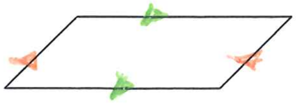
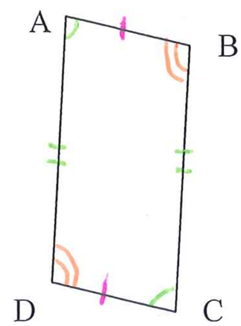
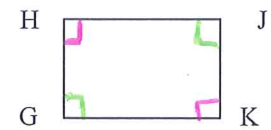
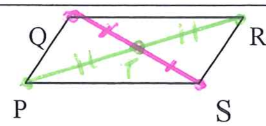
Geometry Notes; Lesson 8.2 Parallelograms Name Key Date ______

GOALS:
- Recognize and apply properties of the sides and angles of parallelograms.
- Recognize and apply properties of the diagonals of parallelograms.

Parallelogram:

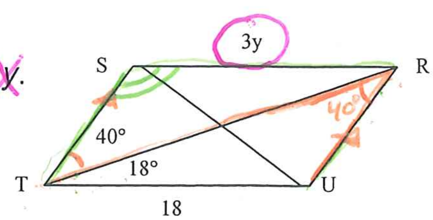


Quadrilateral (4-sides) with two sets of parallel lines

Properties of Parallelograms	**Example**	**Figure**
1. Opp. sides of a ▱ are Congruent.	$\overline{AB} \cong \overline{DC}$ $\overline{AD} \cong \overline{BC}$	
2. Opposite ∠s of a ▱ are Congruent.	$\angle A \cong \angle C$ $\angle D \cong \angle B$	
3. Consecutive ∠s in a ▱ are Supplementary.	$m\angle A + m\angle B = 180°$ $m\angle C + m\angle D = 180°$	
4. If a ▱ has 1 right ∠, it has 4 right ∠s.	If $\angle H = 90°$ Then $\angle G, \angle J, \angle K = 90°$	
5. The diagonals of a ▱ Bisect each other.	$\overline{PT} \cong \overline{TR}$ $\overline{QT} \cong \overline{TS}$	

*Since the diagonals of a parallelogram bisect each other, the intersection point is the Midpoint of each of the diagonals!

Example 1:
RSTU is a parallelogram. Find $m\angle$ URT, $m\angle$ RST, and y.



$\frac{3y}{3} = \frac{18}{3}$

$y = 6$

$m\angle URT = 40°$

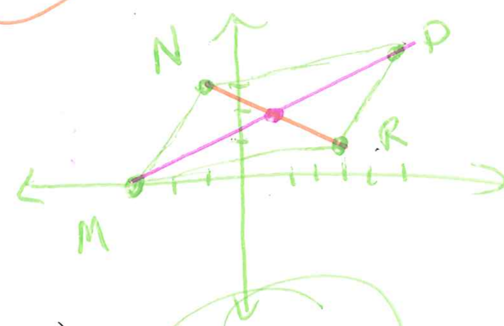
$40° + 18° = 58°$

$58° + m\angle RST = 180°$
$-58° \qquad -58°$

$m\angle RST = 122°$

Example 2:
What are the coordinates of the intersection of the diagonals of parallelogram MNPR, with vertices M(-3,0), N(-1, 3), P(5,4), and R(3,1)? *(Sketch it, making sure the vertices are in order!)*

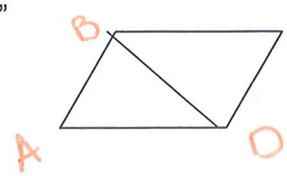
$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$



A) (2,4)   B) $\left(\frac{9}{2},\frac{5}{2}\right)$ C) (1,2)   D) $\left(-2,\frac{3}{2}\right)$

*Test taking tip from the Princeton Review – check your answer – by finding the coordinates of the other midpoint.

Theorem 8.8
Each diagonal of a parallelogram separates the parallelogram into two Congruent triangles.
"Diag. separates ▱ into 2 ≅ Δs."

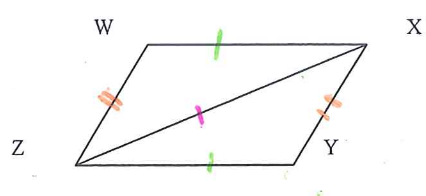


Δ ABD ≅ ΔCBD

Proof of Theorem 8.8:

Given: ▱ WXYZ

Prove: ΔWXZ ≅ ΔYZX



Statements	*Reasons*
1. ▱ WXYZ	1. Given
2. $\overline{WZ} \cong \overline{XY}$	2. opp. sides ▱ are ≅
3. $\overline{WX} \cong \overline{ZY}$	3. Opp. sides ▱ are ≅
4. $\overline{ZX} \cong \overline{ZX}$	4. Reflexive
5. ΔWXZ ≅ ΔYZX	5. SSS postulate