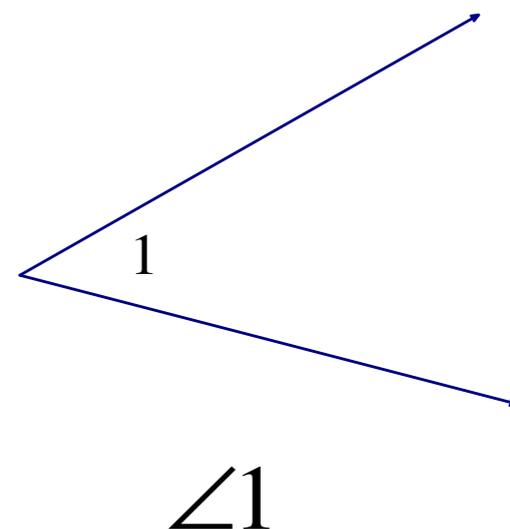
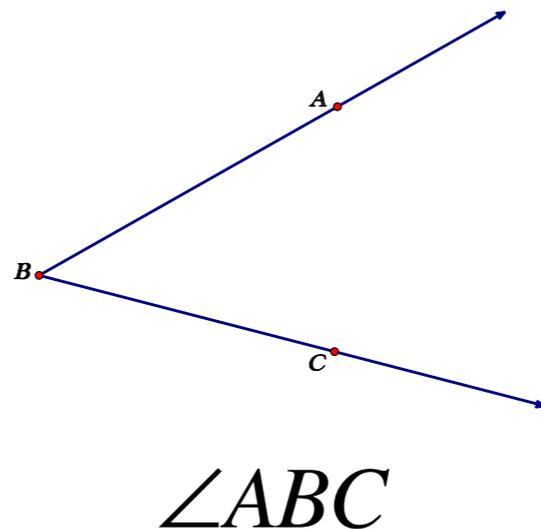
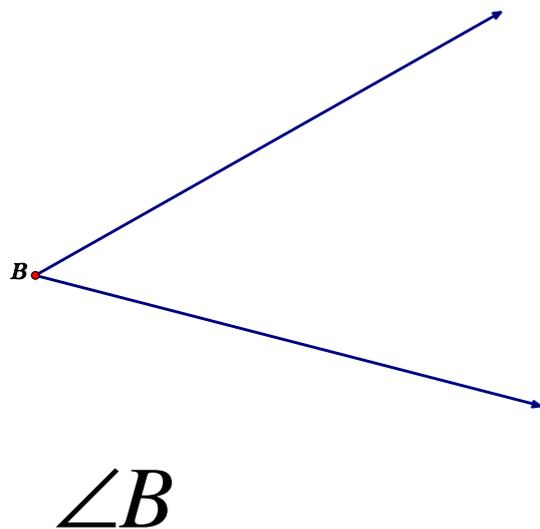


# Proving the Vertical Angles Theorem (5.5.1)

April 25th, 2018

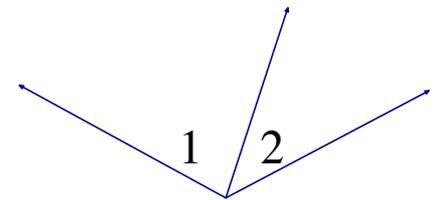
# Angles

Angles are formed by two rays that share a common vertex. They can be named by their vertex alone, by three points (the vertex being the middle point), or by a given number.

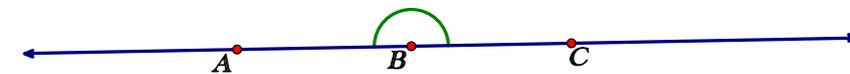


# Definitions & Properties

- Adjacent Angles are angles that share a common vertex and common side, but do not overlap.



- straight Angles are angles formed by opposite rays (forms a straight line) and \_\_\_\_\_.

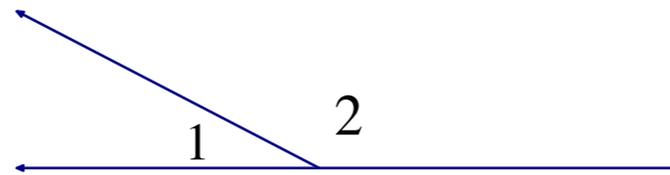


- Supplementary angles are two angles whose sum is \_\_\_\_\_.

- Complementary angles are two angles whose sum is \_\_\_\_\_.

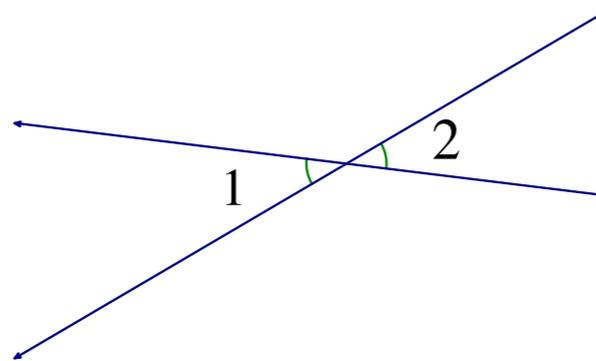
- A linear pair is a pair of adjacent angles that form a straight angle (so they are **supplementary**).

$$m\angle 1 + m\angle 2 = 180^\circ$$



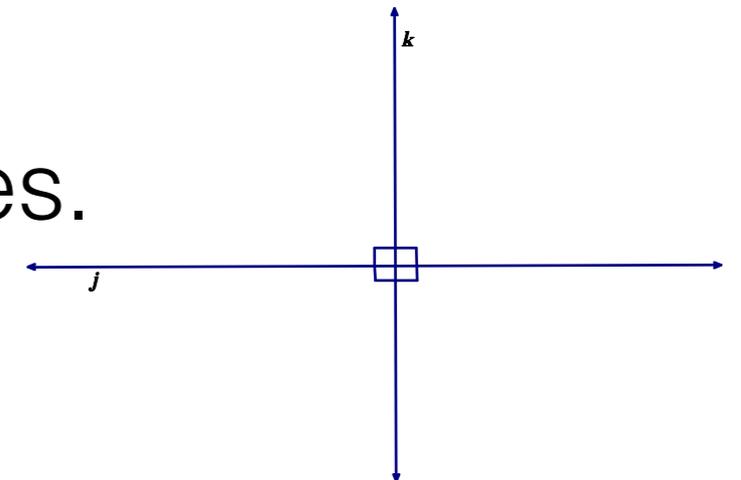
- Vertical angles are nonadjacent angles that are formed by two intersecting lines (and are **congruent**).

$$m\angle 1 = m\angle 2$$

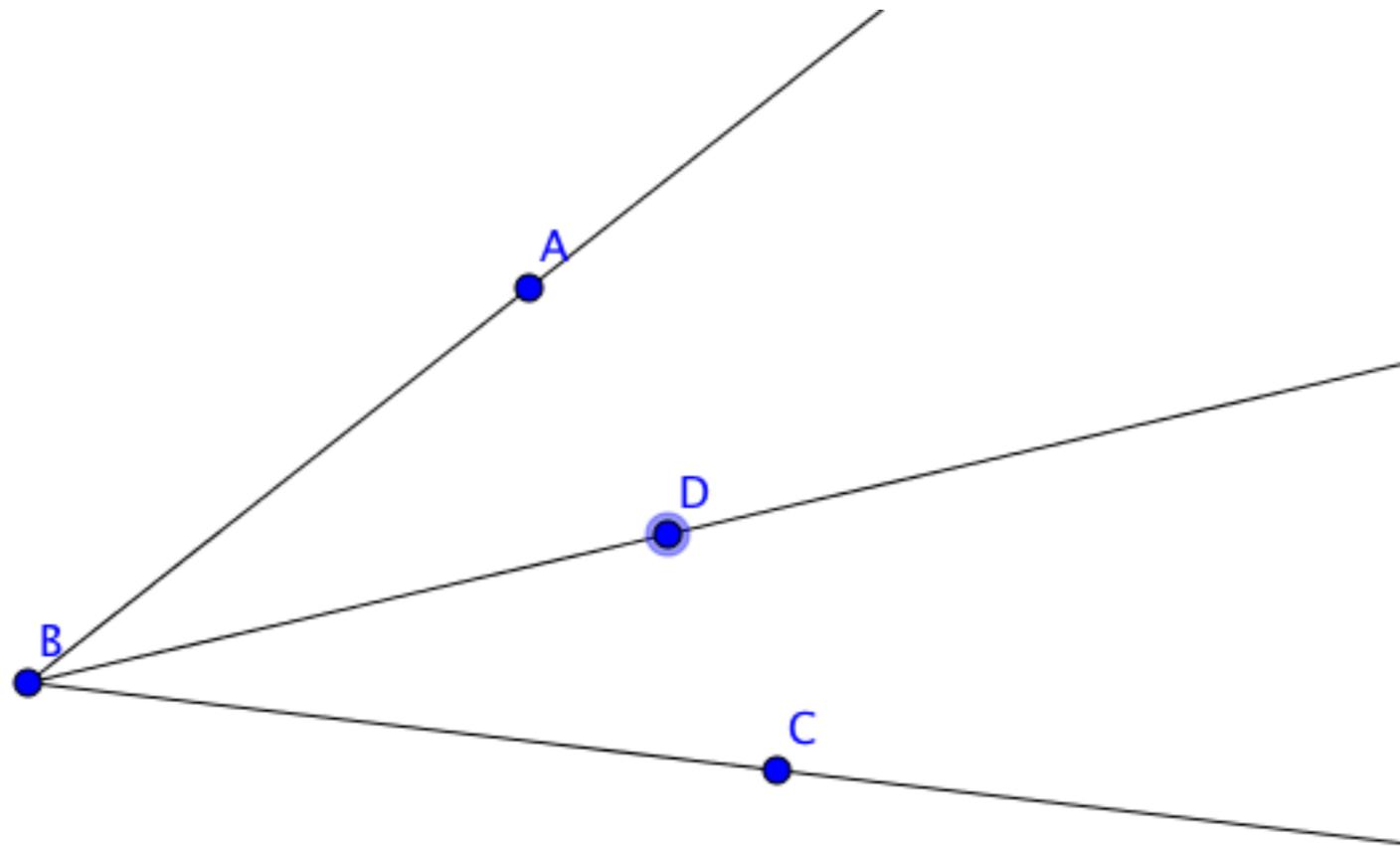


- perpendicular lines form 4 right angles.

$$j \perp k$$



Angle Addition Postulate: If  $D$  is in the interior of  $\angle ABC$  ,  
then.  $m\angle ABD + m\angle DBC = m\angle ABC$  .



## Properties of Congruence:

Reflexive Property:  $\angle A \cong \angle A$

Symmetric Property: If  $\angle A \cong \angle B$ , then  $\angle B \cong \angle A$

Transitive Property:

If  $\angle A \cong \angle B$  and  $\angle B \cong \angle C$ , then  $\angle A \cong \angle C$

## Angle Relationship Theorems:

\*Angles that are supplementary to the same angle are congruent:

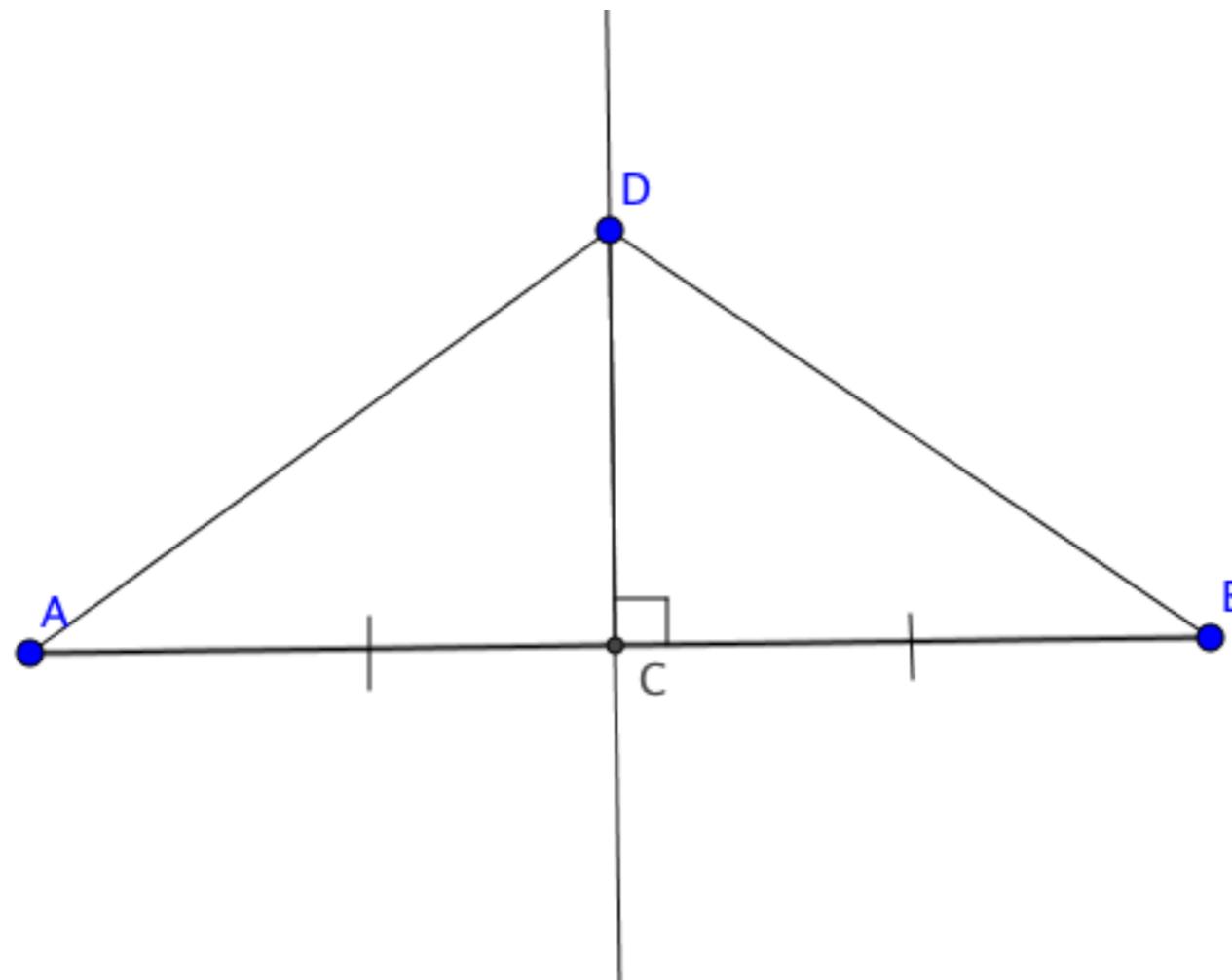
\*If two congruent angles form a linear pair, then they are right angles.

\*If two angles are congruent and supplementary, then they are right angles.

## Perpendicular Bisector Theorem:

If a point lies on the perpendicular bisector of a segment, then that point is equidistant from the endpoints of the segment.

Similarly, if a point is equidistant from the endpoints of a segment, that point lies on the perpendicular bisector of the segment.



Ex. 1: Use the given diagram to answer the questions below.

a) List a pair of adjacent angles

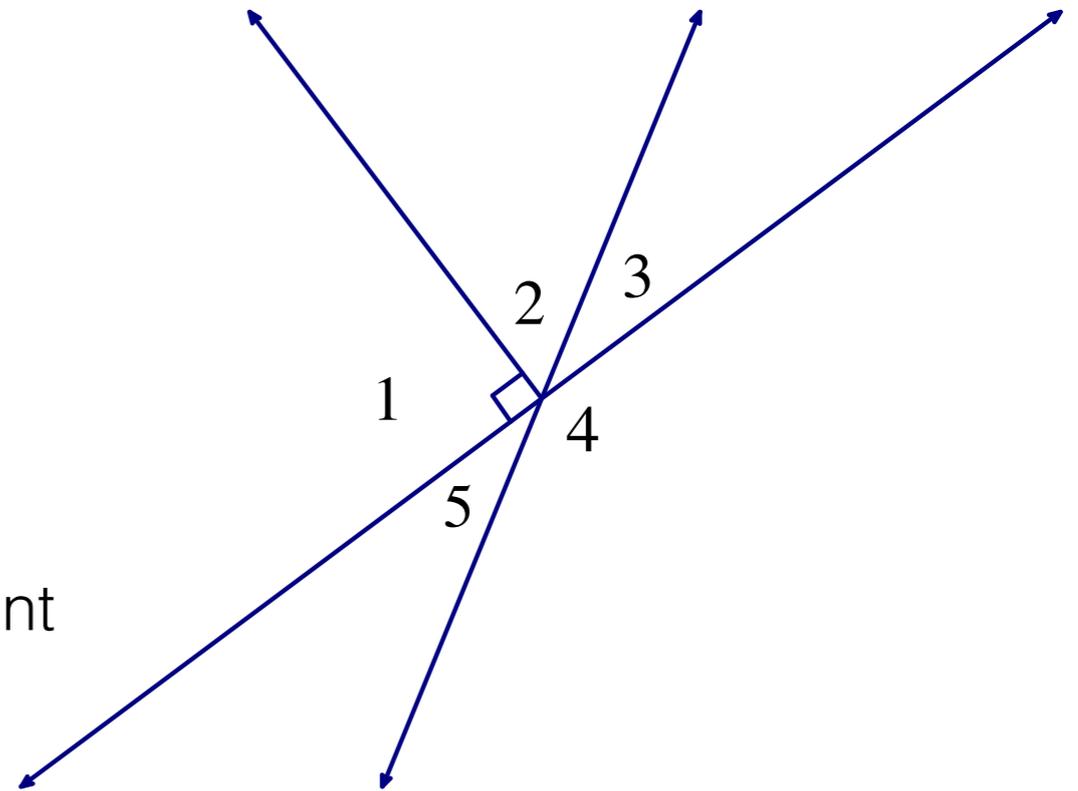
B) List a pair of non-adjacent angles

c) List a Pair of supplementary angles. Write a statement about those angles using the Supplement Theorem

d) List a pair of vertical angles. Write a statement about those angles using the Vertical Angles Theorem

E) List a pair of complementary angles. Write a statement about those angles using the Complement Theorem

F) If  $m\angle 2 = 70^\circ$ , find the measure of each of the other angles in the diagram.



Ex. 2: Find  $m\angle 2$  if  $m\angle 1 = 2x + 5$   
and  $m\angle 3 = x + 12$ .

