Geometry 1.4

Measure and classify angles
Identify and use congruent angles
Identify and use angle bisectors

bisector

ray

opposite rays

angle

side

vertex

interior

exterior

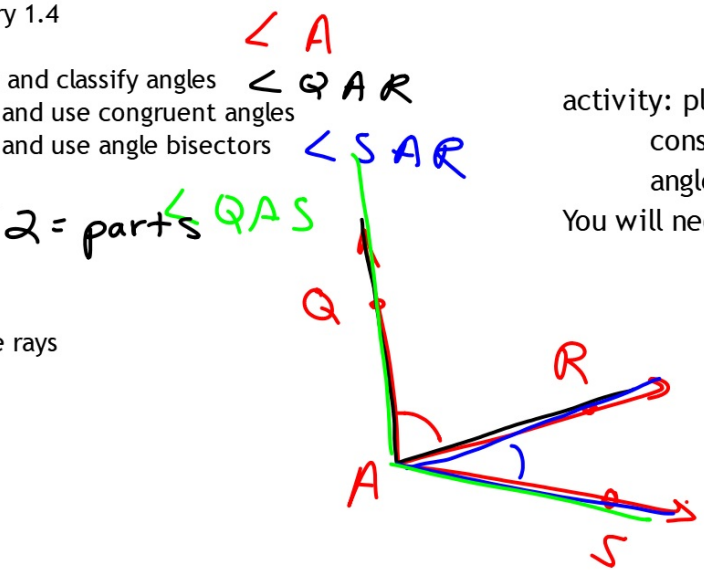
degree

right angle

acute angle

obtuse angle

angle bisector



activity: plates
constructions
angle measuring
You will need a protractor and compass today

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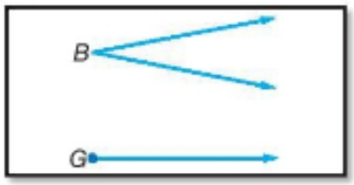
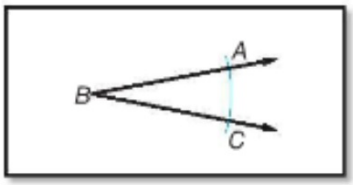
Construction Copy an Angle

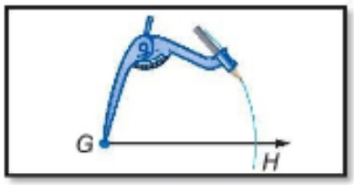
Step 1 Draw an angle like $\angle B$ on your paper. Use a straightedge to draw a ray on your paper. Label its endpoint G.



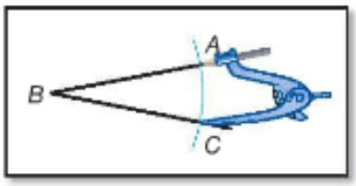
Step 2 Place the tip of the compass at point B and draw a large arc that intersects both sides of $\angle B$. Label the points of intersection A and C.



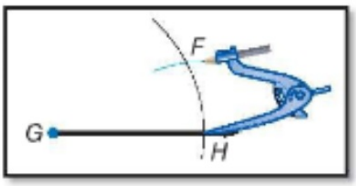
Step 3 Using the same compass setting, put the compass at point G and draw a large arc that starts above the ray and intersects the ray. Label the point of intersection H.



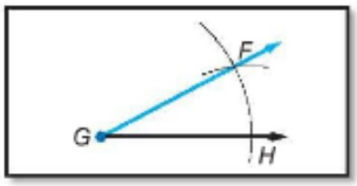
Step 4 Place the point of your compass on C and adjust so that the pencil tip is on A.



Step 5 Without changing the setting, place the compass at point H and draw an arc to intersect the larger arc you drew in Step 4. Label the point of intersection F.



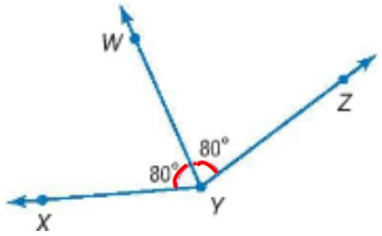
Step 6 Use a straightedge to draw $\overrightarrow{GF}$. $\angle ABC \cong \angle FGH$



StudyTip

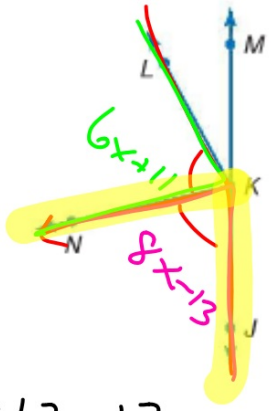
Segments A line segment can also bisect an angle.

A ray that divides an angle into two congruent angles is called an **angle bisector**. If $\overrightarrow{YW}$ is the angle bisector of $\angle XYZ$, then point W lies in the interior of $\angle XYZ$ and $\angle XYW \cong \angle WYZ$.



Example 3 Measure and Classify Angles

ALGEBRA In the figure, $\overrightarrow{KJ}$ and $\overrightarrow{KM}$ are opposite rays, and $\overrightarrow{KN}$ bisects $\angle JKL$. If $m\angle JKN = 8x - 13$ and $m\angle NKL = 6x + 11$, find $m\angle JKN$.



$8x - 13 = 6x + 11$

$-6x + 13 \quad -6x + 13$

$2x = 24$

$x = 12$

$8 \cdot 12 - 13$

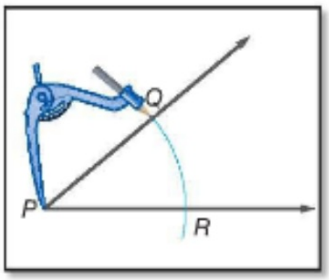
$96 - 13$

83

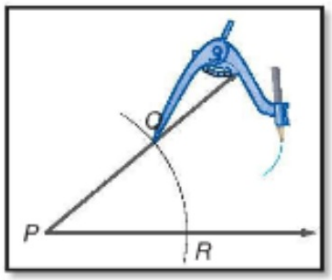
p 40 → 2 = parts

Construction Bisect an Angle

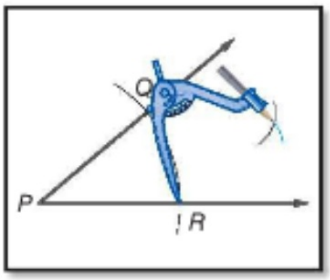
Step 1 Draw an angle on your paper. Label the vertex as P. Put your compass at point P and draw a large arc that intersects both sides of $\angle P$. Label the points of intersection Q and R.



Step 2 With the compass at point Q, draw an arc in the interior of the angle.



Step 3 Keeping the same compass setting, place the compass at point R and draw an arc that intersects the arc drawn in Step 2. Label the point of intersection T.



Step 4 Draw $\overrightarrow{PT}$. $\overrightarrow{PT}$ is the bisector of $\angle P$.