**General:**

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| Reflexive Property | A quantity is congruent (equal) to itself.  a = a |
| Symmetric Property | If a = b, then b = a. |
| Transitive Property | If a = b and b = c, then a = c. |
| Addition Postulate | If equal quantities are added to equal quantities, the sums are equal. |
| Subtraction Postulate | If equal quantities are subtracted from equal quantities, the differences are equal. |
| Multiplication Postulate | If equal quantities are multiplied by equal quantities, the products are equal.  (also Doubles of equal quantities are equal.) |
| Division Postulate | If equal quantities are divided by equal nonzero quantities, the quotients are equal. (also Halves of equal quantities are equal.) |
| Substitution Postulate | A quantity may be substituted for its equal in any expression. |
| Partition Postulate | The whole is equal to the sum of its parts. Also:  **Betweeness of Points:**  *AB + BC = AC* **Angle Addition Postulate**:  *m<ABC + m<CBD = m<ABD* |
| Construction | Two points determine a straight line. |
| Construction | From a given point on (or not on) a line, one and only one perpendicular can be drawn to the line. |

**Angles:**

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| Right Angles | All right angles are congruent. |
| Straight Angles | All straight angles are congruent. |
| Congruent Supplements | Supplements of the same angle, or congruent angles, are congruent. |
| Congruent Complements | Complements of the same angle, or congruent angles, are congruent. |
| Linear Pair | If two angles form a linear pair, they are supplementary. |
| Vertical Angles | Vertical angles are congruent. |
| Triangle Sum | The sum of the interior angles of a triangle is 180º. |
| Exterior Angle | The measure of an exterior angle of a triangle is equal to the sum of the measures of the two non-adjacent interior angles. The measure of an exterior angle of a triangle is greater than either non-adjacent interior angle. |
| Base Angle Theorem (Isosceles Triangle) | If two sides of a triangle are congruent, the angles opposite these sides are congruent. |
| Base Angle Converse (Isosceles Triangle) | If two angles of a triangle are congruent, the sides opposite these angles are congruent. |

**Triangles:**

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| Side-Side-Side (SSS) Congruence | If three sides of one triangle are congruent to three sides of  another triangle, then the triangles are congruent. |
| Side-Angle-Side (SAS) Congruence | If two sides and the included angle of one triangle are congruent to the corresponding parts of another triangle, the triangles are congruent. |
| Angle-Side-Angle (ASA) Congruence | If two angles and the included side of one triangle are congruent to the corresponding parts of another triangle, the triangles are congruent. |
| Angle-Angle-Side (AAS) Congruence | If two angles and the non-included side of one triangle are congruent to the corresponding parts of another triangle, the triangles are congruent. |
| Hypotenuse-Leg (HL) Congruence (right triangle) | If the hypotenuse and leg of one right triangle are congruent to the corresponding parts of another right triangle, the two right triangles are congruent. |
| CPCTC | Corresponding parts of congruent triangles are congruent. |
| Angle-Angle (AA) Similarity | If two angles of one triangle are congruent to two angles of another triangle, the triangles are **similar.** |
| SSS for Similarity | If the three sets of corresponding sides of two triangles are in proportion, the triangles are similar. |
| SAS for Similarity | If an angle of one triangle is congruent to the corresponding angle of another triangle and the lengths of the sides including these angles are in proportion, the triangles are similar. |
| Side Proportionality | If two triangles are **similar**, the corresponding sides are in proportion. |
| Mid-segment Theorem (also called mid-line) | The segment connecting the midpoints of two sides of a triangle is **parallel** to the third side and is half as long. |
| Sum of Two Sides | The sum of the lengths of any two sides of a triangle must be greater than the third side |
| Longest Side | In a triangle, the longest side is across from the largest angle. In a triangle, the largest angle is across from the longest side. |
| Altitude Rule | The **altitude** to the hypotenuse of a right triangle is the mean proportional between the segments into which it divides the hypotenuse. |
| Leg Rule | Each **leg** of a right triangle is the mean proportional between the hypotenuse and the projection of the leg on the hypotenuse. |

**Parallels:**

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| |  |  | | --- | --- | | Corresponding Angles | If two **parallel** lines are cut by a transversal, then the pairs of corresponding angles are congruent. | | Corresponding Angles Converse | If two lines are cut by a transversal and the corresponding angles are congruent, the lines are **parallel**. | | Alternate Interior Angles | If two **parallel** lines are cut by a transversal, then the alternate interior angles are congruent. | | Alternate Exterior Angles | If two **parallel** lines are cut by a transversal, then the alternate exterior angles are congruent. | | Interiors on Same Side | If two **parallel** lines are cut by a transversal, the interior angles on the same side of the transversal are supplementary. | | Alternate Interior Angles  Converse | If two lines are cut by a transversal and the alternate interior angles are congruent, the lines are **parallel**. | | Alternate Exterior Angles Converse | If two lines are cut by a transversal and the alternate exterior angles are congruent, the lines are **parallel.** | | Interiors on Same Side Converse | If two lines are cut by a transversal and the interior angles on the same side of the transversal are supplementary, the lines are **parallel.** | |

**Quadrilaterals:**

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| Parallelograms | **About Sides** | **\*** If a quadrilateral is a parallelogram, the opposite    sides are parallel. **\*** If a quadrilateral is a parallelogram, the opposite    sides are congruent. |
| **About Angles** | **\*** If a quadrilateral is a parallelogram, the opposite    angles are congruent. **\*** If a quadrilateral is a parallelogram, the    consecutive angles are supplementary. |
| **About Diagonals** | **\*** If a quadrilateral is a parallelogram, the diagonals    bisect each other. **\*** If a quadrilateral is a parallelogram, the diagonals    form two congruent triangles. |
| Parallelogram Converses | **About Sides** | **\*** If both pairs of opposite sides of a quadrilateral    are parallel, the quadrilateral is a parallelogram. **\*** If both pairs of opposite sides of a quadrilateral    are congruent, the quadrilateral is a    parallelogram. |
| **About Angles** | **\*** If both pairs of opposite angles of a quadrilateral    are congruent, the quadrilateral is a     parallelogram. **\*** If the consecutive angles of a quadrilateral are  supplementary, the quadrilateral is a parallelogram. |
| **About Diagonals** | **\*** If the diagonals of a quadrilateral bisect each    other, the quadrilateral is a     parallelogram. **\*** If the diagonals of a quadrilateral form two    congruent triangles, the quadrilateral is a    parallelogram. |
| Parallelogram | If one pair of sides of a quadrilateral is BOTH parallel and congruent, the quadrilateral is a parallelogram. | |
| Rectangle | If a parallelogram has one right angle it is a rectangle | |
| A parallelogram is a rectangle if and only if its diagonals are congruent. | |
| A rectangle is a parallelogram with four right angles. | |
| Rhombus | A rhombus is a parallelogram with four congruent sides. | |
| If a parallelogram has two consecutive sides congruent, it is a rhombus. | |
| A parallelogram is a rhombus if and only if each diagonal bisects a pair of opposite angles. | |
| A parallelogram is a rhombus if and only if the diagonals are perpendicular. | |
| Square | A square is a parallelogram with four congruent sides and four right angles. | |
| A quadrilateral is a square if and only if it is a rhombus and a rectangle. | |
| Trapezoid | A trapezoid is a quadrilateral with exactly one pair of parallel sides. | |
| Isosceles Trapezoid | An isosceles trapezoid is a trapezoid with congruent legs. | |
| A trapezoid is isosceles if and only if the base angles are congruent | |
| A trapezoid is isosceles if and only if the diagonals are congruent | |
| If a trapezoid is isosceles, the opposite angles are supplementary. | |

**Circles:**

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| Radius | In a circle, a radius perpendicular to a chord bisects the chord and the arc. |
| In a circle, a radius that bisects a chord is perpendicular to the chord. |
| In a circle, the perpendicular bisector of a chord passes through the center of the circle. |
| If a line is tangent to a circle, it is perpendicular to the radius drawn to the point of tangency. |
| Chords | In a circle, or congruent circles, congruent chords are equidistant from the center. (and converse) |
| In a circle, or congruent circles, congruent chords have congruent arcs. (and converse0 |
| In a circle, parallel chords intercept congruent arcs |
| In the same circle, or congruent circles, congruent central angles have congruent chords (and converse) |
| Tangents | Tangent segments to a circle from the same external point are congruent |
| Arcs | In the same circle, or congruent circles, congruent central angles have congruent arcs. (and converse) |
| Angles | An angle inscribed in a semi-circle is a right angle. |
| In a circle, inscribed angles that intercept the same arc are congruent. |
| The opposite angles in a cyclic quadrilateral are supplementary |
| In a circle, or congruent circles, congruent central angles have congruent arcs. |