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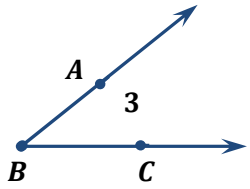
Measuring Angles Guide Notes

An angle is a figure formed by two non collinear rays that have a common endpoint.

The common endpoint is called **the vertex**, and the two rays that make up the angle are called **the sides of the angle**.

There are several ways to name the angle.



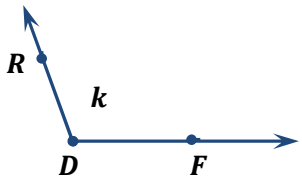
Use the vertex and a point from each side. $\angle CBA \text{ and } \angle ABC$

Use the vertex only. $\angle B$

Use a number. $\angle 3$

Angles are measured in units called degrees. The symbol for degree is °.

Angles Measure Postulate

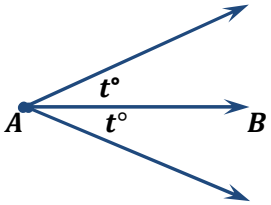


For every angle, there is a unique positive number between 0 and 180 called the degree measure of the angle.

$$m\angle FDR = k$$

$$0 < k < 180$$

Protractor Postulate Describes the relationship between angle measures and numbers.

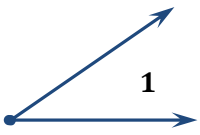
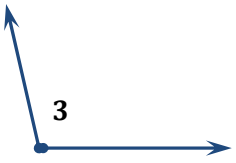


On a plane, given $\overrightarrow{AB}$ and a number t between 0 and 180, there is exactly one ray with endpoint A extending on each side of $\overrightarrow{AB}$ such that the degree measure of the angle formed is t.

A protractor can be used to approximate the measure of an angle.

How to use the protractor:
1. Place the notch of the protractor at the vertex of the angle.
2. Place the edge of the protractor along a side of the angle so that the scale reads 0.
3. Read the angle size by reading the degree measure that corresponds to the second side of the angle.

Types of Angles

Acute Angle	Right Angle	Obtuse Angle	Straight Angle
			
$m\angle 1 < 90$	$m\angle 2 = 90$	$180 > m\angle 3 > 90$	$m\angle 4 = 180$

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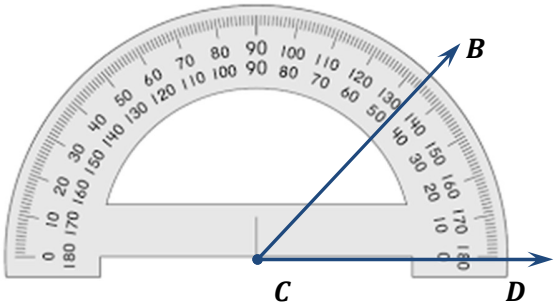
Measuring Angles Guide Notes

Sample Problem 1: **Find the measure of each angle. Then classify each angle.**

a.

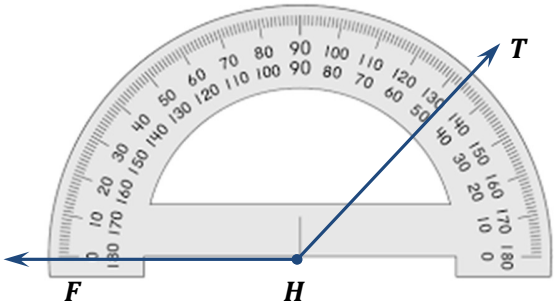


$m\angle DCB = 45$

Angle DCB measures 45°

Acute angle

b.



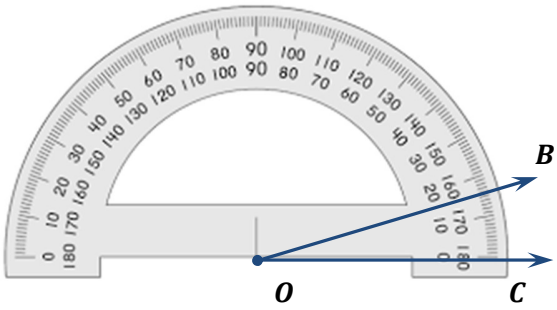
$m\angle FHT = 135$

Angle FHT measures 135°

Obtuse angle

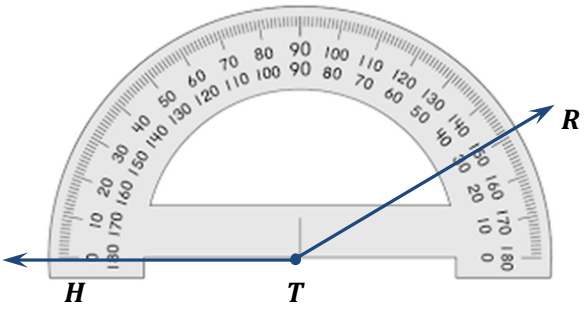
Sample Problem 2: **Use a protractor to draw each angle. Then classify each angle.**

a. $m\angle COB = 15$



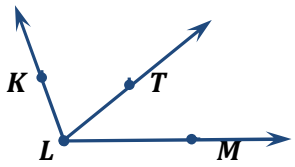
Acute angle

b. $m\angle HTR = 150$



Obtuse angle

Angle Addition Postulate

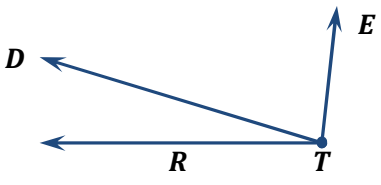


If T is in the interior of $\angle KLM$, then the measure of $\angle KLM$ is equal to the sum of the measures of $\angle MLT$ and $\angle TLK$.

$$m\angle KLM = m\angle MLT + m\angle TLK$$

Sample Problem 3: **Find the indicated angle measures.**

a. $m\angle RTD = 39$ $m\angle DTE = 56$
$m\angle RTE = ?$



$m\angle RTD = 39$ $m\angle DTE = 56$
$m\angle RTE = ?$

$m\angle RTE = m\angle RTD + m\angle DTE$
$m\angle RTE = 39 + 56$
$m\angle RTE = 95$

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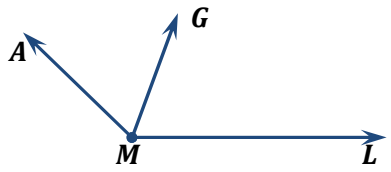
Measuring Angles Guide Notes

b. $m\angle LMA = 164 \quad m\angle GMA = 56$
$m\angle LMG = ?$



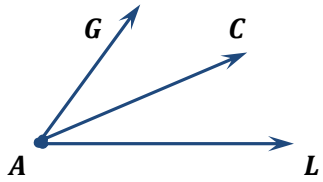
$m\angle LMA = 164 \quad m\angle GMA = 56$
$m\angle LMG = ?$

$m\angle LMA = m\angle LMG + m\angle GMA$
$m\angle LMG = m\angle LMA - m\angle GMA$
$m\angle LMG = 164 - 56$
$m\angle LMG = 108$

The bisector of an angle is the ray with its endpoint at the vertex of the angle extending into the interior of the angle. The bisector separates the angle into two angles of equal measure.

Sample Problem 4: Find the indicated angle measures.

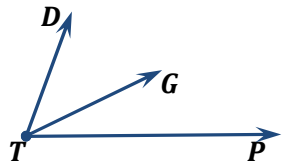
a. If $\overrightarrow{AC}$ bisects $\angle LAG$ and $m\angle LAG = 64$, find $m\angle LAC$ and $m\angle CAG$.



$m\angle LAG = 64$
$m\angle LAC = ? \quad m\angle CAG = ?$

$m\angle LAG = m\angle LAC + m\angle CAG$
$m\angle LAC = m\angle CAG$
$m\angle LAG = 2 * m\angle LAC$
$m\angle LAC = \frac{m\angle LAG}{2}$
$m\angle LAC = \frac{64}{2}$
$m\angle LAC = 32 \quad m\angle CAG = 32$

b. If $\overrightarrow{TG}$ bisects $\angle PTD$ and $m\angle PTG = 26$, find $m\angle PTD$ and $m\angle GTD$.



$m\angle PTG = 26$
$m\angle PTD = ? \quad m\angle GTD = ?$

$m\angle GTD = m\angle PTG$
$m\angle GTD = 26$

$m\angle PTD = m\angle PTG + m\angle GTD$
$m\angle PTD = 26 + 26$
$m\angle PTD = 52$