# Geometry Final Cheat Sheet

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| Vocabulary | |
|---|---|
| Segment | Part of a line consisting of two end points and the points between them |
| Ray | Part of a line consisting of an end point and all the points to one side |
| Opposite rays | 2 collinear rays with the same endpoint; forms a line |
| Parallel Lines | Coplaner lines that do not intersect |
| Skew Lines | Non-coplaner lines that do not intersect |
| Parallel Planes | Planes that do not intersect |
| Congruent Segments | 2 segments with the same length |
| Midpoint | Point on a segment that divides a segment into 2 congruent segments |
| Angle | Formed by two rays with the same endpoint. |
| Acute Angle | Angle Greater than 0 and less than 90 |
| Right angle | 90 degree angle |
| Obtuse angle | Angle greater than 90 but less than 180 |
| Straight Angle | 180 degree angle |
| Congruent angles | Angles with the same measure |
| Vertical angles | Opposite angles formed by intersecting lines |
| Adjecent angles | 2 coplaner angles that share a common vertex and a common side |
| Complementary angles | 2 angles that add up to 90 degrees |
| Supplementry angles | 2 angles that add up to 180 degrees |
| Conditional | An if/then statement |
| Hypothesis | What follows the If in a conditional |
| Conclusion | What follows the then in a conditional |
| Truth Value | If a conditional is true or false |

| Vocabulary (cont) | |
|---|---|
| Converse | Palendrome of a conditional |
| Biconditional | The combination of a conditional statement and its converse |
| Deductive Reasoning/Logical Thinking | The process of reasoning from a given statement to a conclusion |
| Negation | Opposite of the truth value |
| Inverse | Negates both the hypothesis and the conclusion |
| Contraposotove | Switches the hypothesis and the conclusion and negates both |
| Transversal | A line that intersects 2 or more coplaner lines at distinct points |
| Equiangular Triangle | All angles are congruent |
| Acute Tringle | all angles are acute |
| Right Triangle | one right angle |
| Obtuse Triangle | one obtuse angle |
| Equalateral Triangle | All sides are congruent |
| Isosceles Triangle | 2 congruent sides |
| Scalene Triangle | No congruent sides |
| Exterior angle | Angle formed by a side and an extention of an adjacent side |
| Polygon | A closed plane figure with at least 3 sides that are segments. The sides only intersect at end points, no adjacent sides are congruent |
| Convex Polygons | No "dents" |
| Concave polygon | Has a "dent" or "dents" |
| Equilateral Polygon | a polygon where all sides are congruent |
| Equiangular polygon | a polygon where all angles are congruent |
| regular polygon | a polygon that is both equiangular and equalateral |
| Congruent Polygons | Polygons with congruent corresponding sides and angles |
| Corollary | a statement that follows directly from a theorem |

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| Vocabulary (cont) | |
|---|---|
| Midsegment | a segment that connects the midpoints of 2 sides of a triangle |
| Perpendicular Bisector | a line segment or ray that is perpendicular to a segment through its midpoint |
| Concurrent | When 3 or more lines intersect in one point |
| Point of concurrency | Point where 3 concurrent lines intersect |
| Circumcenter | The point of concurrency of the perpendicular bisectors of a triangle |
| circumscribed circle | circle that passes through all the vertices of a triangle |
| Obtuse Circumcenter | Lies outside the triangle |
| Right Circumcenter | midpoint of the hypotenuse |
| Acute circumcenter | Lies within the triangle |
| Angle Bisector | Ray that divides an angle into to congruent segments |
| Incenter | Point of concurrency of the angle bisectors of a triangle |
| Inscribed Circle | Largest circle contained in a triangle that touches all three sides |
| Median | Segment whose endpoints are a vertex and the midpoint of the opposite side |
| centroid | point of concurrency of the medians; always lies within the triangle |
| Altitude | Height of a triangle |
| Quadrilateral | Polygon with 4 sides |
| Parallelogram | A quadrilateral with 2 pairs of opposite parallel sides |
| Rhombus | Quadrilateral with all sides congruent and 2 pairs of opposite parallel sides |
| Rectangle | Parallelogram with four right angles |
| Square | A parallelogram with four congruent sides and four right angles |

| Vocabulary (cont) | |
|---|---|
| Kite | Quadrilateral with two pairs of adjacent sides congruent and no opposite sides congruent |
| Trapezoid | A quadrilateral with exaclty one pair of parallel sides |
| Isosceles Trapezoid | A trapezoid whose non-parallel sides are congruent |
| Consecutive Angles | Angles of a polygon that share a side; are supplementary |
| Base angles | two angles that share a base of a trapezoid |
| Proportion | a statement that 2 ratios are equal |
| Indirect Measurement | Used to find the lengths of objects that are too difficult to measure directly |
| Vector | any quantity with magnitude (size) and direction |
| Magnitude | Distance from initial point to terminal point |
| Tangent line to a circle | A line on the same plane as a circle that intersects the circle at exactly one point |
| point of tangency | point where a circle and tangent line intersect |
| Apothem | Perpendicular distance from the center of a regular polygon |
| Circle | The set of all points in a plane equidistant to a given point called the center |
| radius | a segment w/ one endpoint at the center and the other in the circle |
| Diameter | a segment that contains the center and has both endpoints on a circle |
| Congruent circles | circles with congruent radii or diameters |
| central angle | an angle whose vertex is the center of the circle |
| Arc | Part of circle |

## Vocabulary (cont)

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|---|---|
| Semi-circle | Half a circle |
| Minor Arc | Smaller than a semi-circle |
| Major arc | Greater than a semi circle |
| adjacent arc | arcs of the same circle that have exactly one point in common |
| Circumference | Perimeter of a circle |
| concentric circles | coplanar circles that share a center |

## All the other crap continued

| | |
|---|---|
| Theorem 12-1 | If a line is tangent to a circle, then the line is perpendicular to the radius drawn to the point of tangency |
| Theorem 12-2 | If a line is in the plane of a circle is a radius at its endpoint on the circle, then the line is tangent to the circle |
| Theorem 12-3 | The two segments tangent to a circle from a point outside the circle are congruent |
| Perimiter of a Square | 4S |
| Area of a Square | $S^2$ |
| Perimiter of a Rectangle/Parallelogram | 2B+2H |
| Area of a Rectangle/Parallelogram | BH |
| Circumference | PiD or 2PiR |
| Area of a Circle | $PiR^2$ |
| Perimiter of a Triangle | S1+S2+S3 |
| Area of a Triangle | .5(b*h) |
| Area of a Trapezoid | .5(b1*b2)h |
| Area of a Rhombus/Kite | .5(d1*d2) |
| Area of Regular Polygons | .5AP |
| Arc Addition Postulate | The whole is equal to the sum of its parts |
| Arc Length | |

## Postulates, Formulas, etc...

| | |
|---|---|
| Ruler Postulate | The points of a line can be put into 1:1 correspondence with the real numbers AB=\|A-B\| |
| Segment addition postulate | If three points (A,B,C) are colliner and B is between A and C, then AB+BC=AC; The whole is equal to te sum of its parts |
| Vertical Angles Theorem | Vertical angles are congruent |
| Law of detachment | If P->Q and P is true, then Q is true |
| Law of syllogism | If P->Q and Q->R are true, then P->R is true |
| Addition Property | A=B, then A+C=B+C |
| Subtraction Property | A=B, then A-C=B-C |
| Multiplication Property | A=B, then A*C*=*B*C |
| Division Property | A=B and C is not 0, then (A/C)=(B/C) |
| Reflexive Property | A=A |
| Symmetric Property | A=B and B=A |
| Transitive Property | A=B and B=C, then A=C |
| Substitution Property | A=B, so B can replace A in equations |
| Distributive property | A(B+C)= AB+AC |
| Congruent Supplements Theorem | If 2 ngles are supplements of the same angle or of congruent angles, then that angles are congruent |
| Congruent Complements Theorem | If 2 angles are complements of the same angle or of congruent angles, then the 2 angles are congruent |
| Right Angle Congruence | All right angles are congruent |
| Corresponding angles are congruent | Implys parallel lines |
| Alternate Interior angles are congruent | Implys parallel lines |
| Same side Interior angles are supplementry | Implys parallel lines |

| Postulates, Formulas, etc... (cont) | |
|---|---|
| Alternate exterior angles are congruent | Implys parallel lines |
| Same side Exterior angles are supplementry | Implys parallel lines |
| If two lines are parallel to the same line | Then they are Parallel |
| If 2 coplaner lines are perpendicular to the same line | then they are parallel |
| Sum of a triangle's angle measures | 180 degrees |
| Triangle exterior angle Theorem | The measure of each exterior angle of a triangle equals the sum of it's two remote exterior angles |
| Degrees in a Quadrilateral | 360 |
| Degrees on a Pentagon | 540 |
| Degrees in a hexagon | 720 |
| Degrees in a octagon | 1080 |
| Theorem 4-1 | If two angles of one triangle are congruent to two angles of another triangle, then they are congruent |
| CPCTC | Corresponding Parts of Congruent Triangles are congruent |
| SSS; Side Side Side | If 3 sides of a triangle are congruent to 3 sides of another triangle, then they are congruent |
| SAS; Side Angle Side | If 2 sides and 1 included angle of a triangle are congruent to the 2 sides and angle of another triangle, then they are congruent |
| ASA; Angle Side Angle | If 2 angles and an included side of a triangle are congruent to 2 angles and included side of another triangle, then they are congruent |

| Postulates, Formulas, etc... (cont) | |
|---|---|
| AAS; Angle Angle Side | If 2 angles and a non-included side of a triangle are congruent to 2 angles and non-included side of another triangle, then they are congruent |
| Isosceles Triangle Theorem | If the 2 sides of a triangle are congruent, then the base angles are congruent |
| Converse Isosceles Triangle Theorem | If the 2 base angles of a triangle are congruent, then the sides are congruent |
| HL; Hypotenuse Leg | If the hypotenuse and a leg of a right triangle are congruent to the hypotenuse and leg of another right triangle, then they are congruent |
| Triangle Midsegment theorem | If a segment joins the midpoints if 2 sides of a triangle, then the segment is parallel to the third side and is half the length |
| Perpendicular Bisector theorem | If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment |
| Converse of the Perpendicular Bisector theorem | If a point is equidistant from the endpoints of a segment, then it is on the perpendicular bisector of the segment |
| Angle Bisector theorem | If a point is on the angle bisector of an angle, then the point is wquidistant to the sides of the angle |
| the converse of the Angle Bisector theorem | If a point in the interior of an angle is equidistant to the sides of the angle, then the point is on the angle bisector |

| Postulates, Formulas, etc... (cont) | |
|---|---|
| Theorem 5-6 | The perpendicular bisectors of the sides of a triangle are concurrent at a point equidistant from the vertices |
| Theorem 5-7 | The Bisectors of the angles of a triangle are concurrent at a point equidistant from the sides |
| Theorem 5-8 | The mediams of a triangle are concurrent at a point that is two thirds the distnce from each vertex to the mid point of the opposite side |
| Theorem 5-9 | The Lines that contain the altitudes of a triangle are concurrent |
| Comparison Property | If A=B+C and C>0, then A>B |
| Distance formula | |
| Midpoint Formula | |
| Slope Intercept Form | Y=Mx+B |
| Standard Form | Ax+By=C |
| Point Slope Form | $Y-Y^1=M(X-X^1)$ |
| Theorem 6-1 | Opposite sides of a parallelogram are congruent |
| Theorem 6-2 | Opposite angles of a parallelogram are congruent |
| Theorem 6-3 | The diagonals of a parallelogram bisect each other |
| Theorem 6-4 | If three or more parallel lines cut off congruent segments on one transversal, then they cut off congruent segments on every transversal |
| Theorem 6-5 | If both pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a parallelogram |
| Theorem 6-6 | If both pairs of opposite angles of a quadrilateral are congruent, then the quadrilateral is a parallelogram |

| Postulates, Formulas, etc... (cont) | |
|---|---|
| Theorem 6-7 | If the diagonals of a quadrilateral bisect each other then the quadrilateral is a parallelogram |
| Theorem 6-8 | if one pair of opposite sides of a quadrilateral are both parallel and congruent, then the quadrilateral is a parallelogram |
| Theorem 6-9 | Each diagonal of a rhombus bisects 2 angles of the rhombus |
| Theorem 6-10 | The diagonals of a rhombus are perpendicular |
| Theorem 6-11 | The Diagonals of a rectangle are congruent |
| Theorem 6-12 | If one diagonal of a parallelogram bisects 2 angles of the parallelogram, then it is a rhombus |
| Theorem 6-13 | If the diagonals of a parallelogram are perpendicular, then it is a rhombus |
| Theorem 6-14 | If the diagonals of a parallelogram are congruent, then the parallelogram is a rectangle |
| Theorem 6-15 | The Base angles of an isosceles trapezoid are congruent |
| theorem 6-16 | Diagonals of an isosceles trapezoid are congruent |
| AA~; angle angle similarity | If 2 angles of one triangle are congruent to 2 angles of another triangle, then they are similar |
| SAS~; Side Angle Side similarity | If an angle of one triangle is congruent to an angle of an angle of a second triangle, and the sides surrounding the angle are propotional, then they are similar |

| Postulates, Formulas, etc... (cont) | |
|---|---|
| SSS~; Side Side Side similarity | If the corresponding sides of two triangles are proportional, then they are similar |
| Theorem 7-3 | The altitude to the hypotenuse of a right triangle divides the triangle into 2 triangles that are similar to the original and eachother |
| Corollary 1 to Theorem 7-3 | The length of the altitude to the hypotenuse of a right triangle is the geometric mean of the lengths of the segments of the hypotenuse |
| Corollary 2 to Theorem 7-3 | The altitude of the hypotenuse of a right triangle separates the hypotenuse so that the length of each leg of the triangle is the geometric mean of the length of the adjacent hypotenuse segment and the length of the hypotenuse |
| Side-Splitter Theorem | If a line is parallel to one side of a triangle and intersects the other two sides, then its divides those sides proportionally |
| Corollary to Side-Splitter | If three parallel lines intersect 2 transversals, then the segments intercepted on the transversals are proportional |
| Theorem 7-5 | If a ray bisects an angle of a triangle, then it divides the opposite side into two segments that are proportional to the other two sides of the triangle |
| Pythagorean Theorem | $A^2+B^2=C^2$ |
| Pythagoren Triples | {3,4,5} {5,12,13} {8,15,17} {7,24,25} |
| $C^2=A^2+B^2$ | Right Triangle |
| $C^2>A^2+B^2$ | Obtuse Triangle |

| Postulates, Formulas, etc... (cont) | |
|---|---|
| $C^2<A^2+B^2$ | Acute Triangle |
| 45-45-90 Triangle | In a 45-45-90 triangle, both legs are congruent and the length of the hypotenuse is square root of 2 times the length of a leg |
| 30-60-90 Triangle | The Hypotenuse is double the length of the shortest leg and the length of the longer leg is square root of 3 times the length of the shorter leg |
| Tangent | Opposite/Adjacent |
| Sine | Opposite/Hypotenuse |
| Cosine | Adjacent/Hypotenuse |
| SohCahToa | You know what this means, dummy |

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