

## Definitions, Properties, Postulates, and Theorems

- 1. Definition of Midpoint** A midpoint of a segment is a point that divides the segment into two congruent segments.
- 2. Definition of Segment Bisector** A segment bisector is a line, segment, ray, or plane that intersects a segment at its midpoint.
- 3. Definition of Angle Bisector** An angle bisector is a ray or line segment that divides an angle into two congruent angles.
- 4. Definition of Perpendicular Lines** Perpendicular lines are lines that intersect to form right angles.
- 5. Definition of Right Triangle** A triangle with a right angle.
- 6. Right Angle Theorem** All right angles are congruent.
- 7. Definition of Perpendicular Bisector** A perpendicular bisector of a segment is a line, segment, or ray that is perpendicular to the segment at its midpoint, thereby bisecting the segments into two congruent segments.
- 8. Definition of Congruent Angles** Congruent angles are angles that have the same measure.
- 9. Definition of Congruent Segments** Congruent segments are segments that have the same length.
- 10. Vertical Angles Theorem** Vertical angles are congruent.
- 11. Definition of Linear Pair** A linear pair is a pair of adjacent angles with noncommon sides that are opposite rays.
- 12. Linear Pair Theorem** If two angles form a linear pair, then they are supplementary angles.
- 13. Definition of Supplementary Angles** Supplementary angles are two angles with measures that have a sum of 180.
- 14. Properties of Congruence**

- *Reflexive Property*  $\overline{AB} \cong \overline{AB}$   
 $\angle A \cong \angle A$

- *Symmetric Property* If  $\overline{AB} \cong \overline{CD}$  then  $\overline{CD} \cong \overline{AB}$ .  
If  $\angle A \cong \angle B$ , then  $\angle B \cong \angle A$
- *Transitive Property* If  $\overline{DE} \cong \overline{FG}$  and  $\overline{FG} \cong \overline{JK}$ , then  $\overline{DE} \cong \overline{JK}$ .  
If  $\angle D \cong \angle E$  and  $\angle E \cong \angle F$ , then  $\angle D \cong \angle F$ .

### 15. Properties of Equality

- *Addition Property* If  $a = b$ , then  $a + c = b + c$
- *Subtraction Property* If  $a = b$ , then  $a - c = b - c$ .
- *Multiplication Property* If  $a = b$ , then  $a \cdot c = b \cdot c$ .
- *Division Property* If  $a = b$  and  $c \neq 0$ , then  $a/c = b/c$ .
- *Reflexive Property*  $a = a$
- *Symmetric Property* If  $a = b$ , then  $b = a$ .
- *Transitive Property* If  $a = b$  and  $b = c$ , then  $a = c$ .
- *Substitution Property* If  $a = b$ , then  $b$  can replace  $a$  in any expression.

### 16. Postulates/Theorems Relating Angles Formed by Parallel Lines

- ***Corresponding Angles Theorem*** If two parallel lines are cut by a transversal, then *corresponding* angles are congruent.
- ***Alternate Interior Angles Theorem*** If two parallel lines are cut by a transversal, then *alternate interior* angles are congruent.
- ***Same-side Interior Angles Postulate*** If two parallel lines are cut by a transversal, then *same-side interior* angles are supplementary.
- ***Alternate Exterior Angles Theorem*** If two parallel lines are cut by a transversal, then *alternate exterior* angles are congruent.

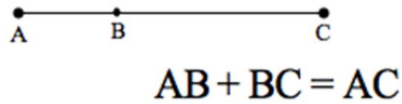
### 17. Postulates/Theorems Used to Prove Triangles Congruent

- *Side-Side-Side (SSS) Postulate*
- *Side-Angle-Side (SAS) Postulate*
- *Angle-Side-Angle (ASA) Postulate*

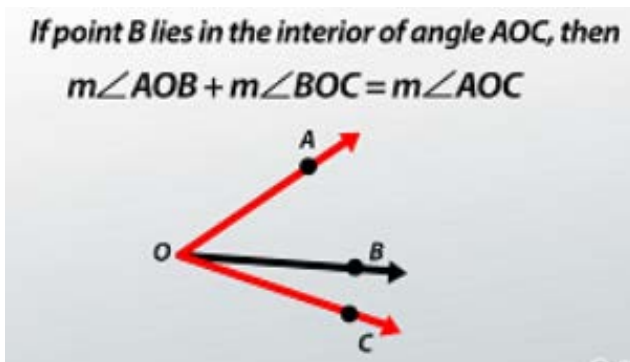
- *Angle-Angle-Side (AAS) Theorem*
- *Hypotenuse-Leg (HL) Theorem*—only applies to right triangles

### 18. Segment Addition Postulate

If three points A, B, and C are collinear and B is between A and C, then  $AB + BC = AC$ .



### 19. Angle Addition Postulate



### 20. Third Angles Theorem

If two angles of one triangle are congruent to two angles of another triangle, then the third angles are also congruent.

