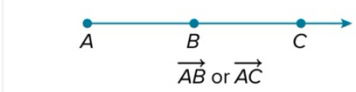
Name _____ Date _____ Period: _____

§2.1 Angles and Congruence

Today we will learn angle characteristics and how to calculate angle measures using special angle pairs and congruence.

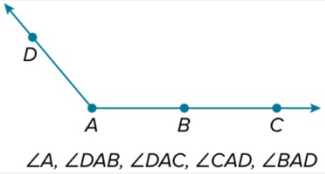
Definitions:

A **ray** is the part of a line consisting of a point on the line, called the *endpoint of the ray*, together with all of the collinear points on one side of the endpoint.

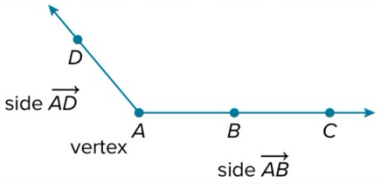


Two collinear rays with a common endpoint are **opposite rays**. Opposite rays form a **straight angle**, which has a measure of 180°.

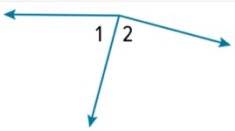
An **angle** is a pair of rays that have a common endpoint.



The rays are called **sides** of the angle. The common endpoint is the **vertex**.



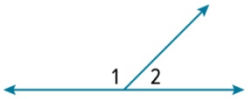
Adjacent angles are two angles that lie in the same plane, have a common vertex and a common side, but have no common interior points.

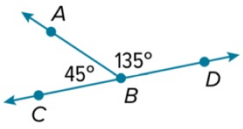


∠1 and ∠2 are adjacent angles.

A **linear pair** is a pair of adjacent angles with noncommon sides that are opposite rays.

The sum of the angle measures is 180°.

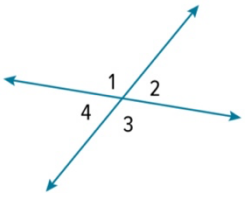




∠1 and ∠2 are a linear pair.

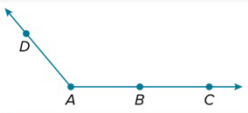
Vertical angles are the two nonadjacent angles formed by two intersecting lines.

Vertical angles are congruent.

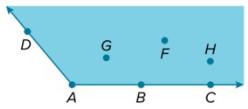


An angle divides a plane into three distinct parts.

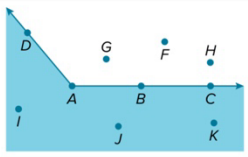
Points *D*, *A*, *B*, and *C* lie on the angle.



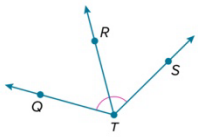
Points *G*, *F*, and *H* lie in the **interior** of the angle.



Points *I*, *J*, and *K* lie in the **exterior** of the angle.

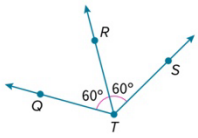


The measure of an angle is the measure in degrees of the space between the sides of an angle. Angles that have the same measure are **congruent angles**. Congruent angles are indicated on the figure by matching numbers of arcs.



$\angle QTR \cong \angle STR$

A ray or segment that divides an angle into two congruent parts is an **angle bisector**. In the figure, $\overline{TR}$ bisects $\angle QTS$.



$m\angle QTR = m\angle STR$

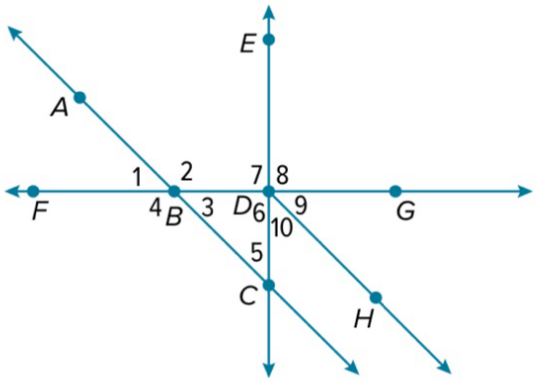
Example 2.1.1: Use the figure to identify the angles or parts of angles that satisfy each given condition.

a) Name all of the angles that have D as a vertex.

b) Name the sides of $\angle 2$

c) Name a point in the interior of $\angle FDE$.

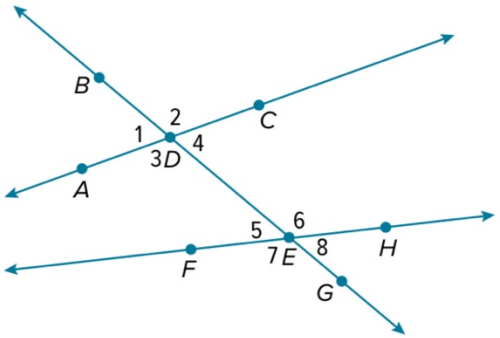
d) Name a point or points in the exterior of $\angle FDE$



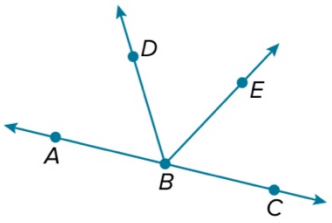
Name _____ Date _____ Period: _____

Example 2.1.2: Which angle has sides $\overrightarrow{DB}$ and $\overrightarrow{DC}$? Select all that apply.

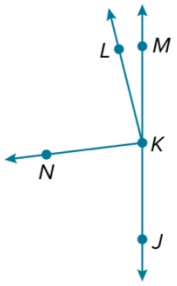
Ⓐ $\angle 2$
Ⓑ $\angle 3$
Ⓒ $\angle ADB$
Ⓓ $\angle BDC$
Ⓔ $\angle CDB$
Ⓕ $\angle EDC$



Activity 2.1.3: In the figure, $\overrightarrow{BA}$ and $\overrightarrow{BC}$ are opposite rays and $\overrightarrow{BD}$ bisects $\angle ABE$. If $m\angle ABD = 4x + 14$ and $m\angle DBE = 8x - 32$, find $m\angle DBE$.



Example 2.1.4: $\overrightarrow{KJ}$ 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 $m\angle JKN$.



Activity 2.1.5: The office lamp is made using two intersecting metal bars.
a) How many pairs of adjacent angles do you see in the figure? List two pairs.

b) Identify two pairs of vertical angles

c) Find $m\angle ABE$