FM Geometry Vocabulary/Properties/Postulates//Theorems for Chapter 5

Midsegment of a Triangle Rectangle Rhombus Square Trapezoid Kite

Bases and Legs of a Trapezoid Isosceles Trapezoid Midsegment/Median of a Trapezoid

Properties of Parallelograms

Definition: A parallelogram is a quadrilateral with both pairs of opposite sides parallel.

Thrm: Opposite sides of a parallelogram are congruent.
Thrm: Consecutive angles of a parallelogram are supplementary.
Thrm: Opposite angles of a parallelogram are congruent.
Thrm: Diagonals of a parallelogram bisect each other.

Proving Quadrilaterals are Parallelograms

Thrm: If both pairs of opp. sides are congruent, then the quadrilateral is a parallelogram.
Thrm: If one pair of opp. sides is both congruent and parallel, then the quadrilateral is a parallelogram.
Thrm: If all consecutive angles are supplementary, then the quadrilateral is a parallelogram.
Thrm: If both pairs of opposite angles are congruent, then the quadrilateral is a parallelogram.
Thrm: If diagonals bisect each other, then the quadrilateral is a parallelogram.

Using Coordinate Geometry

Parallel lines have the same slope.
Perpendicular lines have opposite reciprocal slopes.

$$m = \frac{\triangle y}{\triangle x} = \frac{y_2 - y_1}{x_2 - x_1}$$

The midpoint of a segment is found by finding the average of the coordinates of its endpoints.

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

The Distance Formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Thrm: If two lines are parallel, then all points on one line are equidistant from the other line.

Thrm: If three parallel lines cut off congruent segments on one transversal, then they cut off congruent segments on every transversal.

Thrm: The line that contains the midpoint of one side of a triangle and is parallel to another side passes through the midpoint of the third side.

Triangle Midsegment Theorem: The midsegment of a triangle is parallel to the third side and half as long as the third side.

Special Parallelograms

Thrm: A parallelogram is a rectangle if and only if its diagonals are congruent.
Thrm: A parallelogram is a rhombus if and only if its diagonals are perpendicular.
Thrm: Each diagonal of a rhombus bisects two angles of the rhombus.
Thrm: The midpoint of the hypotenuse of a right triangle is equidistant from the three vertices.
Thrm: If an angle of a parallelogram is a right angle, then the parallelogram is a rectangle.
Thrm: If two consecutive sides of a parallelogram are congruent, then the parallelogram is a rhombus.

Trapezoids

Thrm: Base angles of an isosceles trapezoid are congruent.
Thrm: Diagonals of an isosceles trapezoid are congruent.

Trapezoid Midsegment Theorem: The midsegment of a trapezoid is parallel to the bases and has a length equal to the average of the base lengths.

Kites

Thrm: The diagonals of a kite are perpendicular.
Thrm: In a kite, one diagonal bisects the other diagonal and two angles.