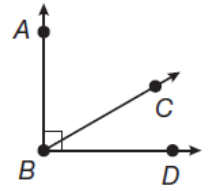# Geometry Lesson 6

Objective: TSW identify and use pairs of angles.

A pair of angles can sometimes be classified by their combined measure.
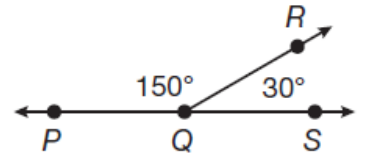
Complementary Angles – Two angles are complementary if the _____ of their measures is 90°.

$m\angle ABC + m\angle CBD = 90°$, so $\angle ABC$ is complementary to $\angle CBD$.

_____ Angles - Two angles are supplementary if the sum of their measures is 180°.

$m\angle PQR + m\angle RQS = 180°$, so $\angle PQR$ is supplementary to $\angle RQS$.

Math Language
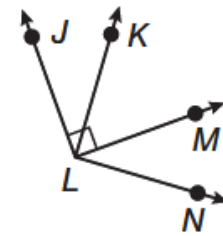
The sum of an angle and its **complement** is 90°.
The sum of an angle and its **supplement** is 180°.

Example 1. Finding complements and supplements.
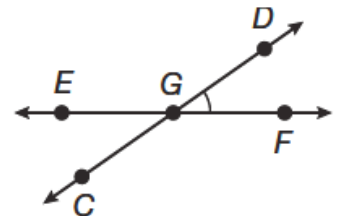   a.   Find the angles complementary to $\angle KLM$ if $m\angle KLN = 90°$.
   Solution

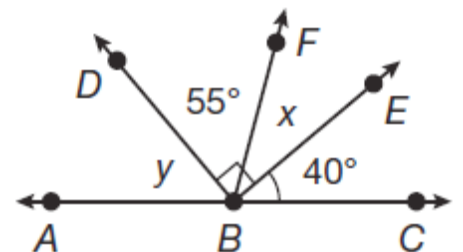   b.   Find the angles supplementary to $\angle DGF$.
   Solution

Theorem 6-1: Congruent Complements Theorem – If two angles are complementary to the same angle or to congruent angles, then they are congruent.

Theorem 6-2: Congruent Supplements Theorem - If two angles are supplementary to the same angle or to congruent angles, then they are congruent.
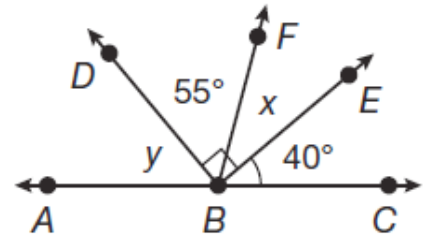
Example 2. Solving with Complements and Supplements.
   Find the measures of the angles labeled x and y.
   Solution

To find y,

_____ Angles - Two angles in the same plane that share a vertex and a side, but share no interior points. In the diagram, $\angle TSL$ is adjacent to $\angle LSM$ and $\angle RST$ is adjacent to $\angle TSL$.

Hint

Notice that m$\angle DBC$ is equal to the sum of the measures of three angles: m$\angle DBF$ + m$\angle FBE$ + m$\angle EBC$.

_____ Pair - Adjacent angles whose non-common sides are opposite rays. In the diagram $\angle RST$ and $\angle TSM$ are a linear pair. Linear pairs are also supplementary because their measures add up to 180°.
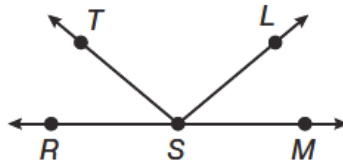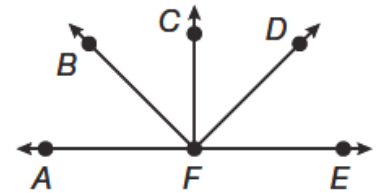
Theorem 6-3: Linear Pair Theorem – If two angle form a linear pair, then they are supplementary.

Example 3. Identifying Angle Pairs.
    Identify two sets of adjacent angles and one linear pair.
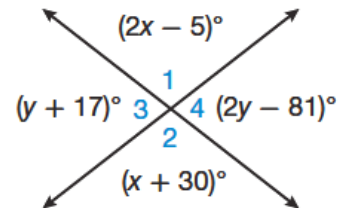   Solution

_____ Angles – Nonadjacent angles formed by two intersecting lines.

Theorem 6-4: Vertical Angle Theorem – If two angles are vertical angles, then they are congruent.

Example 4. Solving with Vertical Angles.
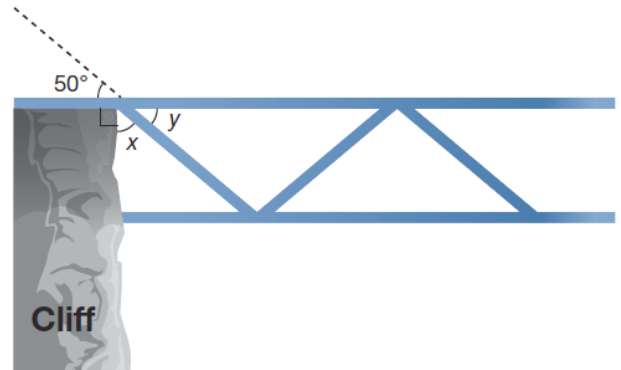   Determine the values of x and y.
    Solution

Example 5. Application: Bridge Supports.

The diagram shows the part of a bridge where it contacts a vertical cliff, so that the bridge and the cliff are perpendicular. The angle between the surface of the road and the line extended from the bridge's support measures 50°. It is important that the bridge's support be set at the correct angle to hold the weight of the bridge. What is the angle x that the support makes with the cliff?
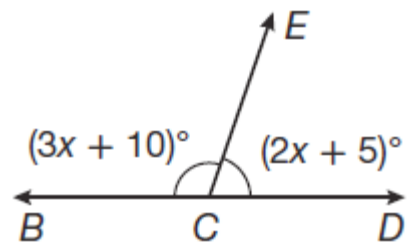
Solution

Math Reasoning

Formulate How could you have solved this problem by looking at a linear pair of angles instead of a vertical pair of angles?

You Try!!!!

c. Find the value of x.

$(3x + 10)°$ $(2x + 5)°$

e. Determine the value of x.

$(6x - 13)°$ $(3x + 11)°$