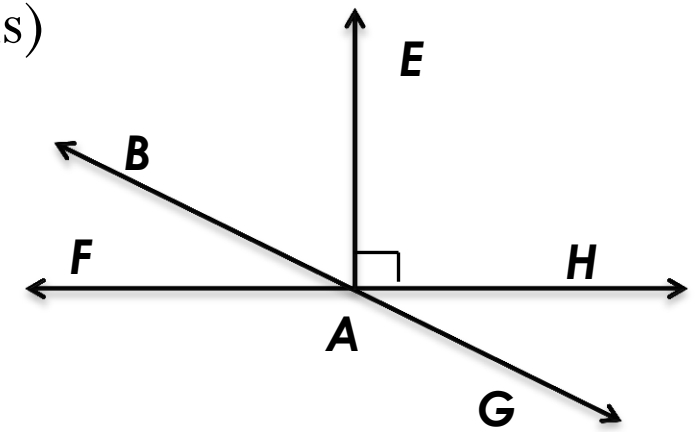
Geometry – Unit 2

Postulates
And
Theorems

Warmup

- Refer to the diagram and complete the statements. *(Don't forget about our previous terms)



- 1. $< BAF \cong$ _____ because they are _____ angles.
- 2. $BA + AG =$ _____ by the _____ Postulate.
- 3. $< BAF$ and $< BAH$ are _____ angles because they add up to _____.
- 4. $m < EAH +$ _____ $= m < EAG$ by the _____ Postulate.

Postulates and Theorems

- **Content Objective:** Students will be able to know and use postulates and theorems related to points, lines and planes.

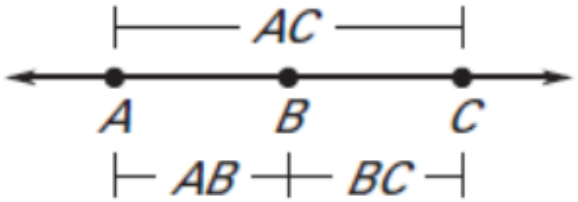
- **Language Objective:** Students will be able to use postulates and theorems to determine whether a given statement is true or false.

Basic Terms

- **Postulate:** A basic assumption that is accepted without proof.
- **Theorem:** A statement that can be proved using postulates, definitions, and previously used theorems.
- **Exists:** There is at least one.
- **Unique:** There is no more than one.
- **One and only one:** There is exactly one.
- **Determine:** To decline or specify.

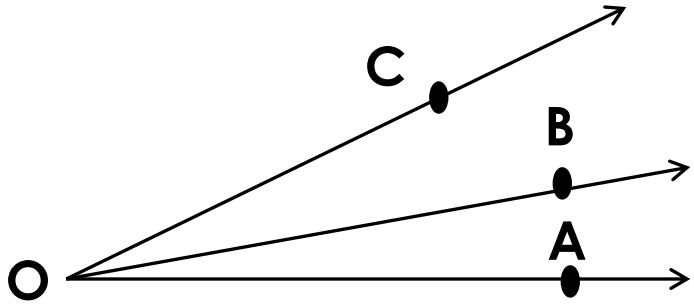
Previous Postulates

- ***Segment Addition Postulate:***
  - If ***B*** is between ***A*** and ***C***, then $AB + BC = AC$.



- *Angle Addition Postulate:*
  - If point B lies in the interior of $< AOC$, then

$$m < AOB + m < BOC = m < AOC.$$



New Postulates – Pg 23 (Textbook)

- **<u>Postulate #5:</u>**
  - A line contains **at least 2 points.**
  - A plane contains **at least 3 non-collinear points.**
  - A space contains **at least 4 non-coplanar points.**

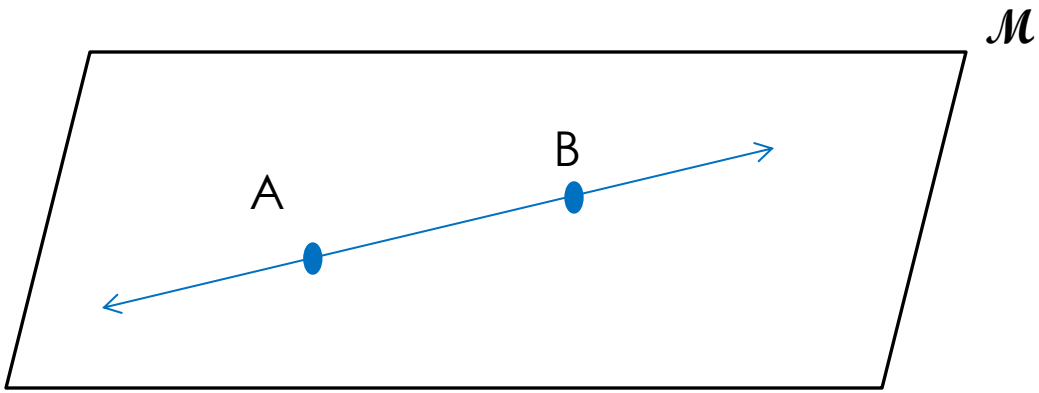
New Postulates – Pg 23 (Textbook)

- **Postulate #6:**
  - Through any two points, there is **exactly 1 line.**

- **Postulate #7:**
  - Through any three points there is **at least 1 plane**.
  - Through any three non-collinear points there is **exactly one plane.**

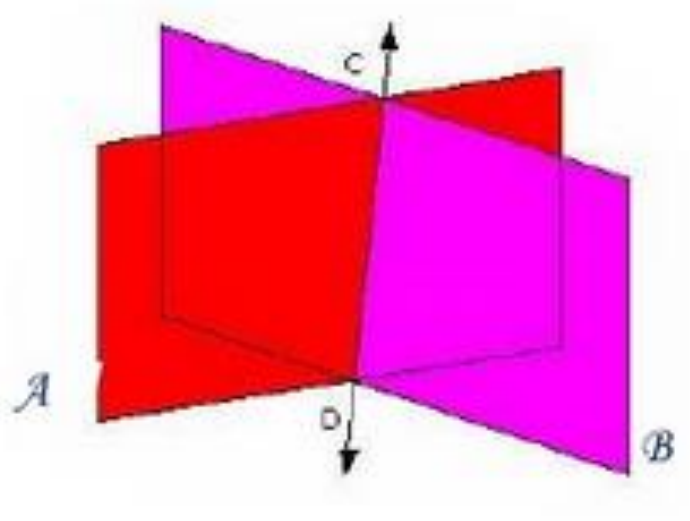
New Postulates – Pg 23 (Textbook)

- **Postulate #8:**
  - If two points are in a plane, then the line that contains the points is also in the plane.



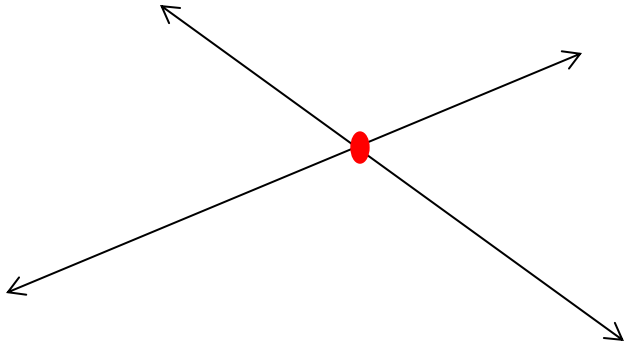
New Postulates – Pg 23 (Textbook)

- **Postulate #9:**
  - If two planes intersect, then their intersection is a line.
  - In the diagram, $\overleftrightarrow{DC}$ is the intersection of **Plane A** and **Plane B.**



Theorems

- **Theorem 1-1: Intersection of Lines**
  - If two lines intersect, then they intersect in exactly one point.

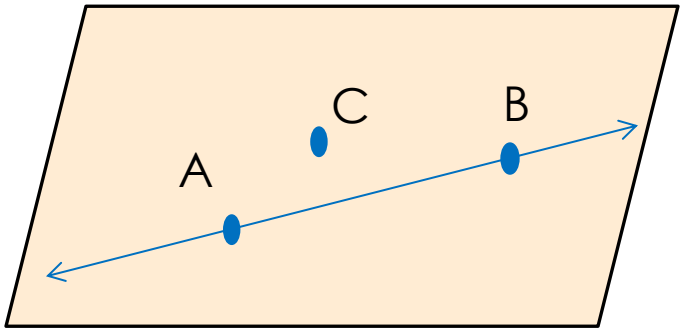


  - What postulate could you use to prove this theorem?

Postulate 6

Theorems

- **Theorem 1-2:**
  - Through a line and a point not in the line, there is exactly one plane.

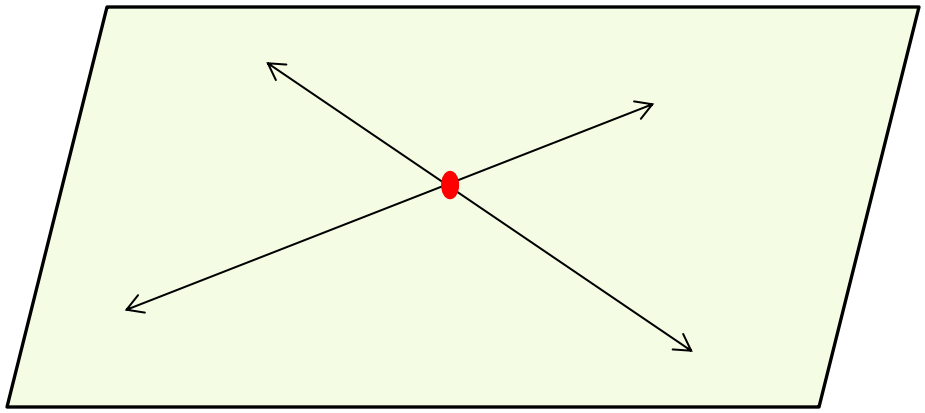


  - What postulate could you use to prove this theorem?

Postulate 7

Theorems

- **Theorem 1-3: Intersection of Lines**
  - If two lines intersect, then exactly one plane contains the lines.



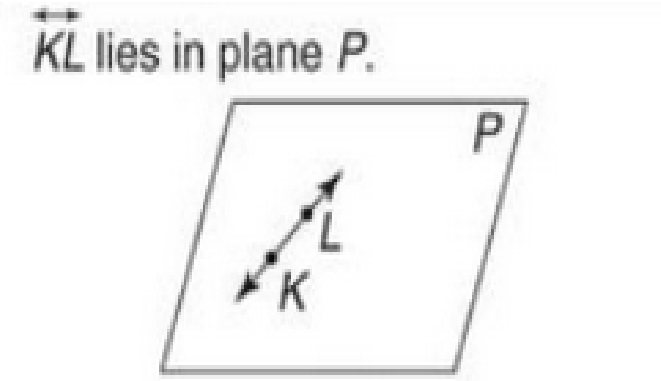
  - What postulate could you use to prove this theorem?

Postulate 5…and 7

Practice Worksheet

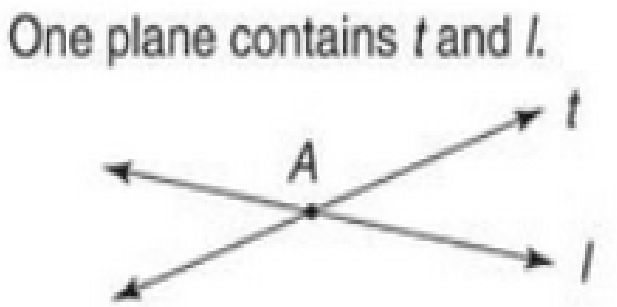
State the Theorem or Postulate you would use to justify the statement made about each figure.

1.)



Postulate 8

2.)



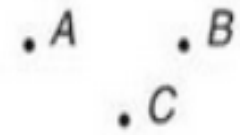
Theorem 1-3

Practice Worksheet

State the Theorem or Postulate you would use to justify the statement made about each figure.

3.)

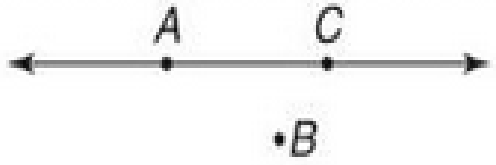
One plane contains points *A*, *B*, and *C*.



Postulate 7

4.)

One plane contains $\overleftrightarrow{AC}$ and *B*.



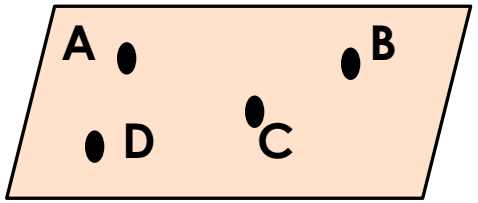
Theorem 1-2

Practice Worksheet

Each of the following statements is ***FALSE***. Use a complete sentence to explain why.

9.) A plain is made up of exactly 3 points.

A plane is made up of AT LEAST 3 points (There could be more)



10.) If two lines intersect, then at least one plane contains the lines.

Exactly one plane contains the lines (Theorem 1-3).