Postulates and Theorems

Postulate	Through any two points there exists exactly one line.
Postulate	Through any three noncollinear points there exists exactly one plane.
Postulate	A plane contains at least three noncollinear points.
Postulate	If there is a line and a point not on the line, then there is exactly one line through the point parallel to the given line.
	If there is a line and a point not on the line, then there is exactly one line through the point perpendicular to the given line.
The Ruler Postulate	a. To every pair of points there corresponds a unique positive number called the distance between the points. b. The points on a line can be matched with the real numbers so that the distance between any two points is the absolute value of the difference of their associated numbers.
Segment Addition Postulate	If B is between A and C, then $AB + BC = AC$. If $AB + BC = AC$, then B is between A and C.
The Protractor Postulate	a. To each angle there corresponds a unique real number between 0 and 180 called the measure of the angle. b. The measure of an angle formed by a pair of rays is the absolute value of the difference of their associated numbers.
Angle Addition Postulate	If P is in the interior of $\angle RST$, then $m\angle RSP + m\angle PST = m\angle RST$.
Alternate Interior Angles Theorem	If two parallel lines are cut by a transversal, then the pairs of alternate interior angles are congruent.
Corresponding Angles Postulate	When parallel lines are cut by a transversal, the corresponding angles will always have the same measure.

Theorem	Vertical angles are congruent.
Theorem	The sum of the measures of the angles of a triangle is 180°.
Theorem	If two lines are parallel to the same line, then they are parallel to each other.
Theorem	In a plane, two lines perpendicular to the same line are parallel.
The Pythagorean Theorem	The square of the length of the hypotenuse of a right triangle is equal to the sum of the squares of the lengths of the legs of the right triangle.
Exterior Angle Theorem	The measure of an exterior angle is equal to the sum of the measures of the two nonadjacent angles.
The Hinge Theorem	If two sides of one triangle are congruent to two sides of another triangle, and the included angle in the first triangle is larger than the included angle in the other triangle, then the third side of the first triangle is longer than the third side of the other triangle.

Triangle Inequality Theorem	The sum of the lengths of any two sides of a triangle is greater than the length of the third side.
Centroid Measure Theorem	The centroid of a triangle divides each median into two parts so that the distance from the vertex to the centroid is twice the distance from the centroid to the midpoint of the opposite side.
AAS Theorem	If two angles and a non-included side of one triangle are congruent to the corresponding two angles and non-included side of another triangle, then the triangles are congruent.
Isosceles Triangle Theorem	If two sides of a triangle are congruent, then the angles opposite them are congruent.
Triangle Midsegment Theorem	The midsegment of a triangle is parallel to the third side, and its length is one half the length of the third side.
Trapezoid Median Theorem	The median of a trapezoid is parallel to the bases and its length is the average of the lengths of the bases.
Theorem	If both pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a parallelogram.
Theorem	If one pair of opposite sides of a quadrilateral are congruent and parallel, then the quadrilateral is a parallelogram.

Theorem	If both pairs of opposite angles of a quadrilateral are congruent, then the quadrilateral is a parallelogram.
Theorem	If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram.
Theorem	If a parallelogram has one right angle, then it has four right angles, and it is a rectangle.
Theorem	If a quadrilateral is equiangular, then it is a rectangle.
Theorem	If the diagonals of a parallelogram are perpendicular, then the parallelogram is a rhombus.
Theorem	If a quadrilateral is equilateral, then it is a rhombus.
Theorem	If the diagonals of a parallelogram are congruent, then the parallelogram is a rectangle.
Theorem	If a diagonal bisects a pair of opposite angles in a parallelogram, then the parallelogram is a rhombus.

AA Similarity Postulate	If two angles of one triangle are congruent to two angles of another triangle, then the triangles are similar.
Side-Angle-Side (SAS) Similarity Theorem	If an angle of one triangle is congruent to an angle of another triangle and the sides including those angles are in proportion, then the triangles are similar.
Side-Side-Side (SSS) Similarity Theorem	If the corresponding sides of two triangles are in proportion, then the triangles are similar.
Triangle Proportionality Theorem	If a line parallel to a side of a triangle intersects the other two sides, then it divides them proportionally.
Parallel Proportionality Theorem	If two or more lines parallel to a side of a triangle intersect the other two sides, then they divide them proportionally.
Angle Bisector Proportionality Theorem	An angle bisector in a triangle divides the side of the triangle opposite the angle into two segments that are in proportion to the adjacent sides.
Linear Pair Postulate	If two angles form a linear pair, then they are supplementary.
Right Triangle Altitude Theorem	If an altitude is drawn to the hypotenuse of a right triangle, then the two triangles formed are similar to the original right triangle and to each other.
Theorem	In a circle, two congruent chords are equidistant from the center of the circle.
Theorem	The tangent segments to a circle from a point outside the circle are congruent.
Inscribed Angle Measure Theorem	In a circle, the measure of an inscribed angle is one-half the measure of intercepted arc.

Theorem	The measure of an angle formed by two secants drawn to a circle from a point in the exterior of the circle is equal to one-half the difference of the measures of their intercepted arcs.
Theorem	The measure of an angle formed by a secant and a tangent drawn to a circle from a point in the exterior of the circle is equal to one-half the difference of the measures of their intercepted arcs.
Theorem	If two chords of a circle intersect, then the product of the lengths of the segments of one chord equals the product of the lengths of the segments of the other chord.
Theorem	If two secant segments share the same endpoint outside a circle, then the product of the length of one secant segment and the length of its external segment equals the product of the length of the other secant segment and the length of its external segment.
Theorem	If a secant segment and a tangent segment share the same endpoint outside a circle, then the product of the length of the secant segment and the length of its external segment equals the square of the length of the tangent segment.