= 90 \\x &= 15\end{aligned}$$



2.  $\angle ABC$  and  $\angle CBD$  are supplementary. If  $m\angle ABC = 4x + 73$ , and  $m\angle CBD = 7x - 25$ , find the measures of both angles.

$$m\angle ABC + m\angle CBD = 180$$

$$4x + 73 + 7x - 25 = 180$$

$$11x + 48 = 180$$

$$11x = 132$$

$$x = 12$$

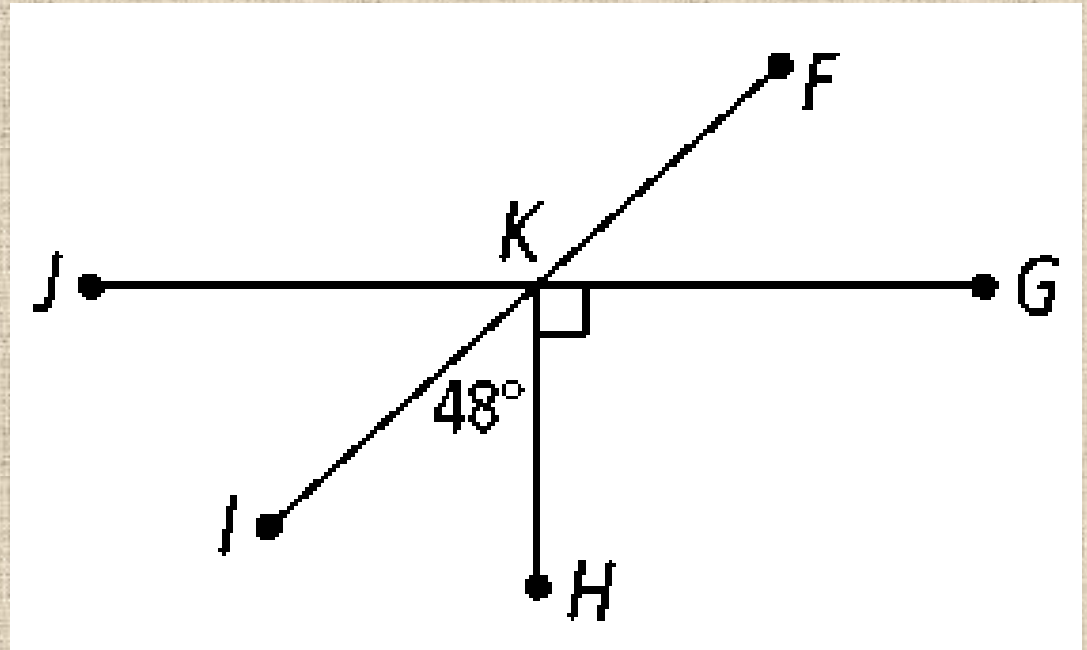
$$m\angle ABC = 4(12) + 73 = 121$$

$$m\angle CBD = 7(12) - 25 = 59$$

# PRACTICE PROBLEM

In the diagram at the right,  $m\angle HKI = 48$ . Find each of the following.

- $m\angle IKJ$
- $m\angle FKG$
- $m\angle FKH$
- $m\angle FKJ$
- $m\angle GKI$





# PRACTICE PROBLEM

In the diagram at the right,  $m\angle HKI = 48$ . Find each of the following.

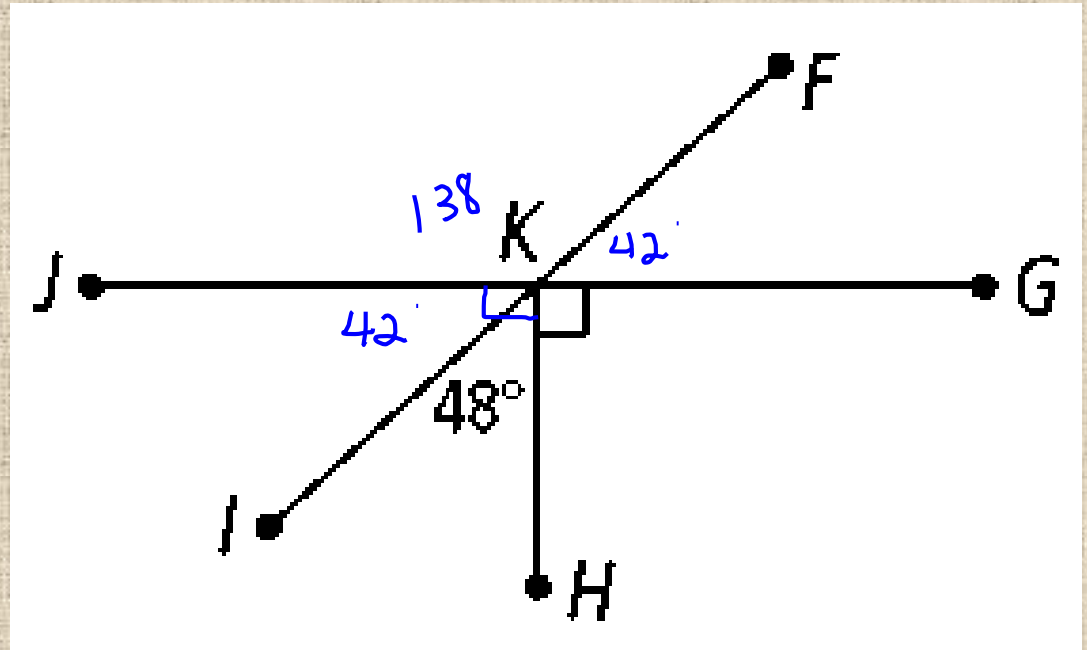
$$m\angle IKJ = 42^\circ$$

$$m\angle FKG = 42^\circ$$

$$m\angle FKH = 132^\circ$$

$$m\angle FKJ = 138^\circ$$

$$m\angle GKI = 138^\circ$$



# LEARNING RUBRIC

- ▶ Got It: Represents and applies angle pairs to complex/real world situations
- ▶ Almost There: Represent/apply angle pair properties with expressions
- ▶ Moving Forward: Represent/apply angle pair properties without expressions.
- ▶ Getting Started: Identifies angle pairs

# HOMework

- ▶ Pages 32 – 33
- ▶ 14 – 32 even
- ▶ 36, 40, 42