

## 2.3 Apply Deductive Reasoning

- G.CO.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
- G.CO.9 Prove theorems about lines and angles. (prep. for)
- G.CO.10 Prove theorems about triangles. (prep. for)
- G.CO.11 Prove theorems about parallelograms. (prep. for)

~~Inductive~~

- Before** You used inductive reasoning to form a conjecture.
- Now** You will use deductive reasoning to form a logical argument.
- Why?** So you can reach logical conclusions about locations.

**DEDUCTIVE REASONING** - Uses, **FACTS, DEFINITIONS, ACCEPTED PROPERTIES**, and the **LAWS OF LOGIC** to form a logical argument.

### LAWS OF LOGIC:

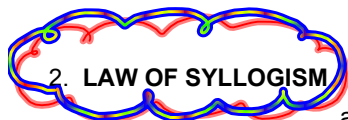
1. **LAW OF DETACHMENT** - If the hypothesis of a TRUE conditional statement is TRUE, then the conclusion is also TRUE.

Ex. If you run everyday then you get good exercise.  
Jillian runs everyday.

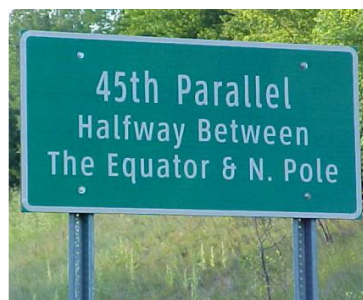
Conclusion: Jillian gets good exercise.

Ex. If you play football then you are an athlete.  
Tebow plays football.

Conclusion: Tebow is an athlete.



If  $p \rightarrow q$   
and  $q \rightarrow r$   
then  $p \rightarrow r$



Ex. If you live in Alpena, MI then you live on the 45th Parallel.

If you live on the 45th Parallel then you live halfway between the Equator and the North Pole.

Conclusion: If you live in Alpena, MI  $\Rightarrow$  you live  $\frac{1}{2}$  way  $\times$  the equator & N. Pole.

Ex. If you live in Pawleys Island then you live in South Carolina.

If you live in South Carolina then you live in the Palmetto State.

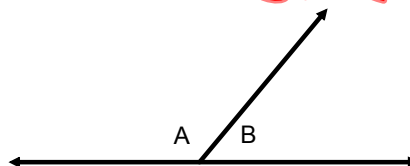
Conclusion: If you live in P.I.  $\Rightarrow$  you live in the Palmetto State.

### Connecting the two Laws of Logic to Geometry:

If the angles are a Linear Pair then the angles are supplementary.

If the angles are supplementary then the sum of the angles is  $180^\circ$ .

Angles A and B are a Linear Pair.



Conclusion (using the Law of Syllogism):

If the  $\angle$ s are a L.P.  $\Rightarrow$  the sum of the  $\angle$ s is  $180^\circ$ .

Conclusion (using the Law of Detachment):

$\angle A \wedge B$  have a sum of  $180^\circ$ .