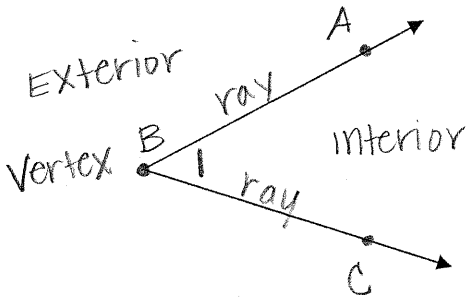
Honors Geometry
Notes - Section 1.3
Measuring and Constructing Angles

Name KEY
Date _____ Period _____

What is an Angle?

Angle - A figure formed by two rays, or sides, with a common endpoint.

Vertex (plural: *vertices*) - The common endpoint of the two rays that form an angle.



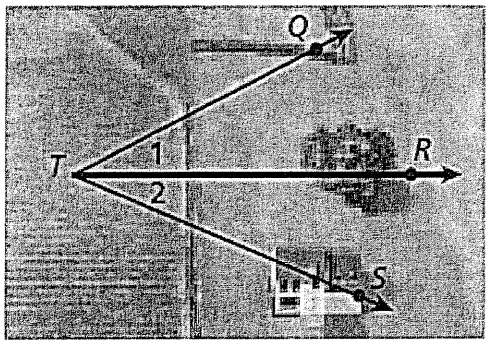
Naming an Angle
You can name an angle THREE ways:

1. 3 points (vertex in the middle) EX: ∠ABC
2. Number EX: ∠1
3. Just Vertex EX: ∠B (only if no other angles are formed from the vertex)

Interior of an angle - The set of all points between the sides of the angle.

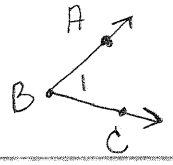
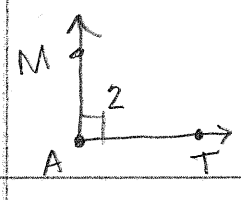
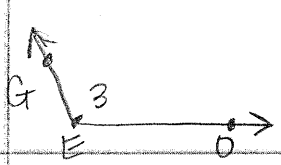
Exterior of an angle - The set of all points outside the angle.

Example 1: Write the different ways you can name the angles in the diagram.



∠QTR ∠STR
∠1 ∠2
∠QTS

The **measure** of an angle is usually given in degrees. (Radians in PRECALC)

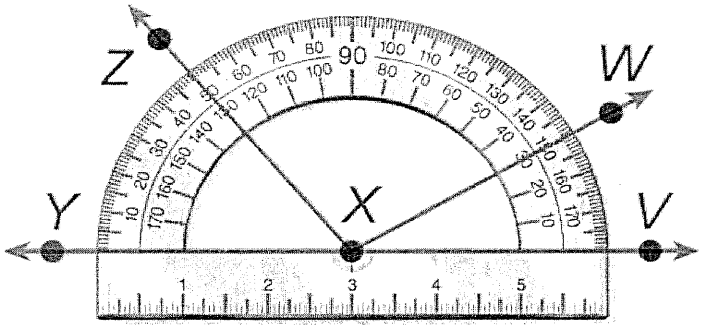
	DIAGRAM	MEASURE	NAME
Acute Angle		$0° < x < 90°$	$\angle ABC$ $\angle B$ $\angle 1$
Right Angle		exactly 90°	$\angle MAT$ $\angle A$ $\angle 2$
Obtuse Angle		$90° < x < 180°$	$\angle GEO$ $\angle E$ $\angle 3$
Straight Angle		exactly 180°	$\angle DOG$ $\angle O$

We use a **protractor** to measure angles.

Postulate 1-3-1 **Protractor Postulate**

Given $\overrightarrow{AB}$ and a point O on $\overrightarrow{AB}$, all rays that can be drawn from O can be put into a one-to-one correspondence with the real numbers from 0 to 180.

Example 2: Find the measure of each angle. Then classify each as acute, right, or obtuse.



$m < YXZ =$ 50°

$m < ZXW =$ 100°

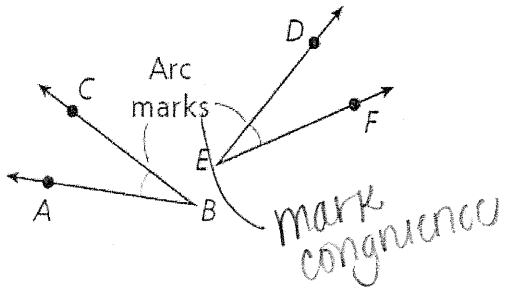
$m < WXV =$ 30°

$m < VXZ =$ 130°

$m < YXW =$ 150°

$m < YXV =$ 180°

Congruent Angles - Angles that have the same measure.



NOTATION is extremely important!

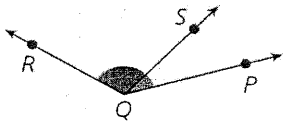
$m\angle ABC = m\angle DEF$ (measure)

$\angle ABC \cong \angle DEF$ (figure)

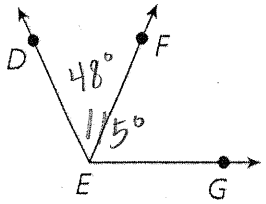
Postulate 1-3-2 Angle Addition Postulate

If S is in the interior of $\angle PQR$, then $m\angle PQS + m\angle SQR = m\angle PQR$.

($\angle$ Add. Post.)



Example 3: $m\angle DEG = 115°, and\ m\angle DEF = 48°.\ Find\ m\angle FEG.$

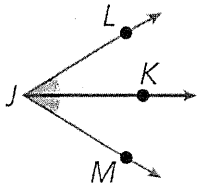


$m\angle FEG = 115° - 48° = 67°$

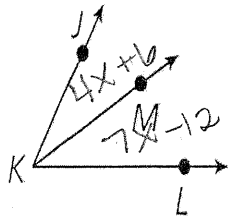
An **angle bisector** is a ray that divides an angle into two congruent angles.

$\overrightarrow{JK}$ bisects $\angle LJM$, so $\angle LJK \cong \angle MJK$.

$\therefore\ m\angle LJK = m\angle MJK$



Example 4: $\overrightarrow{KM}\ bisects\ \angle JKL,\ m\angle JKM = (4x + 6)°,\ and\ m\angle MKL = (7x - 12)°.\ Find\ m\angle JKM.$



$4x+6 = 7x-12$

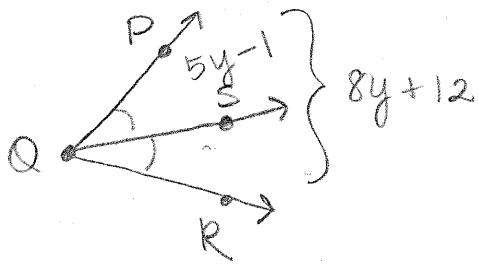
$6 = 3x-12$

$18 = 3x$

$x = 6$

$m\angle JKM = 4(6)+6 = 30°$

Example 5: $\overrightarrow{QS}\ bisects\ \angle PQR,\ m\angle PQS = (5y - 1)°,\ and\ m\angle PQR = (8y + 12)°.\ Find\ m\angle PQS\ and\ m\angle SQR.$



$5y-1 + 5y-1 = 8y+12$

$10y - 2 = 8y + 12$

$2y - 2 = 12$

$2y = 14$

$y = 7$

$m\angle PQS = 5(7)-1$

$m\angle PQS = 34°$

$m\angle SQR = 34°$

Alt ED: $2(5y-1) = 8y+12$ or $\frac{1}{2}(8y+12) = 5y-1$