Theorems and Postulates

Postulate 2-A
Protractor Postulate

Given $\overrightarrow{AB}$ and a number r between 0 and 180, there is exactly one ray with endpoint A, extending on either side of $\overleftrightarrow{AB}$, such that the measure of the angle formed is r.

Definition of Right, Acute and Obtuse Angles

$\angle A$ is a right angle if $m\angle A$ is 90.
$\angle A$ is an acute angle if $m\angle A$ is less than 90.
$\angle A$ is an obtuse angle if $m\angle A$ is greater than 90 and less than 180.

Postulate 2-B
Angle Addition

If R is in the interior of $\angle PQS$, then $m\angle PQR + m\angle RQS = m\angle PQS$.
If $m\angle PQR + m\angle RQS = m\angle PQS$, then R is in the interior of $\angle PQS$.

Vertical angles are congruent.

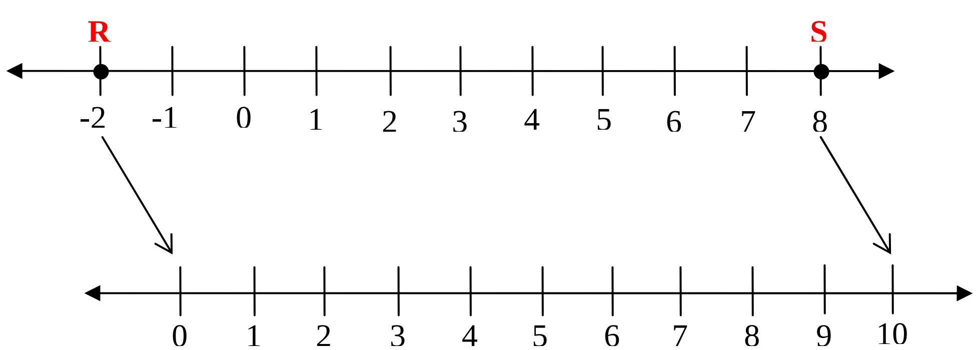
The sum of the measures of the angles in a linear pair is 180°.

The sum of the measures of complementary angles is 90°.

Postulate 3-A
Ruler

Two points on a line can be paired with real numbers so that, given any two points R and S on the line, R corresponds to zero, and S corresponds to a positive number.

Point R could be paired with 0, and S could be paired with 10.



Postulate 3-B
Segment Addition

If N is between M and P, then MN + NP = MP.
Conversely, if MN + NP = MP, then N is between M and P.

Theorem 4-A
Pythagorean Theorem

In a right triangle, the sum of the squares of the measures of the legs equals the square of the measure of the hypotenuse.

Distance Formula

The distance *d* between any two points with coordinates (x_1, y_1) and (x_2, y_2) is given by the formula $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ **.**

Midpoint Definition

The midpoint, M, of $\overline{AB}$ is the point between A and B such that AM = MB.

Midpoint Formula Number Line

With endpoints of A and B on a number line, the midpoint of $\overline{AB}$ is $\frac{A+B}{2}$**.**

Midpoint Formula Coordinate Plane

In the coordinate plane, the coordinates of the midpoint of a segment whose endpoints have coordinates (x_1, y_1) and (x_2, y_2) are $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$**.**

Theorem 4-B
Midpoint Theorem

If M is the midpoint of $\overline{PQ}$, then $\overline{PM} \cong \overline{MQ}$.

Postulate 5-A
Law of Detachment

If $p \Rightarrow q$ **is true, and** p **is true, then** q **is true.**

Postulate 5-B
Law of Syllogism

If $p \Rightarrow q$ **is true and** $q \Rightarrow r$ **is true, then** $p \Rightarrow r$ **is true.**

Postulate 6-A
Reflexive Property

Any segment or angle is congruent to itself.

$\overline{QS} \cong \overline{QS}$

Postulate 6-B Symmetric Property	**If** $\overline{AB} \cong \overline{CD}$, **then** $\overline{CD} \cong \overline{AB}$. **If** $\angle CAB \cong \angle DOE$, **then** $\angle DOE \cong \angle CAB$.
Theorem 6-A Transitive Property	**If any segments or angles are congruent to the same angle, then they are congruent to each other.** **If** $\overline{AB} \cong \overline{CD}$ **and** $\overline{CD} \cong \overline{EF}$, **then** $\overline{AB} \cong \overline{EF}$. **If** $\angle 1 \cong \angle 2$ **and** $\angle 2 \cong \angle 3$, **then** $\angle 1 \cong \angle 3$.
Theorem 6-B Transitive Property	**If any segments or angles are congruent to each other, then they are congruent to the same angle. (This statement is the converse of Theorem 6-A.)**
Theorem 7-A Addition Property	**If a segment is added to two congruent segments, then the sums are congruent.**
Theorem 7-B Addition Property	**If an angle is added to two congruent angles, then the sums are congruent.**
Theorem 7-C Addition Property	**If congruent segments are added to congruent segments, then the sums are congruent.**
Theorem 7-D Addition Property	**If congruent angles are added to congruent angles, then the sums are congruent.**
Theorem 7-E Subtraction Property	**If a segment is subtracted from congruent segments, then the differences are congruent.**

Theorem 7-F Subtraction Property	**If an angle is subtracted from congruent angles, then the differences are congruent.**
Theorem 7-G Subtraction Property	**If congruent segments are subtracted from congruent segments, then the differences are congruent.**
Theorem 7-H Subtraction Property	**If congruent angles are subtracted from congruent angles, then the differences are congruent.**
Theorem 7-I Multiplication Property	**If segments are congruent, then their like multiples are congruent.**
Theorem 7-J Multiplication Property	**If angles are congruent, then their like multiples are congruent.**
Theorem 7-K Division Property	**If segments are congruent, then their like divisions are congruent.**
Theorem 7-L Division Property	**If angles are congruent, then their like divisions are congruent.**