1.4 Angles & Their Measures

An **angle** consists of two rays with the same endpoint.
The rays are the **sides** of the angle.
The endpoint is the **vertex**.

What is the vertex?

What are the names of the sides?

How would you name this angle?

Name the angles in the diagram.

You should only name an angle by a **single** letter when there is no chance of confusion.

How do we measure angles?

degrees
Postulate 3: PROTRACTOR POSTULATE

The measure of $\angle AOB$ is equal to the absolute value of the difference between the numbers for $\overrightarrow{OA}$ and $\overrightarrow{OB}$.

CLASSIFYING ANGLES

- **Acute**: $m\angle A$ is between $0^\circ$ and $90^\circ$
- **Right**: $m\angle A = 90^\circ$
- **Obtuse**: $m\angle A$ is between $90^\circ$ and $180^\circ$
- **Straight**: $m\angle A = 180^\circ$
Postulate 4: ANGLE ADDITION POSTULATE

If R is in the interior of \( \angle POS \), then \( m \angle POR + m \angle ROS = m \angle POS \).

What is the measure of \( \angle DEF \)?

\[ m \angle DEF = 52^\circ \]
Given that $m \angle LKN = 145$, find $m \angle LKM$ and $m \angle MKN$.

$$m \angle LKM = (2x + 10) + 10 = 56^\circ$$

$$m \angle MKN = 4(23) - 3 = 89^\circ$$

If $m \angle XYZ = 72$, find $m \angle XYW$ and $m \angle ZYW$.

$$m \angle XYW = 5(5) = 25^\circ$$

$$m \angle ZYW = 57^\circ$$
Given that \( m \angle KLM \) is a straight angle, find \( m \angle KLN \) and \( m \angle NLM \).

\[
\begin{align*}
(4x + 3)^\circ & + (10x - 5)^\circ = 180^\circ \\
14x - 2 &= 180 + 2 \\
14x &= 182 \\
x &= 13
\end{align*}
\]

\( m \angle NLM = 88^\circ \)

Given that \( m \angle EFG \) is a right angle, find \( m \angle EFH \) and \( m \angle HFG \).

\[
\begin{align*}
(2x + 2)^\circ + (x + 1)^\circ &= 90^\circ \\
3x + 3 &= 90^\circ \\
3x &= 87 \\
x &= 29
\end{align*}
\]

\( m \angle EGH = 2(29) + 2 \\
58 + 2 = 60^\circ \\
\]

\( m \angle HFG = (29) + 1 = 30 \)
Two angles are **congruent angles** if they have the same measure.

**Angle measures are equal.**

\[ \angle A \cong \angle B \]

"is equal to"

**Angle are congruent.**

\[ \angle A \cong \angle B \]

"is congruent to"

Identify all pairs of **congruent angles** in the diagram.

\[ \angle C \cong \angle B \]

\[ \angle A \cong \angle D \]