

Describing Pairs of Angles

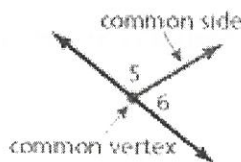
Lesson Objective: INBAT identify and find measures of complementary and supplementary angles.

Complementary and Supplementary Angles

Adjacent Angles: Two angles that share a common vertex and side, but NO common interior points.

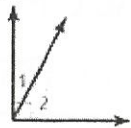


no "overlap"



Complementary Angles: Two positive angles whose measures have a sum of 90° .

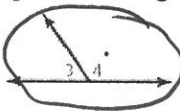
$m\angle 1 + m\angle 2 = 90^\circ$



$\angle A$ is the complement of $\angle B$
 $\angle B$ " " " " $\angle A$

Supplementary Angles: Two positive angles whose measures have a sum of 180° .

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



$\angle C$ is the supplement of $\angle D$
 $\angle D$ " " " " $\angle C$

linear pair: supp. AND adj.

****Complementary and supplementary angles can be adjacent or nonadjacent angles.**

Examples:

1. Name a pair of complementary angles.

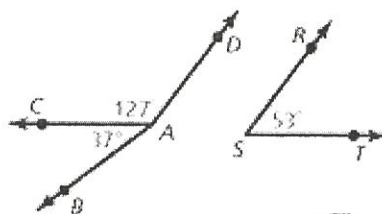
$\angle CAB$ and $\angle S$

2. Name a pair of supplementary angles.

$\angle CAD$ and $\angle S$

3. Name a pair of adjacent angles.

$\angle CAD$ and $\angle CAB$



Think About It...

Are $\angle FGK$ and $\angle KGH$ adjacent angles? Why or why not?

Yes because it meets all parts of definition

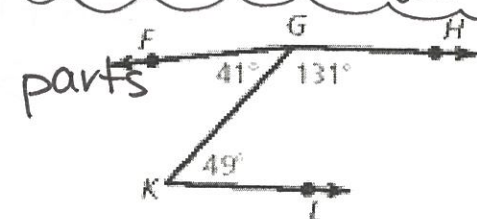
Are $\angle KGH$ and $\angle LKG$ adjacent angles? Why or why not?

No: no common vertex

Are $\angle FGK$ and $\angle FGH$ adjacent angles? Why or why not?

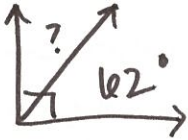
No: these angles share common interior points

common vertex: G
 common side: GK
 no interior points in common



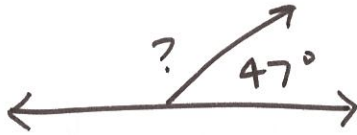
Examples:

4. $\angle 1$ is the complement of $\angle 2$. $m\angle 1 = 62^\circ$. Find $m\angle 2$. Draw a diagram.



$$m\angle 2 = 90 - 62 \\ = \boxed{28^\circ}$$

5. $\angle 3$ is the supplement of $\angle 4$. $m\angle 4 = 47^\circ$. Find $m\angle 3$. Draw a diagram.



$$m\angle 3 = 180 - 47 \\ = \boxed{133^\circ}$$

Using Algebra with Complementary, Supplementary, and Adjacent Angles

Examples:

6. $\angle LMN$ and $\angle PQR$ are complementary angles. Find the measures of the angles when $m\angle LMN = (4x - 2)^\circ$ and $m\angle PQR = (9x + 1)^\circ$.

$$4x - 2 + 9x + 1 = 90 \\ 13x - 1 = 90 \\ 13x = 91 \\ x = 7$$

$$m\angle LMN = 26^\circ \\ m\angle PQR = 64^\circ$$

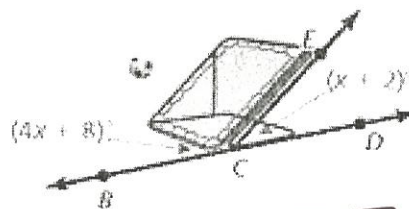
7. $\angle 1$ and $\angle 2$ are supplementary angles. Find the measures of the angles when $m\angle 1 = (7x + 13)^\circ$ and $m\angle 2 = (25x + 7)^\circ$

$$\cancel{m\angle 1} \quad 7x + 13 + 25x + 7 = 180 \\ 32x + 20 = 180 \\ 32x = 160 \\ x = 5$$

$$m\angle 1 = 48^\circ \\ m\angle 2 = 132^\circ$$

8. When viewed from the side, the frame of a ball-return net forms a pair of supplementary angles with the ground. Find $m\angle BCE$ and $m\angle ECD$.

$$4x + 8 + x + 2 = 180 \\ 5x + 10 = 180 \\ 5x = 170 \\ x = 34$$



$$m\angle BCE = 144^\circ \\ m\angle ECD = 36^\circ$$