Complementary and Supplementary Angles

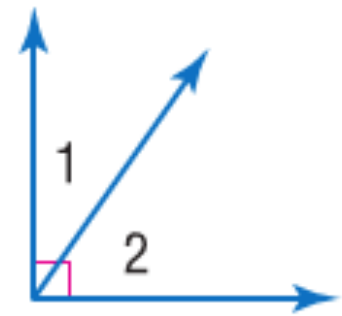
Lesson 7.2

Vocabulary:

Complementary Angles -

the sum of two angles is 90 degrees

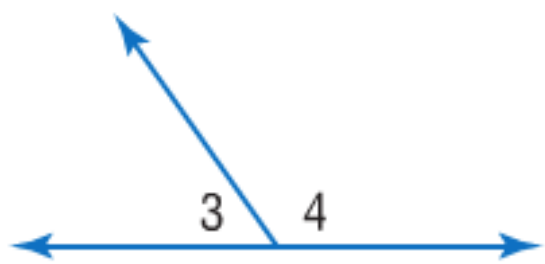
$$m\angle 1 + m\angle 2 = 90^\circ$$



Supplementary Angles -

the sum of two angles is 180 degrees

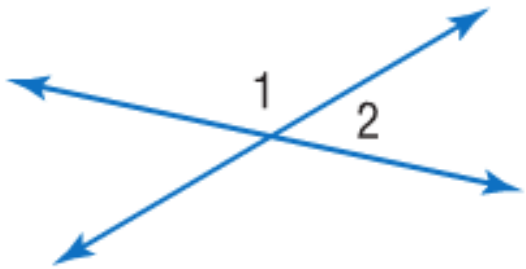
$$m\angle 3 + m\angle 4 = 180^\circ$$



Examples

Identify each pair of angles as *complementary, supplementary,* or *neither*.

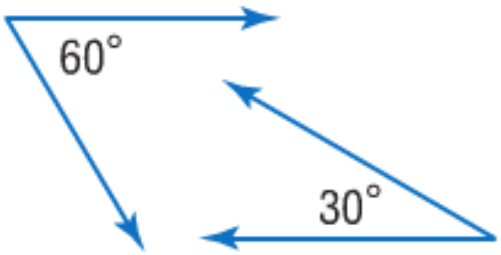
1.



$\angle 1$ and $\angle 2$ form a straight angle. So, the angles are supplementary.

Supplementary

2.



$$60° + 30° = 90°$$

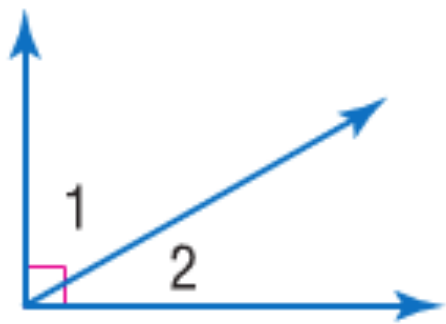
The angles are complementary.

Complementary

Examples

Identify each pair of angles as *complementary, supplementary,* or *neither*.

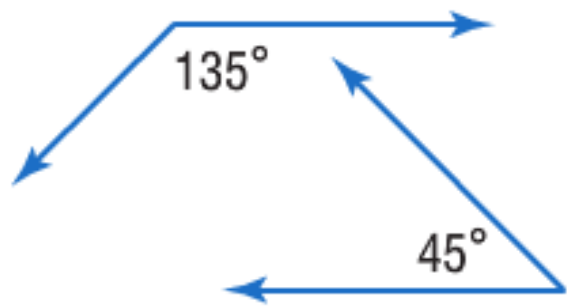
3.



The two angles form a right angle.

Complementary

4.



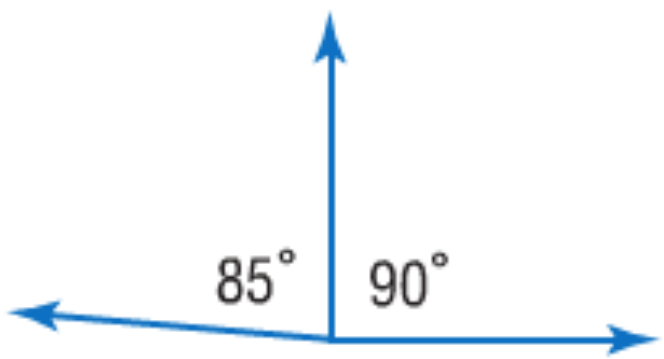
135 + 45 = 180

Supplementary

Got It? Do these problems to find out.

Identify each pair of angles as *complementary, supplementary,* or *neither*.

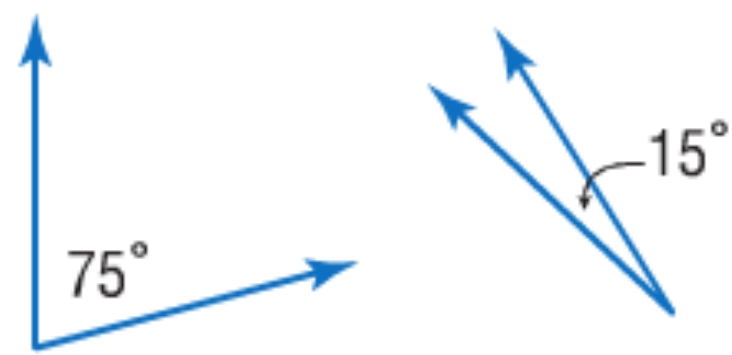
a.



85 + 90 = 175

Neither

b.



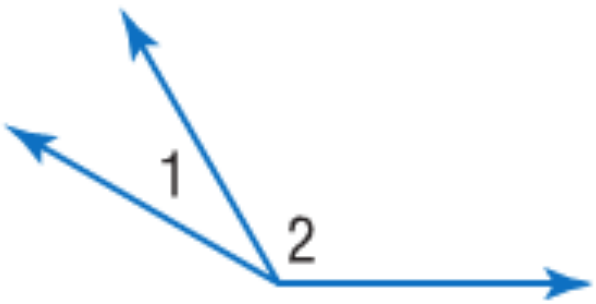
75 + 15 = 90

Complementary

Got It? Do these problems to find out.

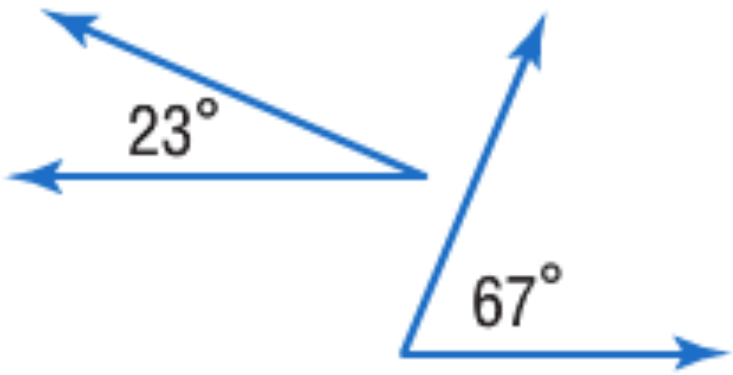
Identify each pair of angles as *complementary, supplementary,* or *neither*.

c.



Neither

d.



$23 + 67 = 90$

Complementary

Find a Missing Measure

1. Determine if the angles are complementary or supplementary.

2. Write an equation.

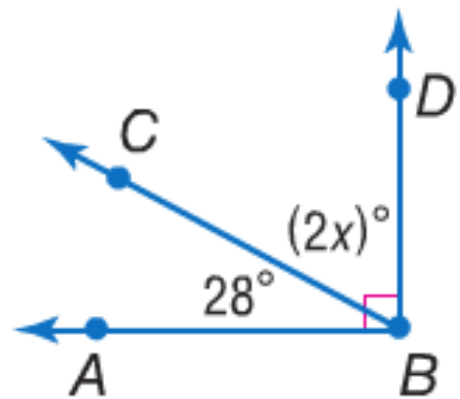
Complementary - $m\angle 1 + m\angle 2 = 90°$

Supplementary - $m\angle 3 + m\angle 4 = 180°$

3. Solve the equation.

Examples

5. Find the value of *x*.



a. Determine if the angles are complementary or supplementary.

complementary

b. Write an equation.

$$28 + 2x = 90$$

c. Solve the equation.

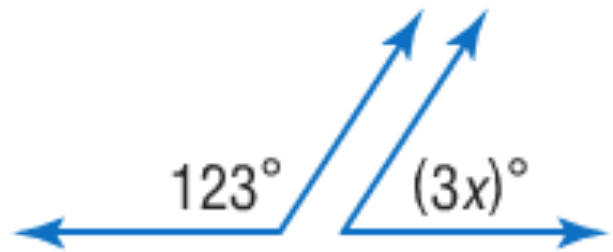
$$-28 \qquad = -28$$

$$\frac{2x}{2} = \frac{62}{2}$$

$$x = 31$$

Examples

6. Find the value of *x*.



a. Determine if the angles are complementary or supplementary.

supplementary

b. Write an equation.

$$123 + 3x = 180$$

c. Solve the equation.

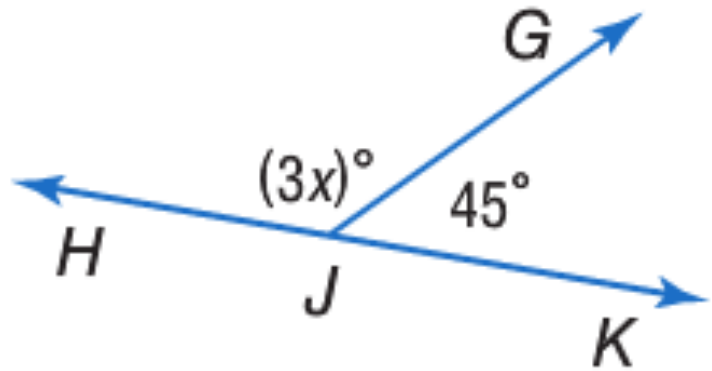
$$-123 \qquad = -123$$

$$\frac{3x}{3} = \frac{57}{3}$$

$$x = 19$$

Got It? Do these problems to find out.

e. Find the value of *x*.



$$3x + 45 = 180$$

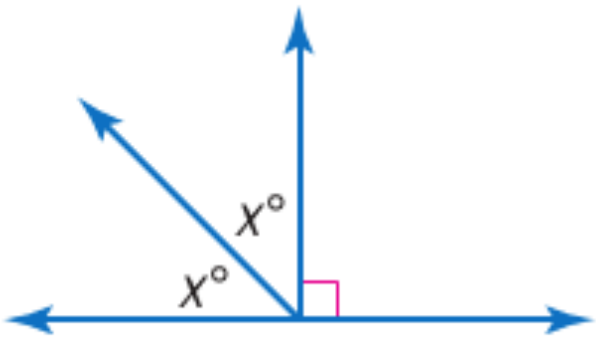
$$\underline{\quad -45 \quad -45}$$

$$\frac{3x}{3} = \frac{135}{3}$$

$$\boxed{x = 45}$$

Got It? Do these problems to find out.

f. Find the value of x.



$$2x = 90$$

$$\frac{2x}{2} = \frac{90}{2}$$

$$\boxed{x = 45}$$

Got It? Do these problems to find out.

g. $\angle J$ and $\angle K$ are supplementary. The measure of $\angle J$ is $(9x)°$ and the measure of $\angle K$ is $45°$. What is the value of x?

$$9x + 45 = 180$$
$$\quad - 45 \quad - 45$$
$$\frac{9x}{9} = \frac{135}{9}$$

$$\boxed{x = 15}$$

Got It? Do these problems to find out.

h. $\angle C$ and $\angle D$ are complementary. The measure of $\angle C$ is $(4x)°$ and the measure of $\angle D$ is $26°$. What is the value of x?

$$4x + 26 = 90$$
$$\quad\quad - 26 \quad - 26$$

$$\frac{4x}{4} = \frac{64}{4}$$

$$\boxed{x = 16}$$

Real World Example

7. The picture shows a support brace for a gate. Find the value of *x*.

a. Determine if the angles are complementary or supplementary.

supplementary

b. Write an equation.

$$80 + 10x = 180$$

c. Solve the equation.

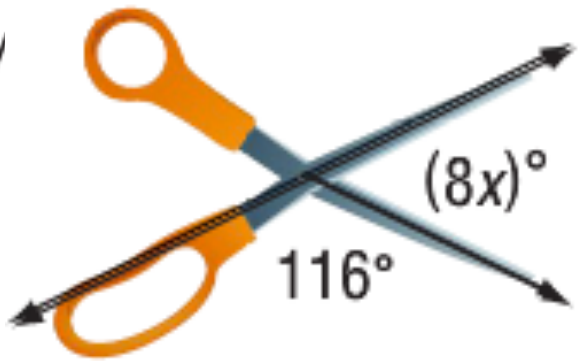
$$-80 \qquad = -80$$

$$\frac{10x}{10} = \frac{100}{10}$$

$$x = 10$$

Got It? Do these problems to find out.

i. What is the measure of the angle given by the opening of the scissors?



$$8x + 116 = 180$$
$$\quad - 116 \quad -116$$

$$\frac{8x}{8} = \frac{64}{8}$$

$$\boxed{x = 8}$$

Homework:

Pg. 547 - 550

#1-14 (all) & #23-28 (all)