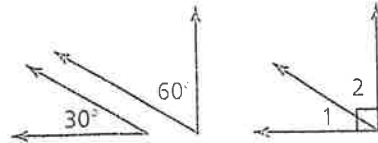


## Identifying Complementary and Supplementary Angles (Topic #3)

### Complementary Angles

**Words** Two angles are **complementary angles** when the sum of their measures is  $90^\circ$

**Examples**

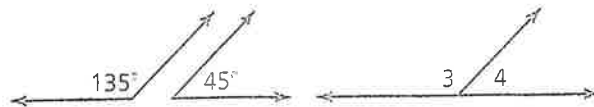


$\angle 1$  and  $\angle 2$  are complementary angles.

### Supplementary Angles

**Words** Two angles are supplementary angles when the sum of their measures is  $180^\circ$ .

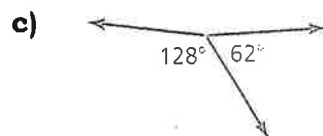
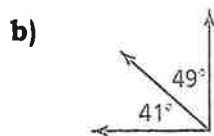
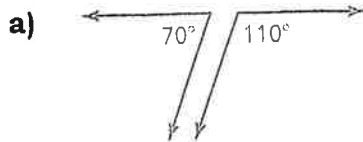
**Examples**



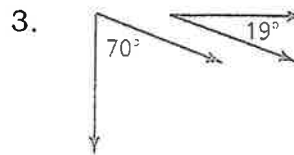
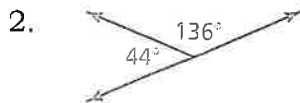
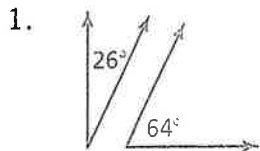
$\angle 3$  and  $\angle 4$  are supplementary angles.

### EXAMPLE 1: Classifying Pairs of Angles

Tell whether the angles are *complementary*, *supplementary*, or *neither*.

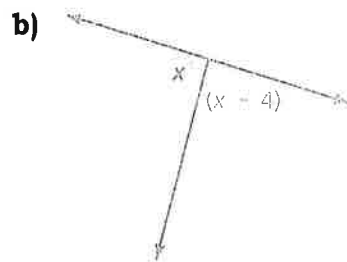
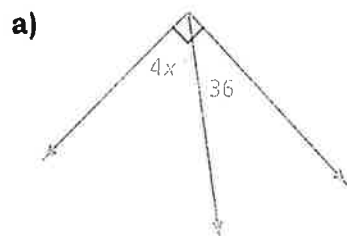


**PRACTICE:** Tell whether the angles are *complementary*, *supplementary*, or *neither*.



**EXAMPLE 2:** Using Complementary and Supplementary Angles

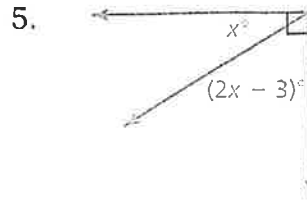
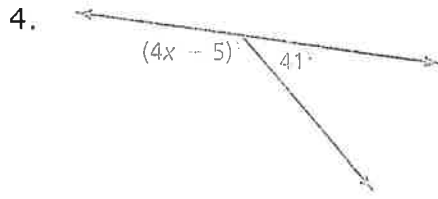
Tell whether the angles are *complementary* or *supplementary*. Then find the value of  $x$ .



**EXAMPLE 3:** Constructing Angles

Draw a pair of adjacent supplementary angles so that one angle has a measure of  $60^\circ$ .

**PRACTICE:** Tell whether the angles are *complementary* or *supplementary*. Then find the value of  $x$ .



6. Draw a pair of adjacent supplementary angles so that one angle has a measure of  $15^\circ$ .

NAME: \_\_\_\_\_  
ANGLES

DATE: \_\_\_\_\_  
PERIOD: \_\_\_\_\_

### HOMework #3

1. Explain how complementary angles and supplementary angles are different.

2. Can adjacent angles be supplementary? complementary? neither? Explain.

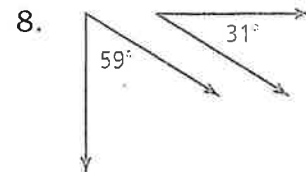
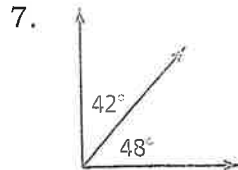
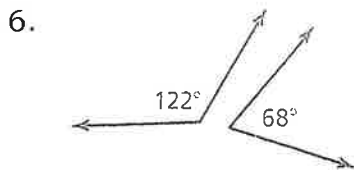
**Tell whether the statement is always, sometimes, or never true. Explain.**

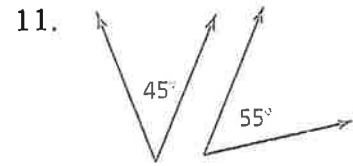
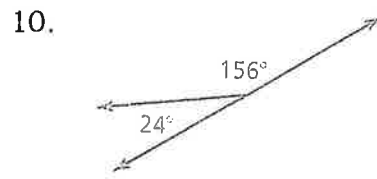
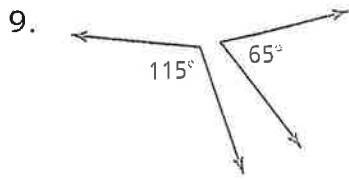
3. If  $x$  and  $y$  are supplementary angles, then  $x$  is obtuse.

4. If  $x$  and  $y$  are right angles, then  $x$  and  $y$  are supplementary angles.

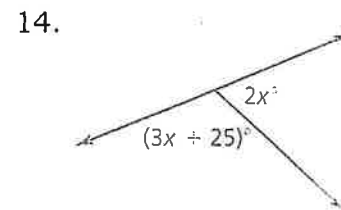
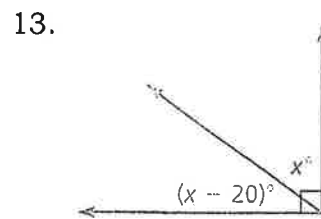
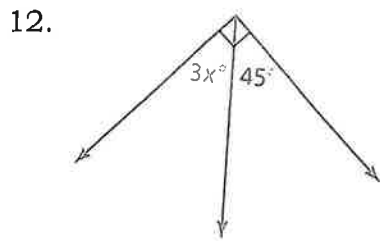
5. If  $x$  and  $y$  are complementary angles, then  $y$  is a right angle.

**Tell whether the angles are *complementary*, *supplementary*, or *neither*.**





**Tell whether the angles are *complementary* or *supplementary*. Then find the value of  $x$ .**



NAME: \_\_\_\_\_  
ANGLES

KEY

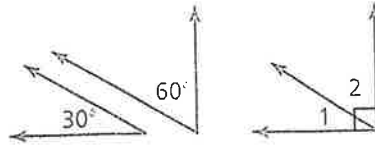
DATE: \_\_\_\_\_  
PERIOD: \_\_\_\_\_

## Identifying Complementary and Supplementary Angles (Topic #3)

### Complementary Angles

**Words** Two angles are **complementary angles** when the sum of their measures is  $90^\circ$ .

**Examples**

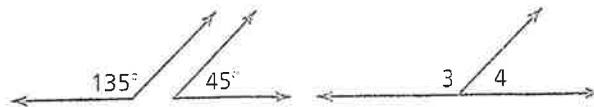


$\angle 1$  and  $\angle 2$  are complementary angles.

### Supplementary Angles

**Words** Two angles are supplementary angles when the sum of their measures is  $180^\circ$ .

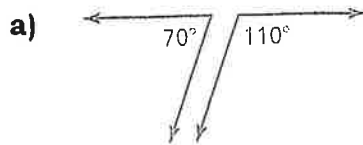
**Examples**



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

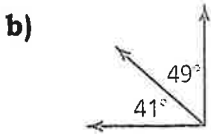
### EXAMPLE 1: Classifying Pairs of Angles

Tell whether the angles are **complementary**, **supplementary**, or **neither**.



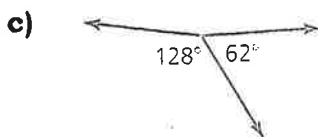
$$70 + 110 = 180$$

Supplementary



$$41 + 49 = 90$$

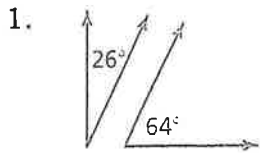
Complementary



$$128 + 62 = 190$$

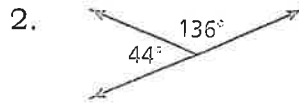
Neither

**PRACTICE:** Tell whether the angles are *complementary*, *supplementary*, or *neither*.



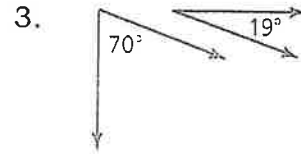
$$26 + 64 = 90$$

Complementary



$$44 + 136 = 180$$

Supplementary

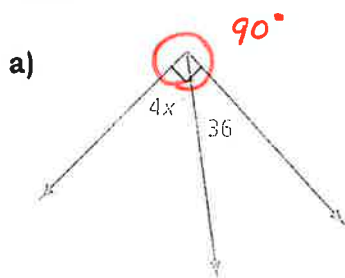


$$70 + 19 = 89$$

Neither

**EXAMPLE 2:** Using Complementary and Supplementary Angles

Tell whether the angles are *complementary* or *supplementary*. Then find the value of  $x$ .



Complementary ( $90^\circ$ )

$$4x + 36 = 90$$

$$\begin{array}{r} -36 \quad -36 \\ \hline 4x = 54 \end{array}$$

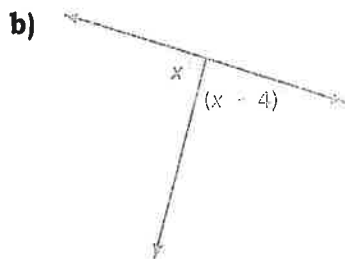
$$\begin{array}{r} 4 \quad 4 \\ \hline x = 13.5 \end{array}$$

$x = 13.5^\circ$

Solve algebraically.

1) Write an equation.

2) Solve for  $x$ .



Supplementary ( $180^\circ$ )

$$x + x - 4 = 180$$

$$2x - 4 = 180$$

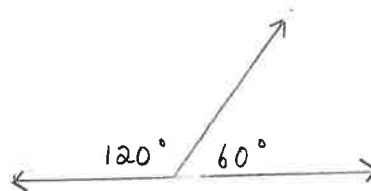
$$\begin{array}{r} -4 \quad -4 \\ \hline 2x = 176 \end{array}$$

$$\begin{array}{r} 2 \quad 2 \\ \hline x = 88 \end{array}$$

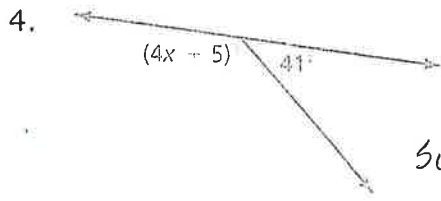
$x = 88^\circ$

**EXAMPLE 3:** Constructing Angles

Draw a pair of adjacent supplementary angles so that one angle has a measure of  $60^\circ$ .



**PRACTICE:** Tell whether the angles are *complementary* or *supplementary*. Then find the value of  $x$ .



Supplementary  
(180°)

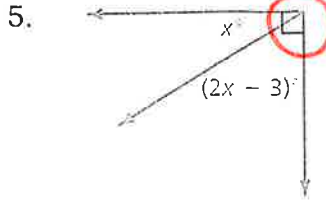
$$4x - 5 + 41 = 180$$

$$4x + 36 = 180$$

$$\underline{-36} \quad \underline{-36}$$

$$\frac{4x}{4} = \frac{144}{4}$$

$x = 36^\circ$



Complementary (90°)

$$2x - 3 + x = 90$$

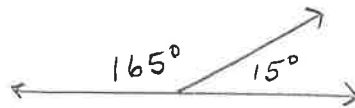
$$3x - 3 = 90$$

$$\underline{+3} \quad \underline{+3}$$

$$\frac{3x}{3} = \frac{93}{3}$$

$x = 31^\circ$

6. Draw a pair of adjacent supplementary angles so that one angle has a measure of 15°.





*Key*

### HOMWORK #3

1. Explain how complementary angles and supplementary angles are different.

*The sum of the measures of two complementary angles is  $90^\circ$ .  
 The sum of the measures of two supplementary angles is  $180^\circ$ .*

2. Can adjacent angles be supplementary? complementary? neither? Explain.

*Adjacent angles are not defined by their measure, so they can be complementary, supplementary, or neither.*

**Tell whether the statement is always, sometimes, or never true. Explain.**

3. If  $x$  and  $y$  are supplementary angles, then  $x$  is obtuse.

*Sometimes; Either  $x$  or  $y$  may be obtuse.*

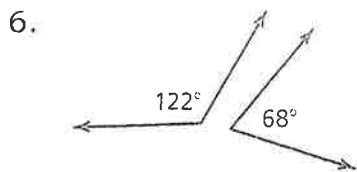
4. If  $x$  and  $y$  are right angles, then  $x$  and  $y$  are supplementary angles.

*Always;  $90^\circ + 90^\circ = 180^\circ$*

5. If  $x$  and  $y$  are complementary angles, then  $y$  is a right angle.

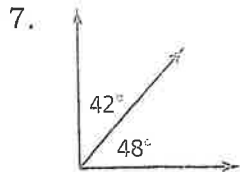
*Never; B/c  $x$  and  $y$  must both be less than  $90^\circ$  and greater than  $0^\circ$ .*

**Tell whether the angles are complementary, supplementary, or neither.**



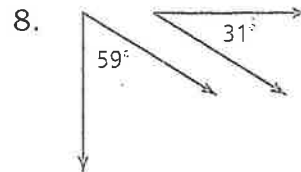
$122 + 68 = 190$

*Neither*



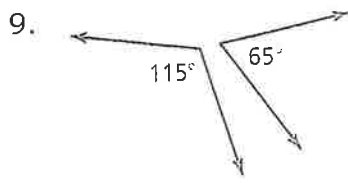
$42 + 48 = 90$

*Complementary*



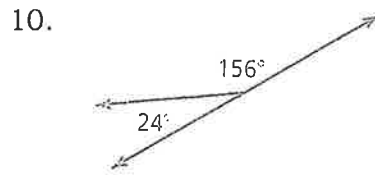
$59 + 31 = 90$

*Complementary*



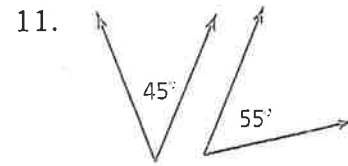
$$115 + 65 = 180$$

Supplementary



$$24 + 156 = 180$$

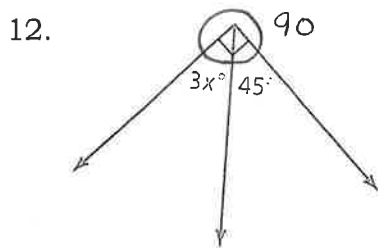
Supplementary



$$45 + 55 = 100$$

Neither

Tell whether the angles are *complementary* or *supplementary*. Then find the value of  $x$ .

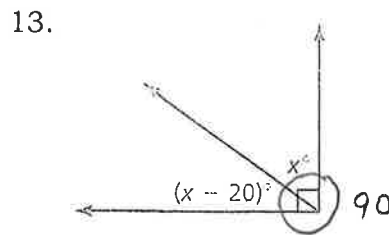


Complementary

$$3x + 45 = 90$$

$$\begin{array}{r} -45 \quad -45 \\ \hline 3x = 45 \\ \hline \frac{3x}{3} = \frac{45}{3} \end{array}$$

$$x = 15^\circ$$



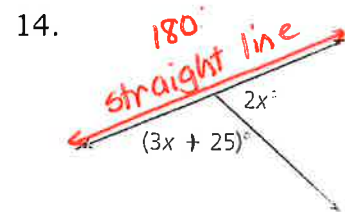
Complementary

$$x + x - 20 = 90$$

$$\begin{array}{r} 2x - 20 = 90 \\ +20 \quad +20 \\ \hline 2x = 110 \end{array}$$

$$\begin{array}{r} 2x = 110 \\ \hline \frac{2x}{2} = \frac{110}{2} \end{array}$$

$$x = 55^\circ$$



Supplementary

$$2x + 3x + 25 = 180$$

$$5x + 25 = 180$$

$$\begin{array}{r} -25 \quad -25 \\ \hline 5x = 155 \\ \hline \frac{5x}{5} = \frac{155}{5} \end{array}$$

$$x = 31^\circ$$

\* **STEPS**

1) Write an equation

2) Then solve for  $x$ .

3) Show all work.