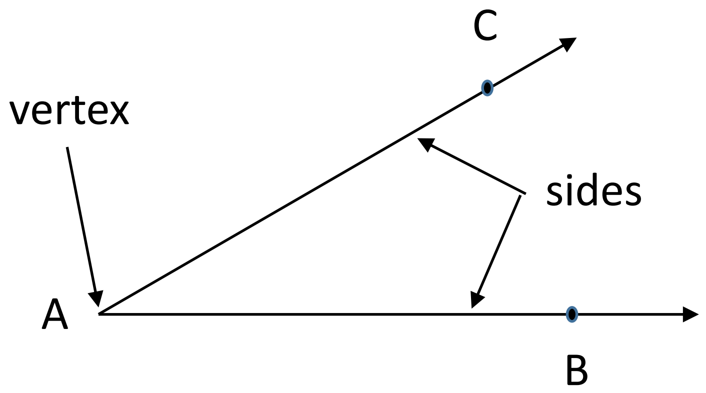
Chapter 1

Basics of Geometry

Section 4
Angles and Their Measures

GOAL 1: Using Angle Postulates

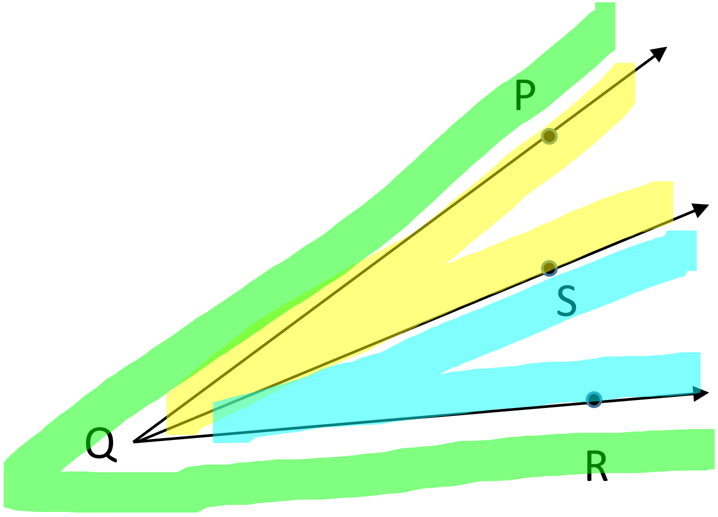
An _angle_ consists of two different rays that have the same initial point. The rays are the __sides__ of the angle. The initial point is the ___vertex___ of the angle.



The angle that has side __$\overrightarrow{AB}$__ and __$\overrightarrow{AC}$__ is denoted by __<CAB__, __<BAC__, or __<A__. The point __A__ is the vertex of the angle.

Example 1: Naming Angles

Name the angles in the figure.



<PQS (<SQP)

<SQR (<RQS)

<PQR (<RQP)

*when there is more than one angle – you CANNOT name the angle with the vertex

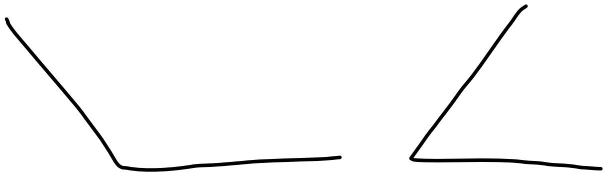
The ___measure_ of <A is denoted by __m<A__.

The measure of an angles can be approximated

with a protractor, using units called degrees. For instance, <BAC has a measure of 50°, which can be written as

m<BAC = 50°

inside



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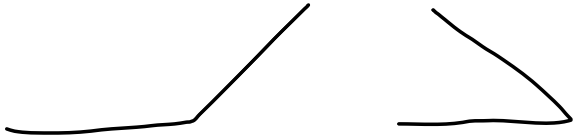
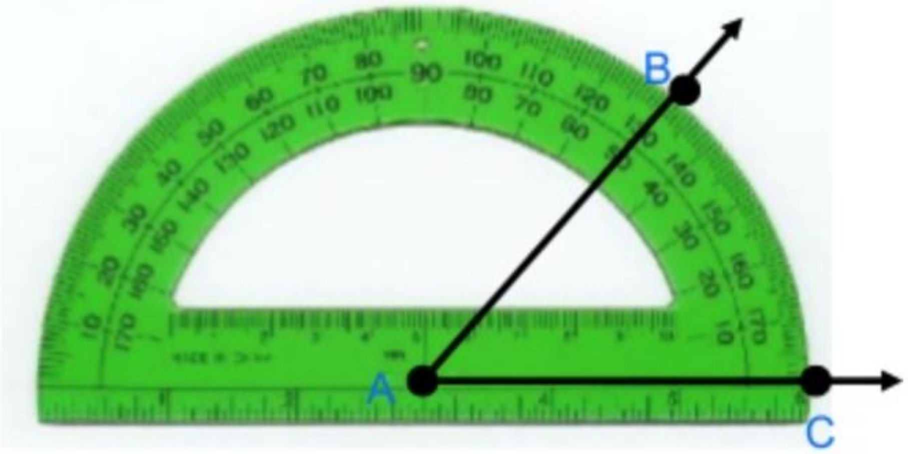




Angles that have the same measure are called ____congruent angles____.

For instance, <BAC and <DEF each have a measure of 50°, so they are congruent.

IMPORTANT NOTE:

MEASURES ARE EQUAL

m<BAC = m<DEF

ANGLES ARE CONGRUENT

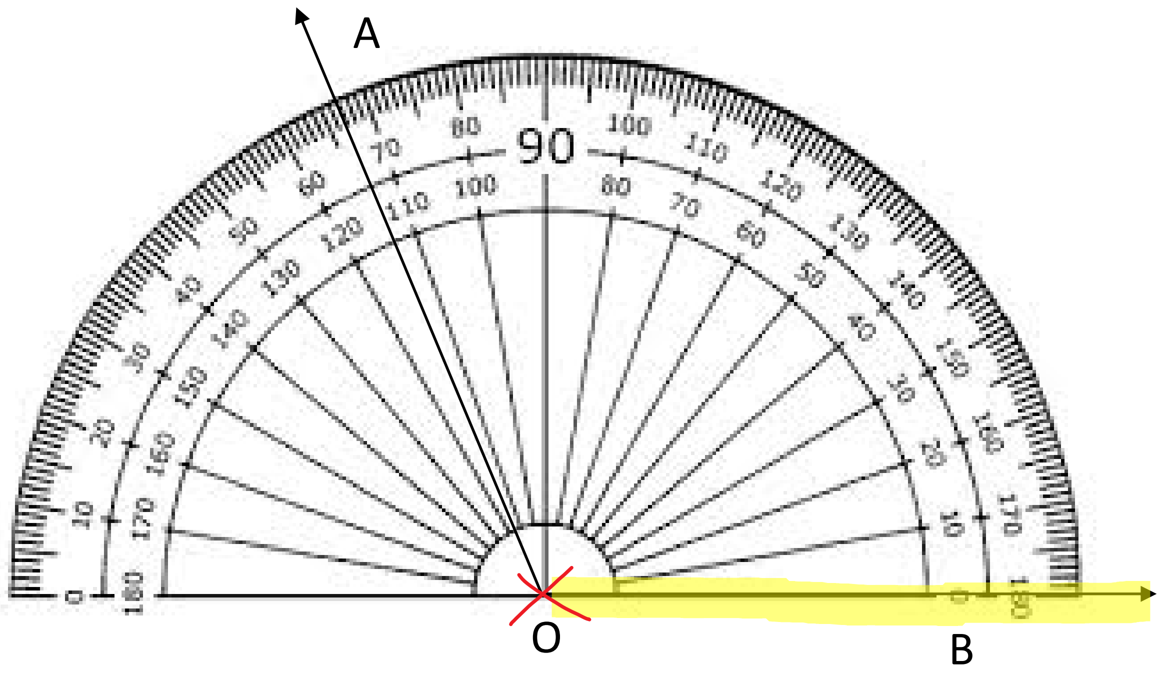
<BAC ≅ <DEF

POSTULATE 3: Protractor Postulate

Consider a point A on one side of $\overleftrightarrow{OB}$.

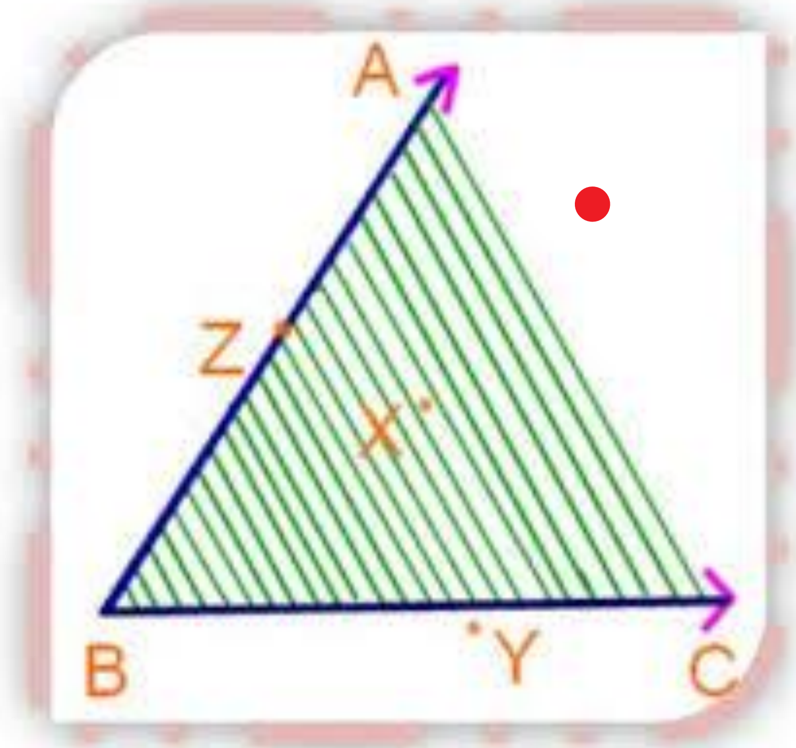
The rays of the form $\overrightarrow{OA}$ can be matched one to one with the real numbers from 0 to 180.

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



A point is in the __interior__ of an angle if it is between points that lie on each side of the angle.

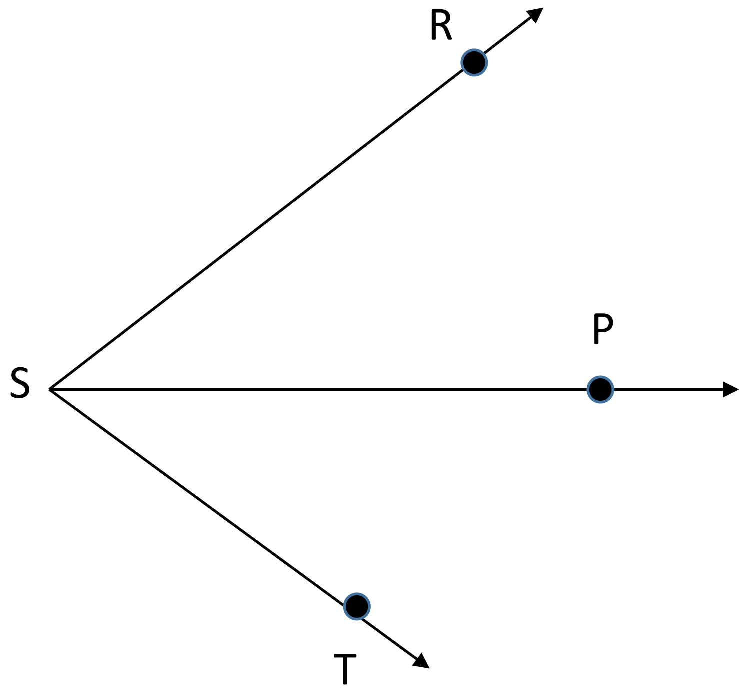
A point is in the __exterior__ of an angle if it is not on the angle or in its interior.



POSTULATE 4: Angle Addition Postulate

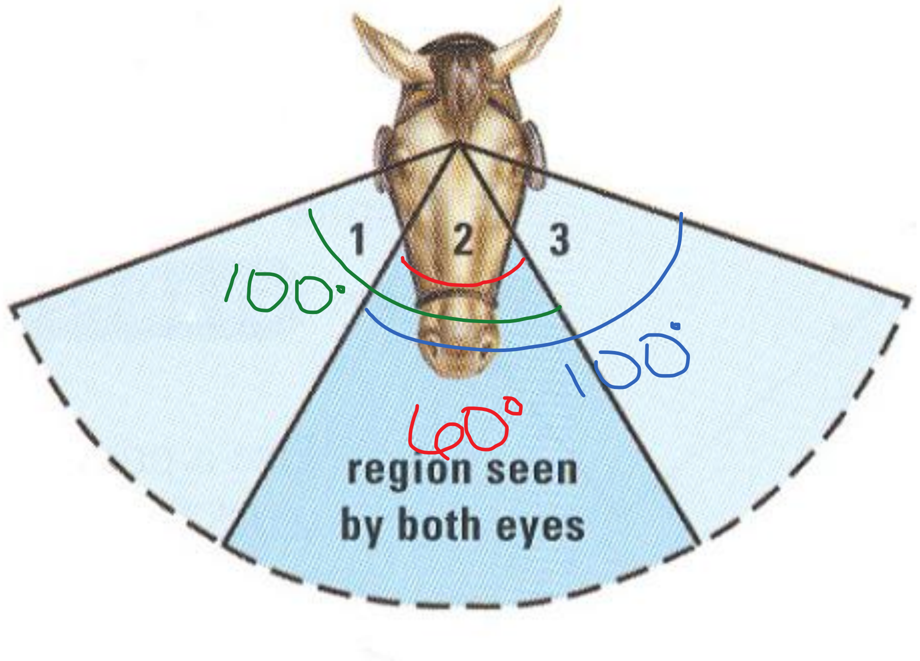
If P is in the interior of <RST, then

__<RSP__ + __<PST__ = __<RST__



Example 2: Calculating Angle Measures

Each eye of a horse wearing blinkers has an angle of vision that measures 100°. The angle of vision that is seen by both eyes measures 60°.



Find the angle of vision seen by the left eye alone.

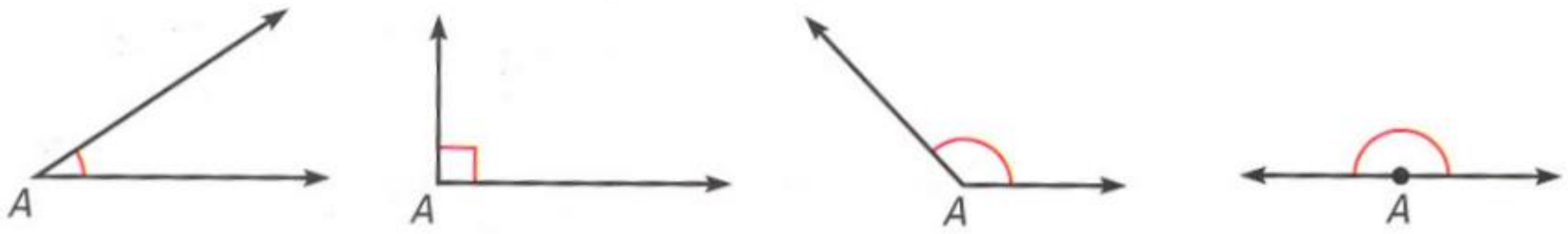
$$m<1 + m<2 = 100$$

$$m<1 + 60 = 100$$

$$m<1 = 40^*$$

GOAL 2: Classifying Angles

Angles are classified as __acute__, __right__, __obtuse__, and __straight__, according to their measures. Angles have measures greater than 0° and less than or equal to 180°.



Acute angle	Right angle	Obtuse angle	Straight angle
$0° < m\angle A < 90°$	$m\angle A = 90°$	$90° < m\angle A < 180°$	$m\angle A = 180°$

Example 3: Classifying Angles in a Coordinate Plane

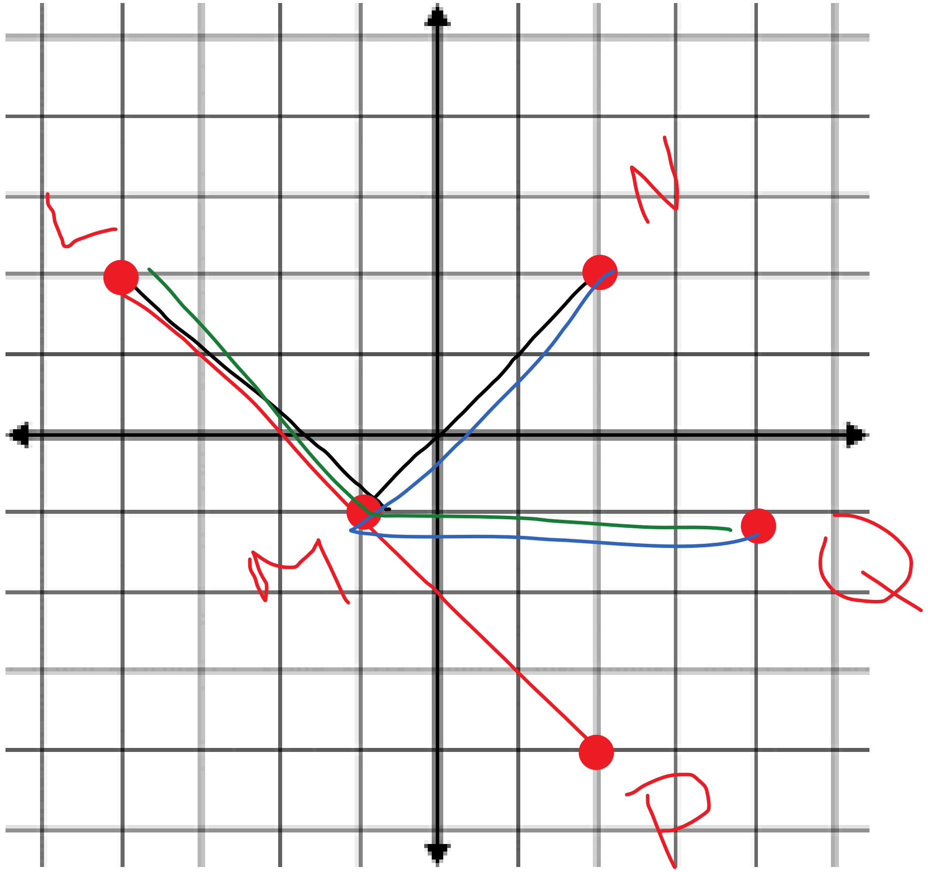
Plot the points L(-4, 2), M(-1, -1), N(2, 2), Q(4, -1) and P(2, -4). Then measure and classify the following angles as acute, right, obtuse, or straight.

a. <LMN right

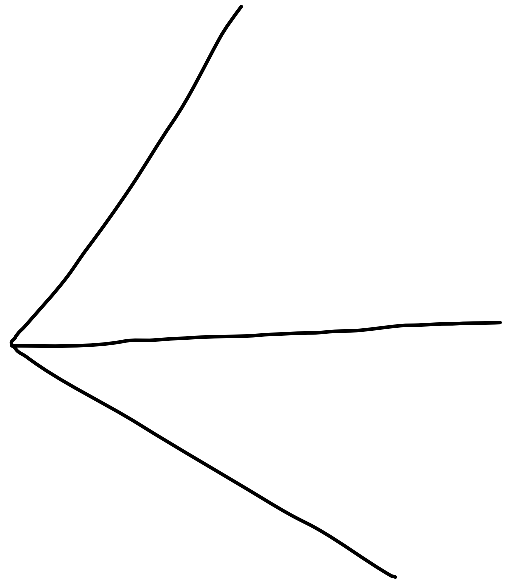
b. <LMP straight

c. <NMQ acute

d. <LMQ obtuse



Two angles are __adjacent angles__ if they share a ____side_____ and _vertex_, but have no common ___interior points____.



Example 4: Drawing Adjacent Angles

Use a protractor to draw two adjacent acute angles <RSP and <PST so that <RST is (a) acute and (b) obtuse.