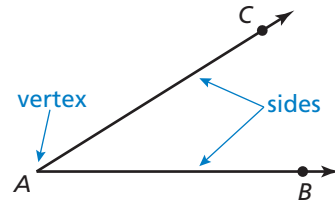


Naming and Bisecting Angles

You can name an angle by its vertex, such as $\angle A$, or by a point on each ray and the vertex, such as $\angle BAC$ or $\angle CAB$.

When a point is the vertex of more than one angle, you cannot use the vertex alone to name the angles, as shown in the following example.



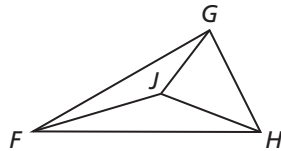
Example 1 Name the included angle between each given pair of sides.

a. \overline{FJ} and \overline{FH}

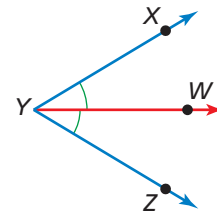
▶ $\angle JFH$ or $\angle HFJ$

b. \overline{JH} and \overline{GH}

▶ $\angle JHG$ or $\angle GHJ$



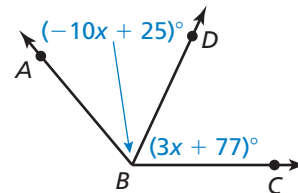
An **angle bisector** is a ray that divides an angle into two angles that are congruent. In the figure, \overrightarrow{YW} bisects $\angle XYZ$, so $\angle XYW \cong \angle ZYW$.



Example 2 \overrightarrow{BD} bisects $\angle ABC$. Find $m\angle ABC$.

First write and solve an equation. Use the fact that $m\angle ABD = m\angle CBD$.

| | |
|-----------------------------|---------------------|
| $m\angle ABD = m\angle CBD$ | Write the equation. |
| $-10x + 25 = 3x + 77$ | Substitute. |
| $-4 = x$ | Solve for x . |



Then evaluate the expression for $m\angle ABD$ when $x = -4$ to obtain $m\angle ABD = 65^\circ$. By the Angle Addition Postulate and the definition of angle bisector, $m\angle ABC = m\angle ABD + m\angle CBD = 65^\circ + 65^\circ = 130^\circ$.

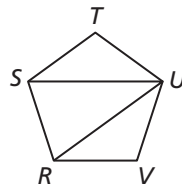
▶ So, the measure of $\angle ABC$ is 130° .

Practice

Check your answers at BigIdeasMath.com.

In Exercises 1–4, use the figure to name the included angle between the given pair of sides.

- \overline{ST} and \overline{UT}
- \overline{SU} and \overline{VU}
- \overline{UR} and \overline{UT}
- \overline{RV} and \overline{RS}



- \overrightarrow{QS} bisects $\angle PQR$ such that $m\angle PQS = (5x + 9)^\circ$ and $m\angle RQS = (9x - 3)^\circ$. Find the value of x and $m\angle PQR$.
- \overrightarrow{KM} bisects $\angle JKL$ such that $m\angle JKM = (6x + 33)^\circ$ and $m\angle LKM = (13x - 2)^\circ$. Find the value of x and $m\angle JKL$.