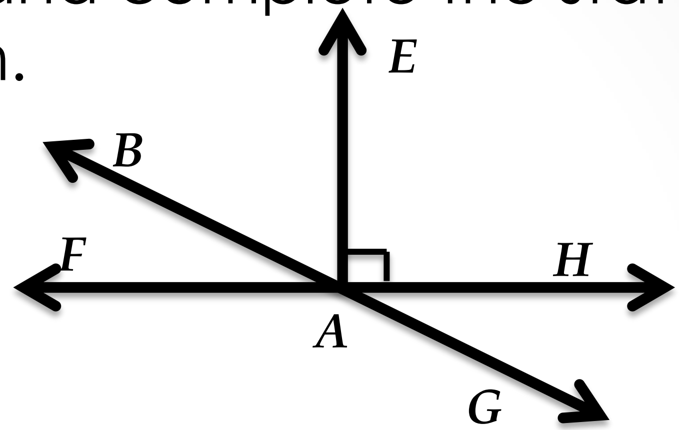
Geometry: Unit 2

Angles

Warmup – Segment Review

- Refer to the diagram and complete the statement and solve the problem.



- 1. $\overrightarrow{BG}$ is the segment __________ of $\overline{FH}$ passing through ______ A creating __________ segments AF and AH.
- 2. Using the above statement, Find the values of AF and AH if $FH = 42$.

Angles

- **<u>Content Objective:</u>** Students will be able to complete statements and answer problems related to angles using the Angle Addition Postulate.

- **<u>Language Objective:</u>** Students will be able to state and use the Angle Addition Postulate to solve problems.

Angle Reminder

- Here is a reminder of the definitions, along with visual examples, of an angle, discussed in the previous lecture.

angle	two different rays connected at the same endpoint called vertex.		$\angle A$

- Additional information: The two rays that make the angle are known as the **sides**.

Different Types of Angles

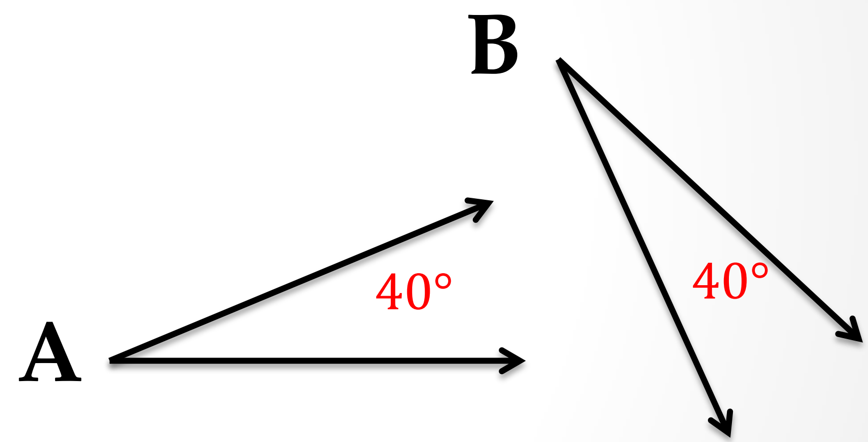
- Angles are classified according to their measures (in degrees for us).

- **Acute Angle:** Measures less than $90°$
- **Right Angle:** Measure of exactly $90°$
- **Obtuse Angle:** Measures larger then $90°$, but less than $180°$
- **Straight Angle:** Measure of exactly $180°$

Angle Congruence

- **Congruent Angles** are angles that have equal measures. In the diagram below you can see that both $< \boldsymbol{A}$ and $< \boldsymbol{B}$ have angle measures of $40°$. So we can write

$$\boldsymbol{m < A = m < B} \text{ or } \boldsymbol{< A = < B}$$



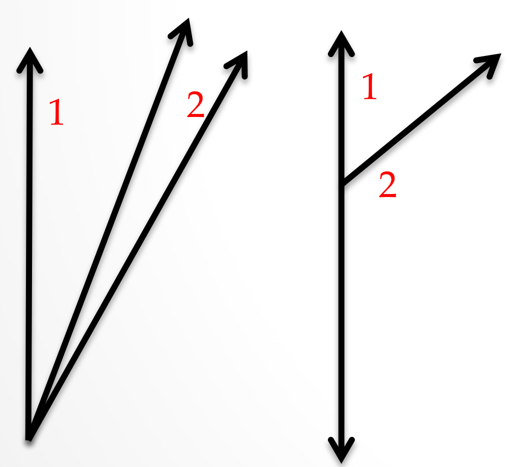
Thus, we can write that the angles are congruent:

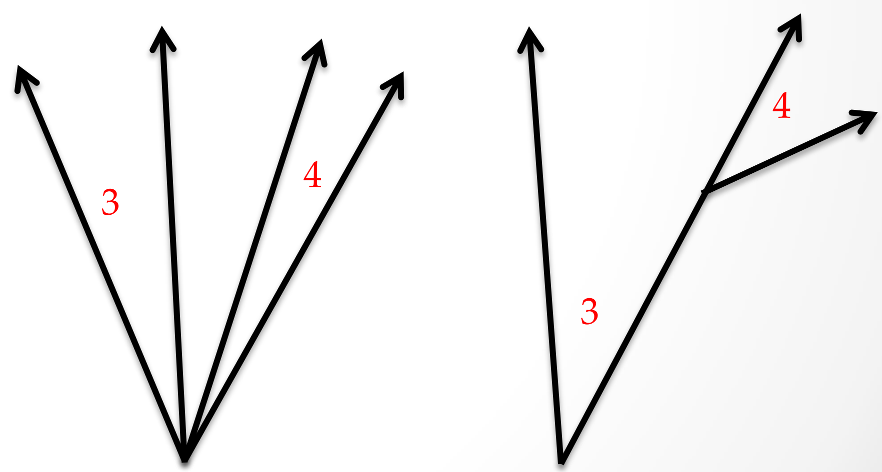
$$\boldsymbol{< A \cong < B}$$

Adjacent Angles

Adjacent Angles are two angles in a plane that have a common vertex and an common side. Here are some examples:

- < **1** and < **2** are adjacent angles.
- < **3** and < 4 are not adjacent angles.





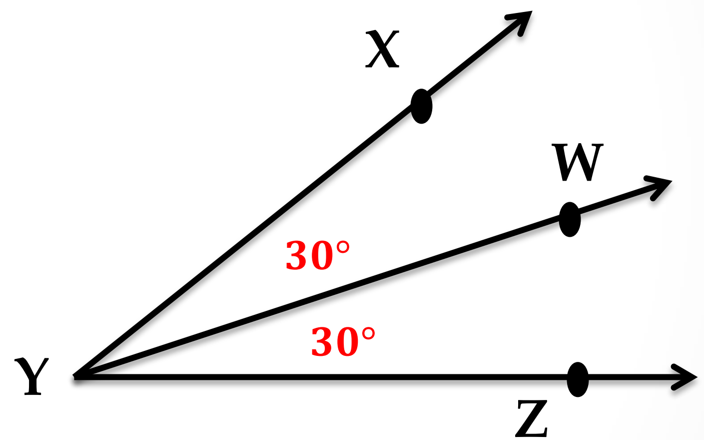
Angle Bisector

- The **bisector of an angle** is the ray that divides the angle into two congruent, adjacent angles.
- In the given diagram,

$m < XYW = m < WYZ,$

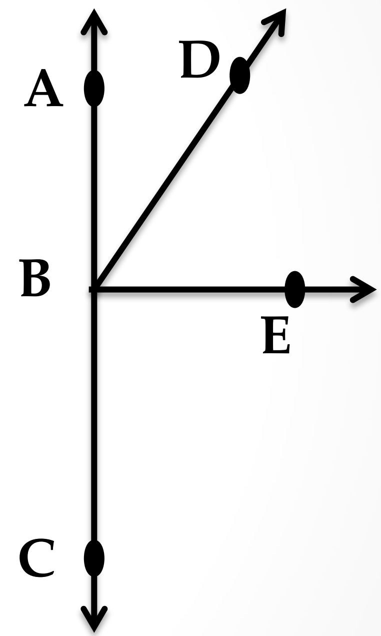
$< XYW \cong < WYZ,$

$\overrightarrow{YW}$ bisects $< XYZ.$



Using Diagrams to Identify

- What can you conclude from the diagram shown below.



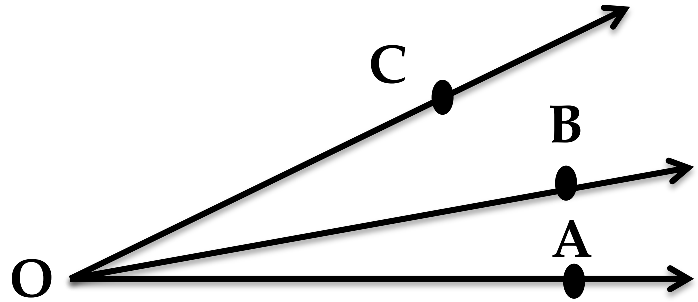
- All points shown are coplanar
- $\overleftrightarrow{AB}$, $\overrightarrow{BD}$, and $\overrightarrow{BE}$ intersect at B
- *A*, *B*, and *C* are Collinear.
- *B* is between *A* and *C*.
- $< ABC$ is a straight angle.
- *D* is in the interior of $< ABE$
- $< ABD$ and $< DBE$ are adjacent angles

Angle Addition Postulate

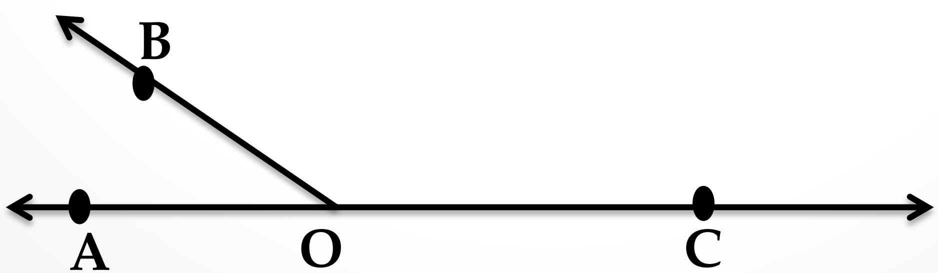
- *Angle Addition Postulate:*

1. If point B lies in the interior of $< AOC$, then

$$m < AOB + m < BOC = m < AOC.$$

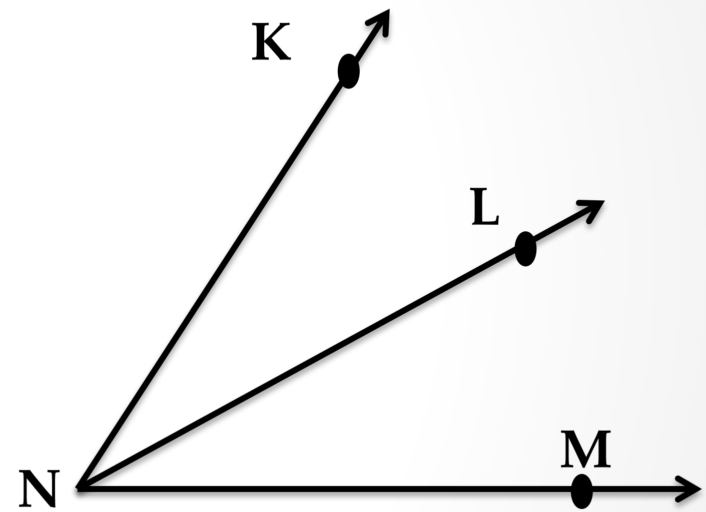


2. If AOC is a straight angle and B is any point not on $\overleftrightarrow{AC}$, then $m < AOB + m < BOC = 180$.



Angle Addition Example

- Use the diagram: $m < MNK = 75°$, $m < MNL = 3x + 15$, and $m < LNK = 4x - 10$. Find the values of $\mathbf{x}$, $\boldsymbol{m < MNL}$ and $\boldsymbol{m < LNK}$.
- Using the Angle Addition Postulate, we can write
- $m < MNL + m < LNK = m < MNK$
- $(3x + 15) + (4x - 10) = 75$
- $7x + 5 = 75$
- $7x = 70$
- $x = 10$

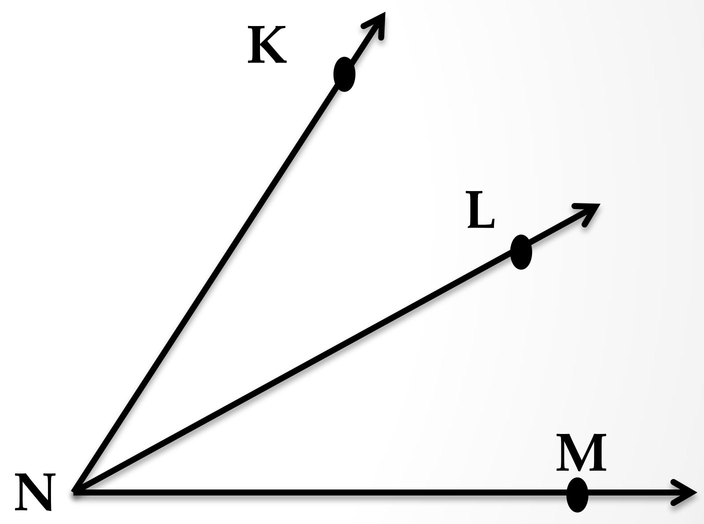


Angle Addition Example Cont.

- We can now use the value of x we just found (10) to solve for $m < \boldsymbol{MNL}$ and $\boldsymbol{m} < \boldsymbol{LNK}$:
- $m < MNL = 3x + 15$
- $= 3(10) + 15$
- $= 30 + 15$
- $= 45$

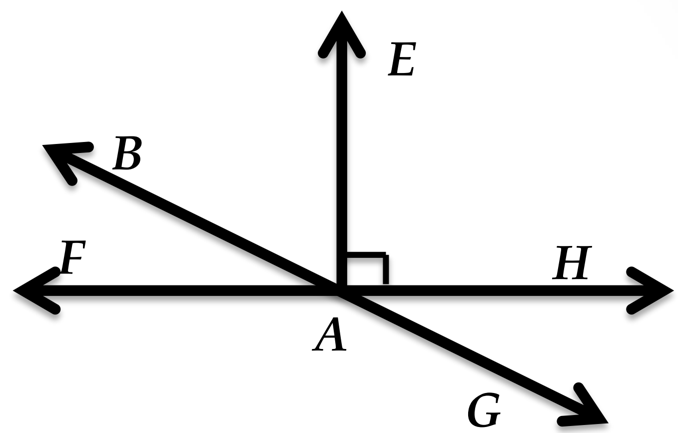
and

- $m < LNK = 4x - 10$
- $= 4(10) - 10$
- $= 40 - 10$
- $= 30$



Exit Ticket

- Refer to the diagram and complete the statement and solve the problem.



- 1. If $\overrightarrow{AB}$ was the angle______________ of $< EAF$, then $< EAB$ and $< BAF$ would be the ______________ angles.

- 2. Using the above statement, Find the values of $m < EAB$ and $m < BAF$ if $< EAF$ was a right angle.