**IDX G9 MATH H+ STUDY GUIDE ISSUE 2**

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**(for more information, please see the math h guide)**

**Good luck on your placement for H+!**

**Unit 2 Congruent Triangles**

2.1 Concept and properties of triangles

-triangle angle-sum theorem: in a triangle, the sum of all three angles is 180

-triangle exterior angle theorem: the measure of each exterior angle of a triangle equals the sum of the measures of its two remote interior angles

-corollary to triangle exterior angle theorem: the measure of each exterior angle of a triangle is greater than the measure of any remote interior angle

-triangle exterior angle-sum theorem: the sum of the measure of exterior angles of a triangle is 360°

2.2 Congruent triangles

-congruent figures have the same size and shape, and can exactly fit each other when moved

-congruent figures are produced through translation, rotation, reflection

-denoted as ΔABC ≅ ΔA’B’C’

-Corresponding parts of congruent triangles are congruent (CPCTC)

Triangle Congruences:

-SSS (side-side-side)

-ASA (angle-side-angle)

-AAS (angle-angle-side)

-SAS (side-angle-side)

-HL (hypotenuse-leg)

2.3 Special Triangles

Isosceles triangles

-leg: congruent sides of isosceles triangles

-base: the third side

-vertex angle: formed by two congruent sides

-base angles: formed by the base and a leg

-isosceles triangle theorem: in ΔABC, if AB = AC, then ∠B = ∠C

-converse of isosceles triangle theorem: in ΔABC, if ∠B = ∠C, then AB = AC

-property of isosceles triangles: in an isosceles triangle, the angle bisector of its vertex angle and the perpendicular bisector of its base are the same line

-perpendicular bisector theorem: the point on the perpendicular bisector of a segment is equidistant from the endpoints of the segment

-converse of perpendicular bisector theorem: in a point is equidistant from the endpoints of a segment, then it is on the perpendicular bisector of that segment

Equilateral Triangles

-a triangle with three congruent interior angles

-an isosceles triangle with an interior angle of 60°

-has the same properties of isosceles triangles

Right Triangles

-Pythagorean theorem: in RtΔABC, m∠C = 90,

-hypotenuse is the longest side in ΔABC

-converse of Pythagorean theorem: if , then m∠C = 90

-property of right triangles: in RtΔABC, m∠C = 90. If D is the midpoint of AB, then CD = ½ AB

-30-60-90 right triangles: in RtΔABC, m∠C = 90, if m∠A = 30, them BC = ½ AB, BC:AB:AC = 1:2:

-angle bisector theorem: the point on the angle bisector is equidistant from both sides of the angle

-converse of angle bisector theorem: if a point is equidistant from both sides of the angle, then the point is on the angle bisector

2.4 Inequalities in Triangles

-segment inequality: given three distinct point A, B, C. C is on segment AB.

-triangle inequality: in ΔABC with sides a, b, c,

-corollary to triangle inequality: the perimeter of a triangle is p, the longest side is c,

-determination of the shape of a triangle: given three sides of ΔABC are a, b, c where c is the longest side,

-obtuse:

-right:

-acute:

-relationship between sides and angles in triangles: in ΔABC, ∠A > ∠B if and only if BC > AC

-Hinge theorem: in ΔABC, ΔA’B’C’, if AB = A’B’, BC = B’C’, ∠B > ∠B’, then AC > A’C’

2.5 Centers in Triangles

-concurrent lines: if lines intersect at a point P, they are concurrent lines. P is the point of concurrency

Circumcenter (O)

-the point where perpendicular bisectors of a triangle intersect

-the circumcenter of a triangle is equidistant from three vertices of the triangle

-the circumcenter of a triangle is the center of the circumscribed circle; the radius denoted as R

Incenter (I)

-the point where angle bisectors of a triangle intersect

-the incenter of a triangle is equidistant from three sides of the triangle

-the incenter of a triangle is the center of the inscribed circle; the radius denoted as r

Excenter

-the point where angle bisectors of two exterior angles of a triangle intersect with the angle bisector of the third interior angle

-circle escribed about the triangle

Orthocenter (H)

-the point where altitudes of a triangle intersect

Centroid (G)

-the point where medians of a triangle intersect

-the distance from the centroid to its vertex is two times the distance from the centroid to the midpoint of its corresponding side