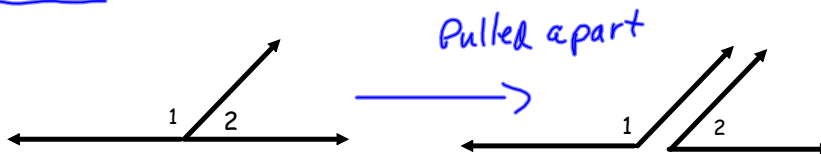


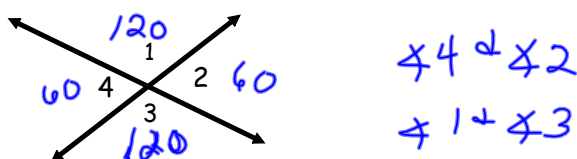
Notes 4-4: Congruence of line segments, angles and triangles  
Proving Theorems about angles, continued

Linear pair of angles: two adjacent angles whose sum is a straight angle.



Theorem 4.7 : If two angles form a linear pair, they are supplementary.

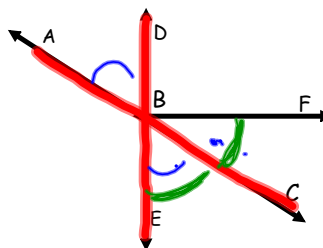
Vertical angles are two non-adjacent angles formed by the intersection of two lines.



Theorem 4.9: If two lines intersect, the vertical angles are congruent.

Ex. 1

Given:  $\overleftrightarrow{ABC}$  and  $\overleftrightarrow{DBE}$  intersect at  $B$   
 $\overleftrightarrow{BC}$  bisects  $\angle EBF$

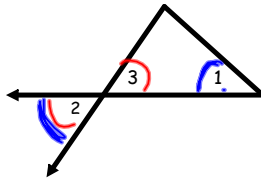


Prove:  $\angle CBF \cong \angle ABD$

Statement	Reason
1) $\overleftrightarrow{ABC}$ & $\overleftrightarrow{DBE}$ intersect at $B$	1. given
2) $\overleftrightarrow{BC}$ bisects $\angle EBF$	2. given
3) $\angle FBC \cong \angle CBE$	3. If a line bisects an angle, it divides it into 2 $\cong$ angles.
4) $\angle ABD$ & $\angle EBC$ are vertical angles	4. If lines intersect they form vertical angles.
5) $\angle ABD \cong \angle EBC$	5. Vertical angles are $\cong$ ,
6) $\angle CBF \cong \angle ABD$	6. A quantity may be substituted for its equal in any statement of equality

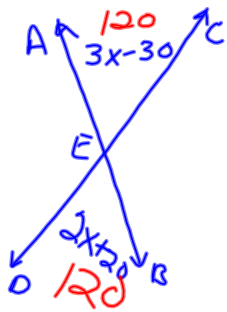
Ex. 2 Given:  $\angle 1 \cong \angle 2$

Prove:  $\angle 1 \cong \angle 3$



Statement	Reason
1) $\angle 1 \cong \angle 2$	1) given
2) $\angle 2$ & $\angle 3$ are vertical angles	2) when lines intersect, they form vertical angles.
3) $\angle 2 \cong \angle 3$	3) vertical angles $\cong$ .
4) $\angle 1 \cong \angle 3$	4) quantities may be substituted....

Ex. 3:  $\overline{AEB}$  and  $\overline{CED}$  intersect at E. If  $m\angle DEB = 2x + 20$  and  $m\angle AEC = 3x - 30$ , find  $m\angle DEB$ ,  $m\angle AEC$ ,  $m\angle AED$ , and  $m\angle CEB$



$$2x + 20 = 3x - 30$$

$$\boxed{x = 50}$$

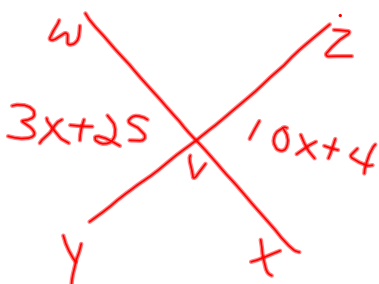
$$\angle DEB = 2(50) + 20 = 120$$

$$\angle AEC = 120$$

$$\angle CEB = 180 - 120 = 60$$

$$\angle AED = 60$$

Ex. 4:  $\overline{WX}$  and  $\overline{YZ}$  intersect at V,  $m\angle WVY = 3x + 25$  and  $m\angle XVZ = 10x + 4$ . Find  $m\angle WVZ$



$$3x + 25 = 10x + 4$$