# 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.

If...
ABCD isa $\square$


Then ...
$\overline{A B} \cong \overline{C D}$ and $\overline{B C} \cong \overline{D A}$


## \#3 - Opp Angles $\cong$

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

Theovern
Ila quadililetealisa paallelogyam, thenits oppacite amger are conguintit.


Then... $\angle A=\angle C$ and $\angle B \equiv \angle D$


## 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.

Then...


$$
\begin{aligned}
& m \angle A+m \angle B=180 \\
& m \angle B+m \angle C=180 \\
& m \angle C+m \angle D=180 \\
& m \angle D+m \angle A=180
\end{aligned}
$$

## Using Consecutive Angles

- What is the measure of angle P in parallelogram PQRS?
A. $26^{\circ}$
B. $64^{\circ}$
C. $116^{\circ}$
D. $126^{\circ}$

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

$m \angle P+64=180$

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



## \#5 - Diagonals Bisect

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


Then...
$\overline{A E} \cong \overline{C E}$ and $\overline{B E} \cong \overline{D E}$


## 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

$K P \cong M P$
$y+10=2 x-8$
$y+10=2(y+2)-8$

$$
y+10=2 y+4-8
$$

$$
10=y-4
$$

$$
14=y
$$

$$
x=14+2
$$

$$
x=16
$$

## 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!!!!!

