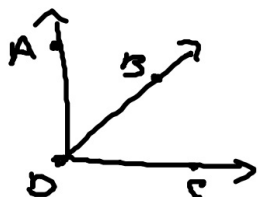


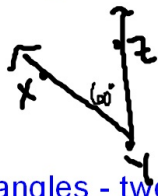
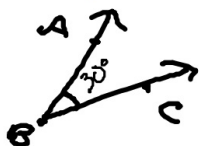
Definitions :

Adjacent angles - two angles in the same plane that have a common vertex and a common side but no interior points in common



$\angle ADB + \angle BDC$ - adjacent
 $\angle ADC + \angle BDC$ - not adjacent

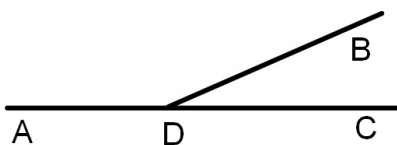
Complementary angles - two angles whose sum is 90 degrees



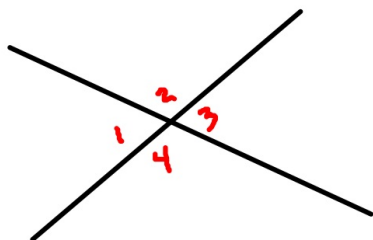
$m\angle ABC + m\angle XYZ = 90$
 $30^\circ + 60^\circ = 90^\circ$

Supplementary angles - two angles whose sum is 180 degrees

Linear pair of angles - two adjacent supplementary angles, two adjacent angles whose sum is 180.



Vertical angles - are two angles in which the sides of one angle are opposite rays to the sides of the second angle



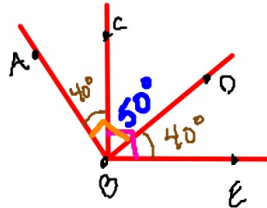
Vertical angle 2, 4 or 1, 3
 $\angle 1 \cong \angle 3$ $\angle 2 \cong \angle 4$
 $m\angle 1 = m\angle 3$ $m\angle 2 = m\angle 4$

Theorems:

4.1 - If two angle are right angles, then they are congruent.

4.2 - If two angles are straight angles, then they are congruent.

4.3 - If two angles are complements of the same angle, then they are congruent



$\angle AOC + \angle COD$ are complements

$\angle DOE + \angle COD$ are complement

$$\angle AOC \cong \angle DOE$$

4.4 If two angles are congruent, then their complements are congruent

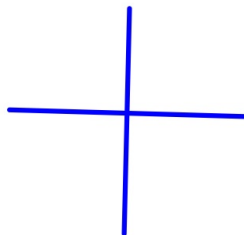


4.5 If two angles are supplements of the same angle, then those angles are congruent

4.6 If two angles are congruent then their supplements are congruent

4.7 If two angles form a linear pair, then they are supplementary

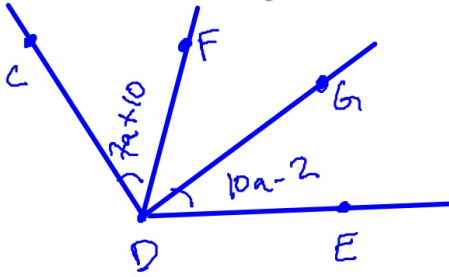
4.8 If two lines intersect to form congruent adjacent angles, then those lines are perpendicular



4.9 If two lines intersect, then the vertical angles are congruent

13. The rays \overrightarrow{DF} and \overrightarrow{DG} separate $\angle CDE$ into three congruent angles, $\angle CDF$, $\angle FDG$, and $\angle GDE$. If $m\angle CDF = 7a + 10$ and $m\angle GDE = 10a - 2$, find:

- a. $m\angle CDG$ b. $m\angle FDE$ c. $m\angle CDE$
 d. Is $\angle CDE$ acute, right, or obtuse?



$$\begin{array}{r} 7a+10 = 10a-2 \\ -7a \quad \quad -7a \\ \hline \end{array}$$

$$\begin{array}{r} 10 = 3a - 2 \\ +2 \quad \quad +2 \\ \hline \end{array}$$

$$\frac{12}{3} = \frac{3a}{3}$$

$$\boxed{4 = a}$$

$$\begin{array}{l} a) m\angle CDG = 76^\circ \\ 38 + 38 \end{array}$$

$$b) m\angle FDE = 76^\circ$$

$$\begin{array}{l} c) m\angle CDE = 38 + 38 + 38 \\ = 114^\circ \end{array}$$