U1 Day 12 - Properties of Parallelograms

- A **parallelogram** is a quadrilateral with both pairs of opposite sides parallel.
- In a quadrilateral, opposite sides do not share a vertex and opposite angles do not share a side.



#1 Opp Sides //

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



#2 – Opp Sides \cong

• If a quadrilateral is a parallelogram, then its opposite sides are congruent.



#3 – Opp Angles ≅

• If a quadrilateral is a parallelogram, then its opposite angles are congruent.

Theorem If a quadrilateral is a parallelogram, then its opposite angles are congruent.





Then . . . $\angle A \cong \angle C$ and $\angle B \cong \angle D$



Def: Consecutive Angles

• Angles of a polygon that share a side are **consecutive angles**.



#4 - Consecutive Angles Supp

• If a quadrilateral is a parallelogram, then its consecutive angles are supplementary.



Using Consecutive Angles

- What is the measure of angle P in parallelogram PQRS?
- A. 26°
- B. 64°
- C. 116°
- D. 126°

 $m \angle P + m \angle S = 180$

$$m \angle P + 64 = 180$$

 $m \angle P = 116^{\circ}$



#5 – Diagonals Bisect

• If a quadrilateral is a parallelogram, then its diagonals **bisect each other.**





For example: Find Lengths

 Solve a system of linear equations to find the values of x and y in parallelogram KLMN. What are KM and LN?



Using Substitution to Find Lengths

$$\overline{KP} \cong \overline{MP}$$
 $\overline{LP} \cong \overline{NP}$
 $y+10=2x-8$ $x=y+2$
 $y+10=2(y+2)-8$
 $y+10=2y+4-8$
 $10=y-4$
 $14=y$
 $x=14+2$
 $x=16$

RECTANGLES

• A rectangle is a parallelogram with:

- 4 Right Angles
- Diagonals \cong



RHOMBUS

• A rhombus is a parallelogram with:

- 4 Congruent sides
- Diagonals \perp

Diagonals bisect <s

SQUARE

• A square is a parallelogram with:

- 4 right angles
- 4 congruent sides
- Diagonals \perp
- Diagonals \cong
- Diagonals bisect <s



KITES

- A 4-sided flat shape with straight sides that:
 - has two pairs of sides.
 - each pair is made of two adjacent sides (they meet) that are equal in length.
- Angles are equal where the pairs meet.
- Diagonals are perpendicular

Trapezoic



- A quadrilateral with exactly one pair of parallel sides.
- The two parallel sides of the trapezoid are called the bases
- The consecutive angles between the bases of the trapezoid are supplementary

Isosceles Trapezoid

- A trapezoid with two congruent legs
- In an isosceles trapezoid the non-parallel sides are congruent
- Both sets of bases angles of an isosceles trapezoid are congruent
- (find one angle you can find them all)
- The diagonal of an isosceles trapezoid are congruent

More Practice!!!!!