Geometry Info Sheet #29

Trapezoids, Triangles, Midsegments, and Inequalities

Definitions

Trapezoid: A quadrilateral with (according to most definitions) exactly one pair of parallel sides

Isosceles Trapezoid: A trapezoid with congruent legs (non-parallel opposite sides)

The **midsegment of a trapezoid** (sometimes called the **median**) is a line segment that connects the midpoints of the two non-parallel sides. A trapezoid has just one midsegment.

Triangle: A closed figure in a plane consisting of three straight sides

The **midsegment of a triangle** is a line segment that connects the midpoints of any two sides of the triangle. Every triangle has three midsegments, which form the **midsegment triangle**.

Theorems

Trapezoid Midsegment Theorem: A midsegment (or median) of a trapezoid is parallel to the two bases of the trapezoid and is half as long as the sum of the lengths of the two bases.

Triangle Midsegment Theorem: A midsegment connecting two sides of a triangle is parallel to the third side of the triangle and is half as long as the third side.

If one side of a triangle is longer than another side, then the angle opposite the longer side is larger than the angle opposite the shorter side.

If one angle of a triangle is larger than another angle, then the side opposite the larger angle is longer than the side opposite the smaller angle.

Triangle Inequality Theorem: The sum of the lengths of any two sides of a triangle is greater than the length of the third side of the triangle.

Hinge Theorem: If two triangles have two sets of congruent sides, then the triangle with the larger included angle will have the larger third side.

Converse of Hinge Theorem: If two triangles have two sets of congruent sides, then the triangle with the larger third side will have the larger included angle.