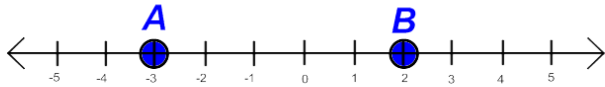


## Section 1.5

# Postulates and Theorems Relating Points, Lines, and Planes

### Postulate 1: The Ruler Postulate

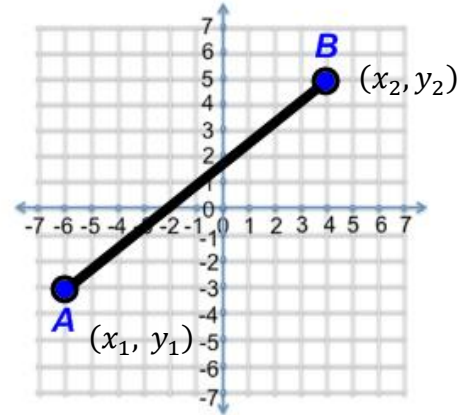
#### Case 1 – Number Line (One Dimensional)



$$AB = |A - B|$$

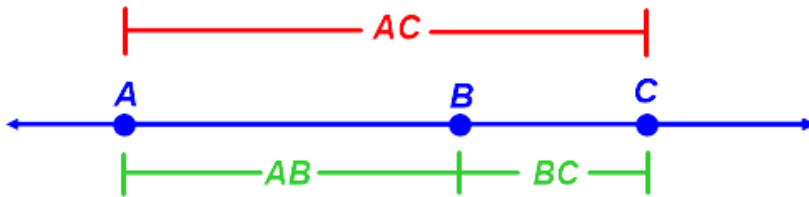
$$AB = B - A$$

#### Case 2 – Coordinate Plane (Two Dimensional)



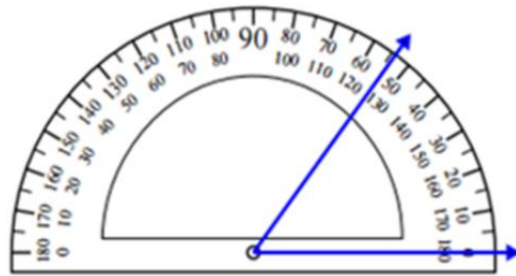
$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

### Postulate 2: The Segment Addition Postulate

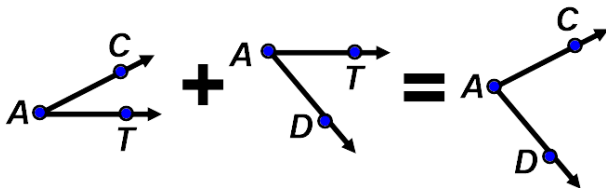


$$AC = AB + BC$$

### Postulate 3: The Protractor Postulate

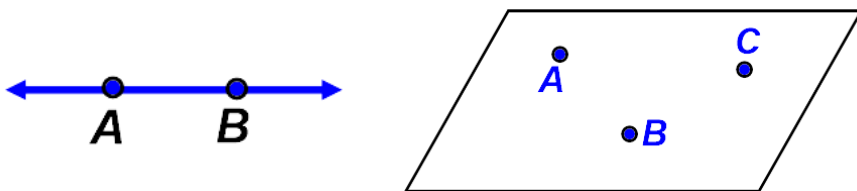


### Postulate 4: The Angle Addition Postulate

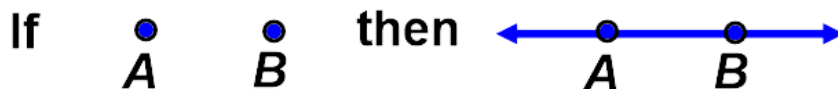


$$m\angle CAT + m\angle DAT = m\angle CAD$$

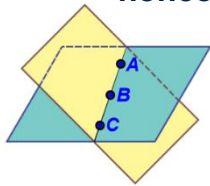
**Postulate 5: A line contains at least two points; a plane contains at least three points not all in one line; space contains at least four points not all in one plane.**



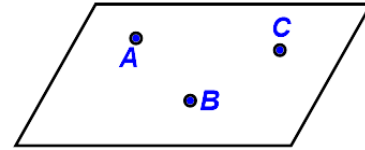
**Postulate 6: Through any two points, there is exactly one line.**



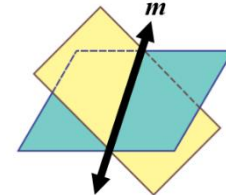
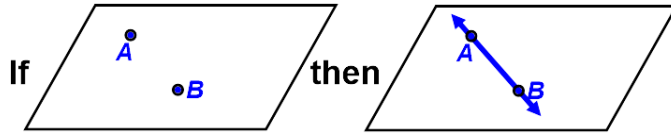
**Postulate 7:** Through any three points, there is at one plane, and through any three noncollinear points, there is exactly one plane.



If  $A$ ,  $B$ ,  $C$  then

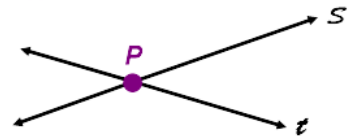


**Postulate 8:** If two points are in a plane, then the line that contains the points is in that plane.

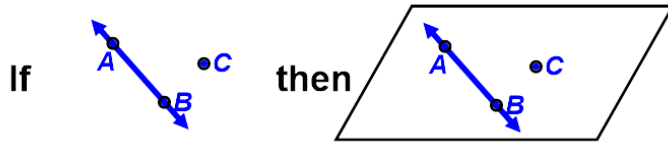


**Postulate 9:** If two planes intersect, then their intersection is a line.

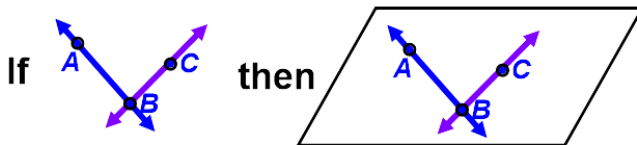
**Theorem 1-1:** If two lines intersect, then they intersect in exactly one point.



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



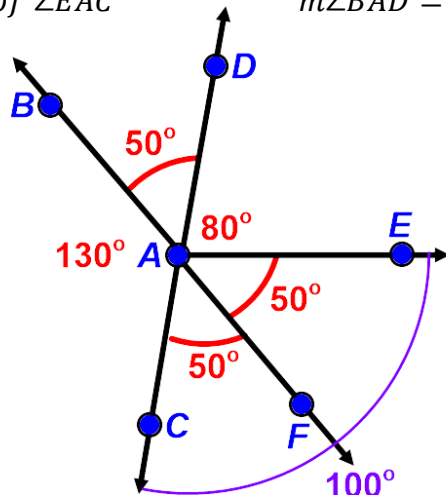
**Theorem 1-3:** If two lines intersect, then exactly one plane contains the lines.



**Draw a sketch and use all the following information.**

Point D is interior of  $\angle BAE$   
 Point E is interior of  $\angle DAF$   
 Point F is interior of  $\angle EAC$

$m\angle BAC = 130^\circ$   
 $m\angle EAC = 100^\circ$   
 $m\angle BAD = m\angle EAF = m\angle FAC$



- $m\angle FAC = 50^\circ$
- $m\angle BAD = 50^\circ$
- $m\angle FAB = 180^\circ$
- $m\angle DAE = 80^\circ$
- $m\angle FAD = 130^\circ$
- $m\angle BAE = 130^\circ$