

Recall that...

The Segment Addition Postulate tells us that if you break a segment into pieces, adding all the pieces together will give you the measure of the entire segment that includes all those parts (i.e., $AB + BC = AC$). The same occurs with angles.

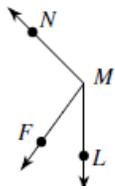
Angle Addition Postulate

If you have an angle that is divided into two or more angles, you would get the measure of the entire angle by adding all the small angles together. In mathematical terms: $m\angle ABC + m\angle CBD = m\angle ABD$.

Example: Find the angle listed, and write your answer in the correct measure notation.

$$m\angle FMN = 99^\circ \text{ and } m\angle LMF = 36^\circ.$$

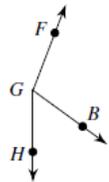
Find $m\angle LMN$.



Practice: Find the angles listed, and write your answer in the correct measure notation.

$$\text{Find } m\angle FGH \text{ if } m\angle FGB = 105^\circ$$

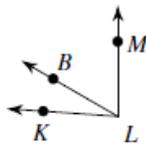
$$\text{and } m\angle BGH = 54^\circ.$$



1) _____

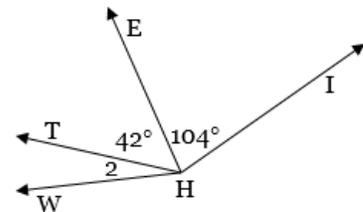
$$\text{Find } m\angle KLM \text{ if } m\angle KLB = 26^\circ$$

$$\text{and } m\angle BLM = 60^\circ.$$



2) _____

$$\text{Find } m\angle 2 \text{ if } m\angle WHI = 160.$$



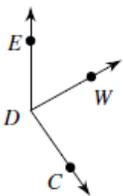
3) _____

The converse (i.e., the opposite) also holds true. If you know the measure of the large angle and the measure of all but one of the small angles, you can find the measure of the missing angle by adding the pieces together, and subtracting them from the large angle.

Example: Find the angle listed, and write your answer in the correct measure notation.

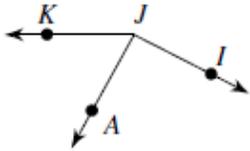
$$\text{Find } m\angle WDC \text{ if } m\angle EDC = 145^\circ$$

$$\text{and } m\angle EDW = 61^\circ.$$



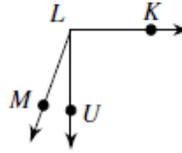
Practice: Find the angles listed, and write your answer in the correct measure notation.

Find $m\angle IJA$ if $m\angle AJK = 61^\circ$
and $m\angle IJK = 153^\circ$.



4) _____

Find $m\angle KLU$ if $m\angle ULM = 20^\circ$
and $m\angle KLM = 110^\circ$.



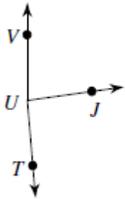
5) _____

Using algebra

The same concepts apply whenever we have variables involved. Whenever we are trying to find the value of a variable, we would add the measures of the parts of the angle together, set them equal to the large angle, and solve for the variable.

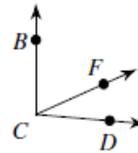
Example where entire angle is a number:

$m\angle VUT = 175^\circ$, $m\angle VUJ = 17x - 3$,
and $m\angle JUT = 17x + 8$. Find x .



Practice:

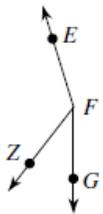
$m\angle FCD = x + 41$, $m\angle BCF = x + 78$,
and $m\angle BCD = 95^\circ$. Find x .



6) _____

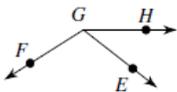
Example where entire angle has a variable:

$m\angle GFZ = 38^\circ$, $m\angle ZFE = 2x + 125$,
and $m\angle GFE = x + 163$. Find x .



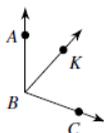
Practice:

$m\angle HGF = 16x + 4$, $m\angle EGF = 110^\circ$,
and $m\angle HGE = 3x + 11$. Find x .



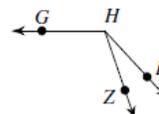
7) _____

$m\angle ABC = 17x + 8$, $m\angle ABK = 42^\circ$,
and $m\angle KBC = 12x - 4$. Find $m\angle ABC$.



8) _____

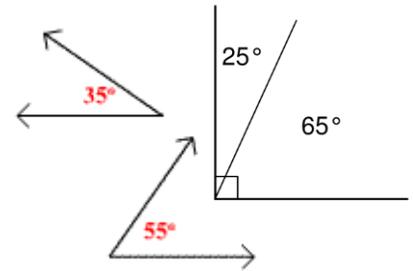
$m\angle ZHG = 11x - 1$, $m\angle IHZ = 24^\circ$,
and $m\angle IHG = 12x + 13$. Find $m\angle IHG$.



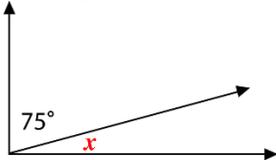
9) _____

Complementary Angles

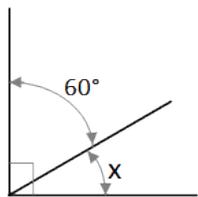
Whenever we have **two angles whose measures add up to _____** we call those two angles complementary. The angles could either be attached or detached. If we have the measure of one of the angles, we can apply the Angle Addition Postulate to find the measure of the other angle. Note: If the angles are attached, they form a right angle, which could be represented by a little square inside the vertex.



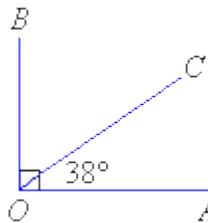
Example: Find the missing measure



Practice: Find the missing measure



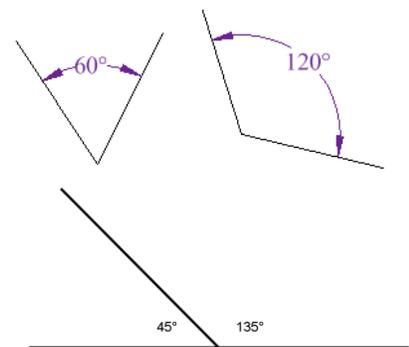
10) _____



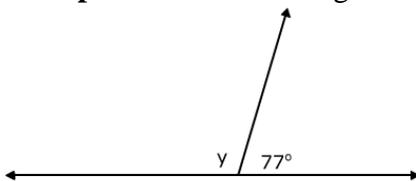
11) _____

Supplementary Angles

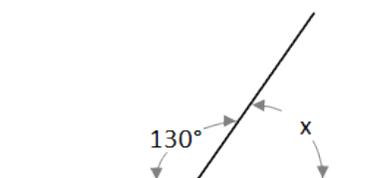
Whenever we have **two angles whose measures add up to _____**, we call those angles supplementary. Just like with complementary angles, the angles could either be attached or detached, and we can use the Angle Addition Postulate to find any missing measure of supplementary angles if we know one of the measures. If the angles are attached, they form what we call a linear pair (i.e., they form a line or a straight angle).



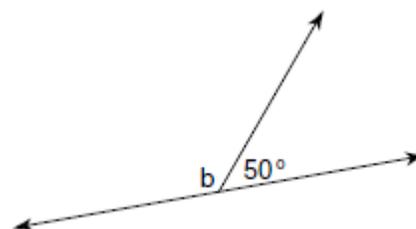
Example: Find the missing measure



Practice: Find the missing measure



12) _____

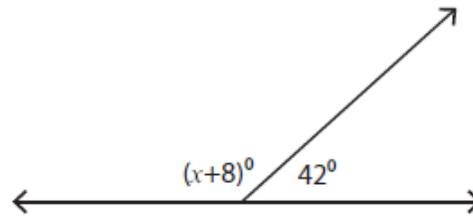
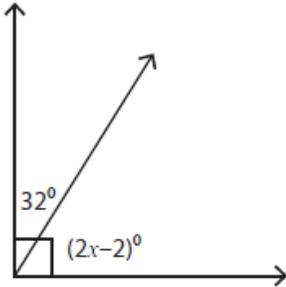


13) _____

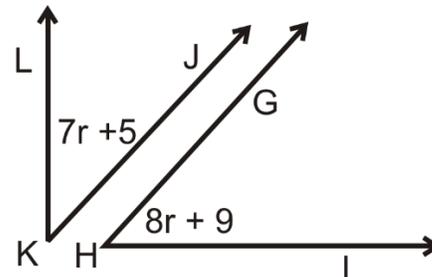
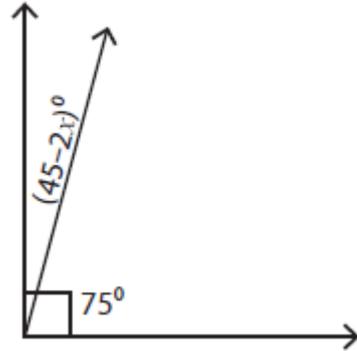
Using algebra

The same concepts apply whenever we have variables involved. If two angles are **complementary**, we would _____ the measures of the small angles together, set them equal to _____, and solve for the variable. If the angles are **supplementary**, we do the same; the only difference is that we set the equation equal to _____.

Examples: Find x

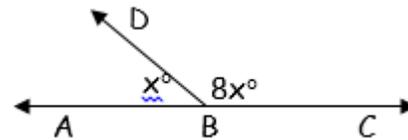
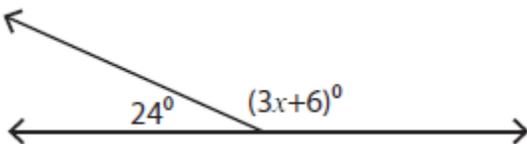


Practice: Find the value of the variable in the following pairs of complementary or supplementary angles.



14) _____

15) _____



16) _____

17) _____

18) $\angle 1$ and $\angle 2$ are complementary. $m\angle 1 = 2x + 7$ and $m\angle 2 = 4x - 19$. Find the measure of each angle.

19) $\angle 3$ and $\angle 4$ are supplementary. $m\angle 3 = 5x + 22$ and $m\angle 4 = 7x + 2$. Find the measure of each angle.