

Definitions

Diagonal: a segment that connects two non-consecutive vertices of a polygon.

Parallelogram: a quadrilateral with parallel opposite sides.

Equilateral polygon: a polygon in which all the sides are congruent.

Equiangular polygon: a polygon in which all the angles are congruent.

Regular polygon: a polygon which is both equilateral and equiangular.

Rhombus: a parallelogram with congruent sides.

Rectangle: a parallelogram with four right angles.

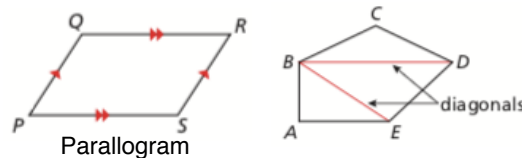
Square: a regular quadrilateral.

Trapezoid: a quadrilateral with exactly one pair of parallel sides.

Bases: the parallel sides of a trapezoid.

Legs: the non-parallel sides of a trapezoid.

Base angles: two consecutive angles of a trapezoid with a common base.



Isosceles trapezoid: a trapezoid with congruent legs.

Midsegment of a trapezoid: the segment that connects the midpoints of a trapezoid's legs.

Kite: a quadrilateral with two pairs of congruent sides, but opposite sides are not congruent.

Theorems and Postulates

- **Polygon Interior Angles Theorem:** The sum of the interior angle measures of a convex n-gon is $(n - 2) * 180$.
- **Polygon Exterior Angles Theorem:** The sum of the exterior angle measures of a convex polygon is 360° .

Parallelogram Theorems

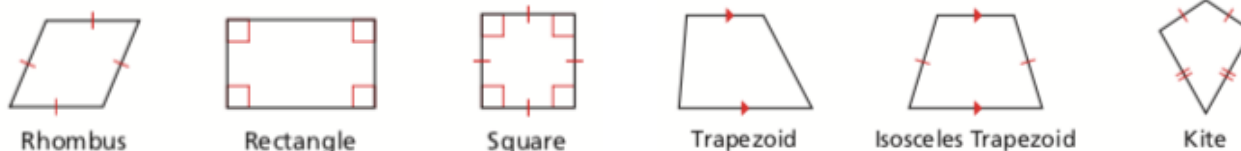
- **Parallelogram Opposite Sides Theorem/Converse:** A quadrilateral is a parallelogram if and only if its opposite sides are congruent.
- **Parallelogram Opposite Angles Theorem/Converse:** A quadrilateral is a parallelogram if and only if its opposite angles are congruent.
- **Parallelogram Consecutive Angles Theorem:** If a quadrilateral is a parallelogram, then its consecutive angles are supplementary.
- **Parallelogram Diagonals Theorem/Converse:** A quadrilateral is a parallelogram if and only if its diagonals bisect each other.
- **Opposite Sides Parallel and Congruent Theorem:** If one pair of opposite sides of a quadrilateral are congruent and parallel, then the quadrilateral is a parallelogram.

Rhombus/Rectangle/Square Theorems

- **Rhombus Corollary:** A quadrilateral is a rhombus if and only if it has four congruent sides.
- **Rectangle Corollary:** A quadrilateral is a rectangle if and only if it has four right angles.
- **Square Corollary:** A quadrilateral is a square if and only if it is a rhombus and a rectangle.
- **Rhombus Diagonals Theorem/Converse:** A parallelogram is a rhombus if and only if its diagonals are perpendicular.
- **Rhombus Opposite Angles Theorem/Converse:** A parallelogram is a rhombus if and only if its diagonals bisect a pair of opposite angles.
- **Rectangle Diagonals Theorem/Converse:** A parallelogram is a rectangle if and only if its diagonals are congruent.

Isosceles and Kite Theorems

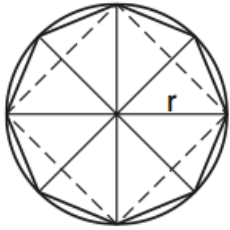
- **Isosceles Trapezoid Base Angles Theorem/Converse:** A trapezoid is isosceles if and only if each pair of base angles is congruent.
- **Isosceles Trapezoid Diagonals Theorem/Converse:** A trapezoid is isosceles if and only if its diagonals are congruent.
- **Trapezoid Midsegment Theorem:** The midsegment of a trapezoid is parallel to each base, and its length is one-half the sum of the lengths of the bases.
- **Kite Diagonals Theorem:** If a quadrilateral is a kite, then its diagonals are perpendicular.
- **Kite Opposite Angles Theorem:** If a quadrilateral is a kite, then exactly one pair of opposite angles are congruent.



Geometry
Big Ideas Chapter 7 Practice Problems
Show all work!!!

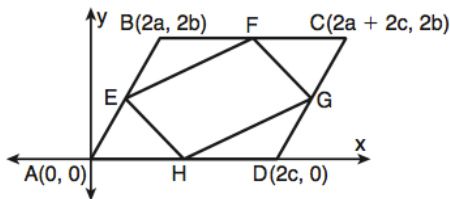
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Date _____ Period _____

1) Any regular polygon can be inscribed in a circle. Find the length of a side of the regular octagon *in terms of* r .



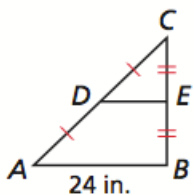
side length of regular octagon = _____

3) Quadrilateral ABCD has midpoints E, F, G, and H. Show that the area of EFGH is half the area of ABCD.



5) The graphs of $y = 2x$, $y = 2x - 5$, and $y = -x$ in the coordinate plane contain three sides of a quadrilateral. Find the equation of the line whose graph contains a segment that can complete the quadrilateral and form a parallelogram.

7) What is the length of the midsegment of trapezoid ADEB in inches?

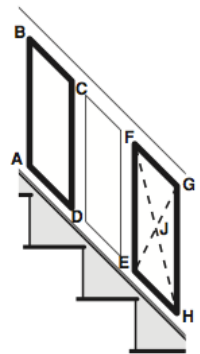


midsegment length = _____

2) A campground site is in the shape of a convex quadrilateral. Three sides of the campground form two right angles. The third interior angle measures 10° less than the fourth angle. Find the measure of each interior angle.

Interior angles = _____

4) In parallelogram EFGH, $FH = 5x$ inches, $EG = (2x+4)$ inches, and $JG = 8$ inches. What is the length of JH?



JH = _____

6) Show that the quadrilateral with vertices $E(-1, 5)$, $F(2, 4)$, $G(0, -3)$, and $H(-3, -2)$ is a parallelogram.

8) Construct a kite such that AC is the segment that connects the congruent angles.